A THESIS

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By

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On

"THE NIGERIAN FILM STUDIOS"

n

JUNE, 1970.

P R E A M B L E

" THE FILM INDUSTRY NIGERIA REQUIRES MUST BE ONE THAT COMBINES OUR ECONOMIC AIMS WITH OUR CULTURAL OBJECTIVES.

IT MUST BE ONE THAT WILL SURVIVE ON ITS ACTIVITIES AND VIRILITY AND RUN AS A PROFITABLE CONCERN; NOT ONE THAT WILL SURVIVE ONLY ON PERENIAL TRANSFUSION FROM GOVERNMENT."

Mr. Ayo OGUNLANDE,
Nigeria's Federal Commissioner for Information
(July 26 1977).

A B S T R A C T

THE NIGERIAN FILM INDUSTRY

A FILM is primarily a dynamic pattern or thythm (achieved by editing and cutting) imported nn nature (the material taken preferably the reality). It is governed PICTORIALLY by the use nf LIGHT and MOVEMENT in; the creation of VISUAL IMAGES and MENTALLY by psychology in the creation of MENTAL IMAGES. Music and synchronised sound, used in this case heighten the emotions of the spectators aurally and subconsciously. This dynamic mental pictorialism is, I claim, the most powerful form of expression available today to a creative artist.

ARRICA imports almost all her films from foreign producers. It is therefore not difficult to grasp the salient fact that the AFRICAN has long been dominated by the infusion of foreign cultural values which have consequently paralysed the active interpretati n of African cultural values into real practical life. AFRICA locks an adequate system of documentation and fact preservation which makes the fluent transfer of old values to the coming generationr; difficult.

The establishment of a FILM INDUSTRY in Nigeria will go a long way to ameliorate the massive importation of foreign films. It will assist in pushing the frontiers of knowledge at a faster rate than now. Politically the masses will become much more involved in government's thinking processes and most important of all, it will ease the preservation and presentation of our culture in all its metamorphic stages to all generations of the world.

My thesis will look into the provision of the various spaces and structures that make the PRODUCTION, DISTRIBUTION AND EXHIBITION of the FILM INDUSTRY possible.

I know from my studies that there is a Universality in the art and technology of the FILM INDUSTRY. As a consequence therefore, the Architecture of the film industry appears to be anonymous i.e. the same solution in America may be acceptable in Europe and the U.S.S.R.

I do not want to be satisfied with this anonymity anyway, hence I am desperately searching for an AFRICAN IMPACT on the Architecture of the FILM INDUSTRY to create a difference since any creation of an architecture which deviates from the present available solution will ultimately catapult the AFRICAN INDENTITY into international circle of a uniquely designed space.

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D E D I C A T I O N

THIS THESIS IS DEDICATED TO:

(a) God for granting me the **Knowlege and strength to** study Architecture;

(b) My PARENTS for their Love and care which sustained me through and

(c) Mrs. E. M. ASALA for teaching me how to read and write.

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TABLE OF CONTENTS

Page

P R E A M B L E .....

A B S T R A C T .....

TITLE PAGE.....

DEDICATION .....

ACKNOWLEDGEMENTS.....

Part ONE

1 - 1 Introduction:.....

1 - 2 The Philosophy and Content of the Film .....

1 - 3 Essential Characteristics of the Film...;.....

1 - 4 Types and Varieties of Film .....

Part Two: ROLE OF FILM IN WORLD HISTORY

2 - 1 The World Perspective of Film Industry.....

2 - 2 Film Industry in Africa .....

2 - 3 The Development of Film in Nigeria .....

Part Three: FILM PRODUCTION

3 - 1 I N T R O D U C T I O N .....

3 - 2 Initial Planning of A Film .....

3 - 3 THE FILM PRODUCTION TEAM .....

3 - 4 The Film Studio .....

3 - 5 Elements of Film Production.....

Part Four: FILM PROCESSING

4 - 1 The Film Processing Laboratory.....

4 - 2 The Process of Film Development.....

4 - 3 The Film Printing Process.....

4 - 4 The Film Cutting Room .....

Part Five: SOUND RECORDING

5 - 1 SOUND DEPARTMENT .....

5 - 2 Sound Recording and Production Techniques.....

5 - 3 MUSIC EDITING .....

5 - 4 SOUND EFFECTS.....

5 - 5 SOUND DUBBING .....

Part Six: FINAL STAGE

6 - 1 The Irreplaceable Negative.....

6 - 2 Foreign Versions of Film Produced .....

6 - 3 FILM STORAGE .....

6 - 4 FINAL RESPONSIBILITIES .....

Part Seven: SPECIAL STUDIES

7 - 1 Acoustical Phenomena in Closed Spaces .....

7 - 2 Sound Absorbing Materials and Construction.....

7 - 3 Acoustic Design of Studios .....

7 - 4 Sound Insulating Construction .....

7 - 5 Ventilation of Studios .....

7 - 6 LIGHTING OF STUDIOS .....

7 - 7 WASTE DISPOSAL .....

Part Eight: THE ARCHITECTURAL DESIGN

8 - 1 The Architecture of Film Studio .....

8 - 2 THE BRIEF .....

8 - 3 THE SITE .....

8 - 4 Examples of Some Film Studios .....

8 - 5 Design Concept and Process .....

PART ONE

INTRODUCTION

The Film Industry is "An Industry that is Sustained by Forceful and Imaginative Business Acumen and by a Supply of Creative Talent and Glamour of all Varieties".

- From Oxford Companion
to Film

edited by Liz - Anne Bawden.

1-1. I N T R O D U C T I O N

Of all the media of Mass Communication, the motion picture has perhaps the most universal appeal and impact. Properly conceived and executed, a film can rise above the limitations of language and cultural barriers by the power of its visual images, its use of music and sound, effects, and can succeed in conveying much the same message to audiences of heterogenous backgrounds.

The ubiquitous presence of film in cultures the world over, and the dominance of a few film-makers and distributors, have almost guaranteed that what many people know about other places is learnt, at the cinema through film.

The film has become the most potent weapon by which the identity and character of a nation (her image, culture, peculiar sound, aspirations and achievements) are impressed on the mind of her people. It is accepted as the most powerful method of communication because of its ability to combine sound and vision and create psychological identification between the audience and the Screen Character.

As a Veritable Vehicle for furthering progress and natural development through its ability to persuade, convince, convert and reshape opinion, it is widely acclaimed as a medium for enlightenment and education. The film will assist us in the struggle to free Nigeria and Africa mentally, physically and economically from the shackles of foreign domination through the establishment of a Virile Film Industry.

Apart from the popularization, renaissance and preservation in Celluloide form at least, of Nigerian cultures in Africa and abroad, making film in Nigeria will create job opportunities for film makers and also create auxilliary industries as:-

i. it will sell newspapers and magazines which will write about actors and actresses and films
ii. it will sell manufactured goods at home and abroad
iii. it will create increased import and export trade and make money at home and abroad.

Though Nigeria has trained Film Technicians she still has to send her filmed materials to foreign laboratories at some loss in foreign exchange because facilities for the development and processing of films are virtually non-existent.

Inspite of its reputed characteristics however, film is the least developed of the mass media in Nigeria. It has been neglected by all the governments of Nigeria, paradoxically it was probably more deliberately exploited by the colonial administrations than by any other government. The ECONOMIC, TECHNICAL and SOCIAL INFRASTRUCTURES which support the growth of the Film Industry to a point of becoming self-sustaining have so far not emerged in any significant form in Nigeria.

In this Thesis our examination of the reason behind this curious state of affairs has been made while suggestions of ways for eliminating the neglect of the Film medium as well as a proposal for the strategies for the creation of a dynamic and virile FILM INDUSTRY compartible with Nigeria's economic and cultural conditions have been made.

Above all a specific translation of the suggested moves has been made into a physical reality by the proposal of an ARCHITECTURAL POSSIBILITY of the NIGERIAN FILM INDUSTRY.

1-2 THE PHILOSOPHY AND CONTENT OF THE MOTION PICTURE (THE FILM)

All art, whether painting, sculpture, music, poetry, drama or FILM, has at the base the same motive, which may be said to be the creation of a work in the presence of which an observer or listener will experience either pleasure or pain as the mood of the work demands.(1) A remarkably effective medium in conveying drama and especially in the evocation of emotions, motion pictures consist of the projection of luminous moving images onto a screen.

The art of the motion picture is exceedingly complex, requiring contributions from nearly all of the other arts as well as countless technical skills. Nonetheless, probably no other art has proliferated as much in the 20th Century nor can any other equal it in popularity or influence.

1-3 ESSENTIAL CHARACTERISTICS OF MOTION PICTURES

In its short history, the art of motion pictures has frequently undergone changes that seemed fundamental, such as that resulting from the introduction of sound. It exists today in styles that differ significantly from country to country and in forms as diverse as the documentary created by one man with a hand-held camera and the multi-million-dollar "epic"(2), involving hundreds of performers and technicians. Despite its diversity, however, an essential unchanging nature can be discerned in most of its manifestations.

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(1) From FILM TILL NOW (Page 334)
A Survey of World Cinema by Rotha and Richard Griffith.

(2) An "Epic" means a Feature Length Film

A number of factors immediately come to mind in connection with the motion picture experience. For one thing, there is something mildly hypnotic about the illusion of movement that holds the attention and may even lower critical resistance. Also, the accuracy of the motion picture image is compelling because it is made by a non-human, scientific process. And, the MOTION PICTURE gives what has been called a strong sense of being present; the film image always appears to be in the present tense. There is also the concrete nature of film; it appears to show actual people and things.

No less important than any of the above are the conditions under which the motion picture ideally is seen, where everything helps to dominate the spectator. He is taken from his everyday environment, partially isolated from others, and prevents comparison of the image on the screen with the objects or people around him. For a while, he lives in the world the motion picture unfolds before him.

The philosophy and content of the MOTION PICTURE can be divided into those characteristics that:-

i. pertain primarily to the motion picture image

ii. pertain to motion pictures as unique medium for works of art

iii. derive from the experience of viewing motion pictures.

1-3.1 QUALITIES OF THE FILM IMAGE

The primary unit of expression in film is THE IMAGE, or the single shot.

The attribution of magical properties to images has a long history, this association is well documented among primitive peoples, and it is even reflected in the term magic lantern as a Synonym for the film projector. Any image taken out of the everyday world and projected onto a screen to some extent appears to become magically transmitted.

(A) INTENSITY, INTIMACY, UBIQUITY

One critic singled out the qualities of intensity, intimacy and ubiquity as the salient characteristics of the motion picture image. It's intensity derives from its power to hold the complete attention of the spectator on whatever bit of reality is being shown. Outside the theatre, a person's attention is usually dispersed in the endless reality around him except for sporadic moments of concentration on which he selects for closer scrutiny.

In the Cinema, he is compelled to look at something that not always appear immediately apparent. This quality of intensity becomes most noticeable when the camera remains fixed on something for a longer time that seems warranted, and the spectator gradually becomes acutely conscious of his loss of Volition over his own attention.

The Intimacy of the Film image is related to the camera's ability to see things in greater detail than the eye can. This ability is demonstrated in long-distance shots through a telephoto lens as well as in close-ups.

The impression of Ubiquity - being everywhere at once - is achieved in part by the camera's apparent freedom to move from place or to approach or withdraw instantaneously. No less important to this illusion of ubiquity is the effect achieved by editing, which allows countless images representing a long, elaborate actions, to be presented in a comparatively short film.

When a film appears to be charged with emotion, it is usually because the director has carefully manipulated the images to give this illusion. In everyday life, the eyes follow the mind; in the cinema the mind follows the eyes.(1)

1-3.2 CHARACTERISTICS OF THE MEDIUM

Four characteristics may be stressed as factors that differentiate the motion picture medium, either in degree or in kind, from other media for works of art:-

i. LUMINOSITY

ii. REALISM

iii. MOVEMENT

and iv. MONTAGE.

i. LUMINOSITY

The intense brightness of the picture projected by powerful light unto the screen in iself transforms the most mundance element of reality. The appeal of a luminous picture is attested by efforts of advertisers to achieve luminous effects in posters and displays and in the popularity of viewing still photographs as transparencies rather than as ordinary prints. The luminosity of the motion picture image also results in a considerable range of tone, between the brightest highlight and the deepest black. Both in black and white and in colour films, the most delicate gradations in the image are therefore possible.

ii. REALISM

Another essential characteristic of the film image is that it gives an impression of reality. Whether in a drama enacted expressly for the camera, or in a documentary film of an event at which the camera just happened to be present, this feeling of realism deriving from motion picture photography accounts for much

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(1) From THE ART OF MOTION PICTURES (Encyclopeadia Britanica Volume 12 Page 498).

of the force of motion pictures. Animated films, which lack this element of photographic realism, tend to be taken much less seriously by adults.

The attempt of the motion picture to reproduce three-dimensional reality on a flat screen presents the same problems and opportunities that are encountered in still photography and in painting. Like still photography, cinematography tends to exaggerate perspective, so that effects of great depth with dramatic contrasts between foreground and background are possible.

iii. MOVEMENT

As a feature of the motion picture, movement is so obvious that its central importance is sometimes forgotten. As has been noted above, the motion picture has much in common with the graphic arts. The added dimension of movement transforms it, allowing it to unfold a narrative or a drama in time, in a way no other graphic art can.

Both in film making and in film appreciation movement must constantly be borne in mind; composition in the motion picture is kinetic rather than static. It is not a simple colour but the cumulative effect that matters, not a single situation but a developing plot. The composition within any frame,(1) or expossure of a motion picture is less important than the relationship of that frame to those that precede and follow it.

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(1) Frame means the indwidual picture on a Strip of Film.

1-4 TYPES AND VARIETIES OF MOTION PICTURE

Motion Pictures today are produced in many styles on a variety of subjects and in several widths. Until the advent of Cinerama in 1952, 35mm conveniently described the standard film width for theatrical exhibition; 16mm film dominated the non-theatrical field, and 8mm was favoured by amateurs. This distinction is no longer altogether valid. Various wide-screen processes, such as Todd-AO and Ultra Panavision use 65mm and 70mm strips of celluloid.

The situation is further complicated by the growing practice of reprinting these films in 35mm CinemaScope for subsequent engagements. Similarly, improved projection equipment has enabled 16mm film to be introduced into the theatrical field, for example, cinema houses occasionally book an experimental 16mm short film. With the recent addition of sound tracks to low-cost 8mm film, this previously substandard form is suddenly making important strides in the educational market. Width is becoming more a matter of choice whereas length and content now provide more meaningful criteria for categorizing motion pictures.

With this two main groupings of films could be made:

i. FEATURE-LENGTH FILMS

ii. SHORT FILMS.

1-4.1 FEATURE-LENGTH FILMS

A Feature-length film, by convention is a film that runs for one hour or more. Today, a feature runs a bare minimum of eighty minutes, and the average one is just two hours. However the Industry's "Specials" may run for three or four hours.

Most Feature-length films are FICTIONAL and are made for purely entertainment purposes. In this category are DRAMAS, MELODRAMAS, ROMANCES, MUSICALS, MYSTERIES, COMEDIES, and frequently combinations of these.

Feature-length entertainment films are performed by professional actors and are produced by or for a major studio. They are frequently based on well-known novels or plays, for producers today prefer the comparative safety of working with pretested materials. The number of "originals" written specifically for the screen has drastically declined.

1-4.1a THE DOCUMENTARY FILMS

This was originally a purely informational type of film. It has however become tinged with entertainment elements and has been prepared for theatrical feature release. Documentaries rarely use actors (except perhaps as offscreen narrators), and they never use studio sets, authenticity is their greatest virtue. During the World War II, when the public was particularly eager for information many significant documentary feature films came to the screen. They were government sponsored and answered a specific need at a specific time.

1-4.1b ANIMATED CARTOON AND PUPPET FEATURES

The Russians inaugurated the puppet feature film in 1934.(1) It is usually a clever blending of live action and stop-motion puppetry. This technique has been pursued with considerable ingennity since World War II by Jiri Trnka in Czechoslovakia and by George Pal in the United States. American puppet work is generally incorporated into live-action films, often science - fiction stories, in which the three-dimensional figures assume fantastic shapes.

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(1) Colliers Encyclopeadia Volume 16 Page 609.

1-4.2 SHORT SUBJECTS

At one time every major studio has its own active shorts department lurily turning out one-and-two-reel comedies, travelogues, novelties, sport reels, and even dramatic featurettes. In addition most studios had a cartoon and news reel affiliation Mounting costs, however, have made these short subjects a luxury that the industry can no longer afford. The incessant lengthening of feature films has absorbed most of the available screen time, thus eliminating the need for short films.

Newsreels are no longer in great demand in the Cinema theatres. Television news reports and specials have replaced thus once-popular form of the film.

1-4.3a THE CARTOON FILM

The term 'cartoon' is used to describe films made from drawings; cartoon technique is widely used for instructional, educational and propaganda purposes as well as for the humorous film. Although the origin of the cartoon film, about 1900, is commonly attributed to Georges Melies, actually R.W.Paul appears to be entitled to equal credit.

In making a cartoon film a series of key drawings is first expanded; from each an "animator"(1) produces a series of drawings of the characters, representing various phases of the action. The animation is completed by "in-betweeners" preparing a drawing for each frame of film. These drawings are traced upon sheets of thin celluloid known as "cells" and for a coloured cartoon are painted on the reverse side. Other artists make drawings of the backgrounds. These drawings are registered by means of pegs fitting into holes. The cartoon "gallows" has similar pegs on which are placed first the background drawing, next a cell (perhaps of a motor-car), then a cell representing the body of a character and yet

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(1) Those who Lay out the Sequence of action and draw the key movements in an animated film are called ANIMATORS.

another cell for one particular position of his arm. By this means a single drawing may serve another drawing of the body of a whole sequence: another drawing of the body of a character may serve for a number of frames, movements of the limbs or features being affected simply by changing the upper cell.

In cartoon gallows, a set of drawings is registered, a frame of film is exposed and then the top cell is changed to portray some small movement, and the next frame of film is exposed, and so on.

A development of cartoon animation is model animation, in which simple objects or puppets are animated by frame-by-frame exposure. Sound may be recorded before or after the picture is produced. In either case, synchronism is assured by the preparation of an elaborate chart which indicates the individual frame of film corresponding to each beat of music or each syllable of speech. Puppets operated by strings are increasingly used for television films; movement of the lips in synchronism with the dialogue is effected electronically.

1-4.4 CLASSIFICATION FILMS

Films are usually classified as follows:-

'U' Films = "UNIVERSAL", suitable for all

'A' Films = Suitable for ADULTS with CHILDREN under Sixteen admitted only if accompanied by an adult

'X' Films = ADULTS only, with no one under Sixteen admitted under any circumstances.

P A R T T W O

PRESENT ROLE OF FILM IN WORLD HISTORY

The Film should not be used Mainly for Entertainment alone for "To have exploited so great a scientific invention for the purpose and pursuit of entertainment alone would have been a prostitution of its powers and an insult to the character and intelligence of the people".

- Reith Lectures

B.B.C London, 1967.

2.1 THE WORLD PERSPECTIVE OF THE FILM INDUSTRY

The world film pattern in the 70's is markedly different from the pattern for the other media. Some 50 countries are regularly producing feature-length entertainment films (in all, around 4000 in a year)(1) and the rest of the world depends on them for supply. Eight countries in Africa have recently produced their first feature-length films. Film Production, Distribution and Exhibition are usually run by private commercial enterprises with the exception of the following countries.

EASTERN EUROPE

U. S. S. R.

CUBA

PEOPLE'S REPUBLIC OF CHINA

DEMOCRATIC PEOPLES REPUBLIC OF KOREA

In a dozen or so countries (9 of which are in Western Europe, the state, for cultural and economic reasons gives financial and other concrete assistance to private commercial production.

The 2 largest producing countries of the world are Asian:

1. INDIA
2. JAPAN.

In 1965, Japan produced nearly 900 and was by far the largest producer even of feature films.

4 Asian Countries:

i. THE REPUBLIC OF KOREA,

ii. THE DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA

iii. THE PHILLIPINES

iv. HONG KONG,

produce between 100 - 200 films a year while 3 others produce more than 50 and 7 others produce from 5 - 30 films each.

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(1) From UNESCO'S publication on World MASS Communication.

No figures are available for the People's Republic of China later than 1964 when the number of Feature Films produced was reported to have been well over 400.

Asian Feature Films are produced essentially for domestic exhibition, most Asian countries have large numbers of Cinema theatres and high Cinema attendances, although attendances, as in almost all countries in the world, are small in relation to the total pupulation and are predominantly urban. Only a small number of films produced in Asia reach audiences outside the continent - these are shown in Europe and North America, usually in a limited number of cinemas specializing in foreign films.

The 3 largest Feature - Film producing countries outside Asia, producing between 200 - 300 films a year are:

ITALY

U. S. A.

U. S. S. R.

In the U. S. A. production which had dropped from 400 to 140 in 1961 had risen to 280 in 1971.

Next in output producing between 100 - 200 come:

FRANCE

THE FEDERAL REPUBLIC OF GERMANY

GREECE

SPAIN

TURKEY IN EUROPE

CENTRAL AMERICA

MEXICO

Then come the

UNITED KINGDOM (90)

EGYPT (60)

BRAZIL (50)

CZECHOSLOVAKIA (50)

Besides the countries in Asia already referred to, 12 countries including

ARGENTINA produce between 10 & 30 while another 10 including 2 SPANISH - speaking countries produce around 5.

Half of the 28 countries producing less than 30 films have languages peculiar to themselves which means that except for occasional outstanding ones, their films are rarely shown in other countries.

In all, 17 Asian countries produce more than half the world Feature-length entertainment films. 24 European countries and the U.S.S.R. produce about a third. The rest are produced by 10 countries notably the U.S.A., MEXICO, EGYPT and BRAZIL.

The numbers of cinemas, cinema seats and annual cinema attendances in Asia are increasing whereas in most of the rest of the world they now seem to be more or less stable at much lower figures than 10 years ago. Even so, in 7 Western European countries the number of cinema's range from 1000 in GREECE to over 10,000 in ITALY and in 5 Eastern European countries from 2,800 in POLAND to over 6000 in ROMANIA. In the U.S.S.R., the number of cinemas and halls in which films are regularly shown has increased by 50% to 147,000 and attendances by 30%.

The world distribution pattern is largely determined by language (and it has been so since the coming of sound). Dubbing or subtitling is expensive and is now obligatory in a number of countries for films which are widely released.

Cultural affinities as well as political and commercial ties, also affect the pattern. Thus, Chinese language films are distributed in many Asian countries which have large Chinese population, but other Asian-Language films are largely confined to their country of origin.

American Films are the most widely distributed foreign films in most Asian countries. Indeed, English-language films, and predominantly those of American origin, occupy a very large part of screen time in almost all countries except the U.S.S.R., the countries of Eastern Europe, the People's Republic of China, India and a few others.

The distribution of the great majority of Russian language films is limited to the U.S.S.R. and other countries with similar economic, social and cultural system. The U.S.S.R. imports around 100 films a year from a wide range of countries. The 20 or so Spanish Language Countries receive Spanish Language films; the 3 regularly producing them are: MEXICO, SPAIN and ARGENTINA.

Arabic Speaking Countries are almost entirely dependent on EGYPT, although in the coming years:

ALGERIA

MOROCCO

TUNISIA

LEBANON

may increase the supply. The Spanish and Arabic Speaking Countries, because of Latin Cultural affinities and other ties and contacts, import a number of French and Italian films.

Similar consideration of language and colonial history affect the import of films in the different countries of Africa.

The U.S.A. imports films from many countries notably:

UNITED KINGDOM

FRANCE

and ITALY, but often only for distribution to the increasing number of small specialized cinemas. To enhance the possibilities of wider international distribution and hence to offset costs, and occasionally for artistic reasons also, producers in several larger film making countries are increasingly resorting to co-production enterprises in other countries; the major co-producers in some cases to the extent of almost half their total production are: FRANCE, ITALY, SPAIN AND UNITED KINGDOM particularly with the U.S.A.

The vast majority of feature-length films produced in almost all countries are dramatized fictional films designed for showing in public cinemas where people pay to be entertained. Other kinds of films:-

NEWSREELS

DOCUMENTARIES

ENTERTAINMENT FILMS e.g. Animated Cartoons which have almost disappeared from the public screens in most countries. In Nigeria, these still feature on the Television programmes.

But thousands of Documentaries and Educational films are produced every year, not only in countries where feature films are produced but in many others as well. They are produced for television or for showing in Schools and other educational Institutions.

In many countries where there is commercial feature film production by private enterpises, and also in some countries where there is none, there are government film services and autonomous public film boards producing and distributing such films and even exhibiting them, by means of mobile units in Schools, Community halls, Libraries, Museums, etc. These films are seen by tens of thousands of small audiences of School Children and Students of all kinds, industrial workers and farmers, Scientists, doctors and other professional workers and by general community audiences seeking information and instruction. Many of the films are diffused by Television organisation during hours devoted to educational programmes.

It seems likely that it will be via the Television in different forms rather than by means of film projection installed in Schools, etc. that the use of films for educational and instructional purposes will be extended and developed to its full potential. Exchanges and co-production of educational films are developing. In these various ways the film continues to be used deliberately to spread information, education and culture to promote understanding among peoples. Films made to entertain people will continue to have powerful influences on how they think and feel and on their knowledge of and attitudes towards other people.

2-1.1 FILM INDUSTRY IN INDIA

India has one of the largest film industries in the world. In 1971, the total number of Nationally produced feature film approved by the censor's board amounted to 433 (with 82 in colour) in 1970, and 324 in 1960.

These were in various languages like Hind, Telegu, Tamil, Malayalam, Kannada, Bengal, Marath and others like Gujarati, Assamese, Tulu, Punjabi, English, Bhojpuri, Maithili, Chattosgarhi, Sundhi, Oriya and KonKani.

Madras and Bombay are the Country's largest production centres with Calcutta in third place. Together, they have some 250 producing companies and over 60 studios, mostly under private commercial ownership.

2-1.2 THE FILM INDUSTRY IN JAPAN

Japan has been one of the world's leading feature-film producers. Production rose from 549 feature titles in 1960 to 893 in 1965 and has gradually declined to 390 in 1972. About half of these are made by 5 major producing companies and the remainder by independent producers. Some 1450 short films, including 856 documentaries, 541 instructional and 57 entertainment, were produced in 1972. There are about 190 companies producing educational and industrial documentaries.

Of the 283 feature films imported in 1972, 138 came from the U.S.A., 33 from FRANCE, 31 from the U.K., 30 from ITALY, 27 from the FEDERAL REPUBLIC OF GERMANY, 9 from U.S.S.R., 6 from SWEDEN and 9 from 7 other countries.

Annual cinema attendance which totalled 1014 million in 1960, had declined to little more than a sixth of that figure in 1972. Over the same period, the number of cinema (7200 in 1960) dropped by more than 60%. About 60% of all cinemas show Japanese films and 24% imported films, while the remainder present both Japanese and foreign film.

The usual programme consists of two features and one newsreel.

SUMMARY

# of CINEMAS Fixed	2,673
Total Seating Capacity	1,249,000
Seats per 1000 people	12
Total annual attendance	187,000,000
Annual Visits per Capita	2

2-1.3 THE FILM INDUSTRY IN CHINA

The Ministry of Culture's Film Administration Bureau has two main divisions - one concerned with film production and processing, and the other with distribution and exhibition - both of which are represented at provincial and municipal levels.

Production in 1964, from the 7 major and numerous smaller studios totalled 480 feature films, 3000 newsreels, 1400 Scientific films and over 200 Cartoons, many of which are shown on the television. No figures are available for years later than 1964, but it is reported that film production has since been greatly reduced.

The largest audiences are reached by mobile projection teams that travel from village to village in every administrative area of the country. In 1964, there were 12,000 such teams, in addition to 4000 films clubs and over 2000 fixed cinemas.

2-1.4 THE FILM INDUSTRY IN THE UNITED KINGDOM

The British Film Industry's facilities include 16 main studios and 10 major processing laboratories. Direct government encouragement to the industry consists of:

a. a regulation requiring that 30% of first feature films shown are British made.

b. a levy on cinema admission which goes towards British production costs,

c. aid from the National Film Finance Corporation for the production of export films.

In addition the British Film Institute, founded in 1933, receives an annual government grant which is meant:

"to encourage the development of the art of the film, to promote its use as a record of contemporary life and manners and to foster public appreciation and study of it from these points of view" (1)

These objectives were extended in 1961 to foster study and appreciation of films for television and television programmes generally and to encourage the best use of television.

The Institute's activities, fall broadly into three main divisions:

i. A National film Archive which is maintained to acquire and preserve important films.

ii. An educational department which provides lectures and other services to Societies, Schools and Colleges running film courses.

iii. In London, the institute assists the maintenance of cinemas devoted to showing films of high quality.

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(1) UNESCOS publication on World MASS Communication.

British-made Feature films continue to draw the largest Cinema audiences in the U. K. Full length feature films registered in 1972 with the Board of Trade, which through its Film's branch, is responsible for the commercial and Industrial aspects of the film industry in Britain, totalled 80 as compared with 79 in 1960. However against these encouraging figures must be set the fact that over half the features produced in recent years have been either fully or partly financed from U.S.A. sources and, also, that if medium length features and short films are taken into consideration (production of the latter having dropped from 315 to 108 titles since 1960) the industry is not really gaining ground.

In ten years, the number of Cinemas has halved while annual attendances have dropped by over 60% from 502 million to 193 million reducing the number of annual visits per capita from 9.5 to 3.2. At the same time, ownership of Cinemas has been concentrated so that now the chains owned by two major companies constitute almost half the cinemas in the country. Among successful innovation, are the installation of automatic projection units and the building of several smaller studio-cinemas in place of one large cinema. Cinema-goers are now younger than they were - 75% of admission in the recent years are estimated to have been of persons under 35 years of age.

Film societies are found throughout the country, 600 of these with 120,000 numbers being grouped in the British Federation of Film Societies. Such Societies along with Schools and other institutions draw on the resources of film libraries like those of the British Film Institute, the Central Office of Information the Children.

Film Foundation, the Educational Foundation for Visual Aids. etc.

SUMMARY:

House of Cinemas Fixed	1,482
Total Seating Capacity	1,381,261
Seats per 1000 people	25
Total annual attendance	176,000,000
Annual Visits per Capita	3

2-1.5 THE FILM INDUSTRY IN THE UNITED STATES OF AMERICA

Feature-film production in the United States has remained fairly stable at around 280 titles annual over the last few years. In 1971, of the 531 features approved by the code administration of the Motion Picture Association of America (MDAA) 284 were domestically produced as compared with 142 titles in 1961 when the industry was most heavily hit by the rise of television. This recovery is still some way from the annual domestic production of around 380 features in the late forties. This, of course, is attributable to various factors, including the new film markets opened up by television, the adaptation of cinema theatres for new viewing publics and the trend towards lower-budget production. Some 90% of feature films are now said to be shot on location to offset high studio costs, often in foreign countries affording appreciable economic advantages.

Over 55% of United States film earnings are regularly accounted for by remittances from abroad mainly from the distribution of domestic productions but also from coproductions with foreign film-making interests and from earnings from U.S. - financed enterprises incorporated in other producing countries.

In 1970, the main markets for U.S. film exports (for either cinema or television showing) were CANADA (15% of U.S. export total). THE UK (9%) JAPAN and BRAZIL (each 7%), AUSTRALIA and MEXICO (each 5%), ARGENTINA (4%) and the APARTHEID SOUTH AFRICA (3%).

The total number of persons employed in the domestic film industry is around 200,000, of whom a third are engaged in productions and distributions and two-thirds in cinema theatres and services.

The number of fixed cinemas, which totalled some 19,000 in 1953 (with an annual attendance of over 2,300 million) and then dropped to fewer than 10,000 in 1965, has gradually risen to 14,300 in 1972, of which 4600 are drive-ins (with an average capacity of 562 cars each). Annual attendances, however, have dropped by more than 50% over the last 10 years, though box-office receipts have shown a gradual rise from 989 million dollars in 1967 to around 1250 million dollars in 1971.

The pattern of cinema attendance is changing, the decline in admissions to large downtown cinemas being offset by the growing popularity of smaller suburban establishment, many of which are being built in shopping centres. A large number of these small automated theatres are being planned and built by local enterprises and by larger franchise companies.

About 53% of the country's cinemas are controlled by some 700 circuits operating four or more theatres, while the remainder are in the hands of 6800 individual distributors or companies.

2-1.6 THE HOLLYWOOD

The U.S. film was made in the context of an industrialized studio system. The basis of the studio system was quantity the need to produce over 500 feature films each year for the over 75,000,000 weekly customers who patronized the drains of theatres that the studio corporation itself owned.

The Hollywood was in effect an entertainment factory. Like any factory, its goal was to produce a large number of products of consistent, dependable quality. Also, like any factory, its organizing principle was the division of labour - separate department for writers, performers, technicians, film cutters, publicity men, etc., each of which contributed its piece to the finished whole. A film was not an individual artistic and commercial enterprise but one part of a whole year's output.

FACTS ABOUT HOLLYWOOD BY 1940

No. of FILM PRODUCERS	159
No. of ACTORS	1,753
ACTRESSES	28.6%
ACTORS	71.4%
No. of FILM DIRECTORS	232
No. of SCRIPT-WRITERS	650.

Wiltim all the studio departments were the men in the management who planned the year's production, managed all the budgets, and kept the assembly line flowing.

The introduction of Synchronized Sound with its mechanical difficulties, technical intricacies, and expense, gave even more power to the industrial system that had already existed for a decade.

From 1930 to 1945, the Studio System reigned Supreme in the United States.

That System created a very clear tension between art and commerce. Art defies mass production and assembly lines. Most Hollywood films substitued craft for inspiration and familiar genres for individual conceptions. The director, who could execute a Script with professional polish, on Schedule within the budget, and the Script that fit into one familiar film cycle - the gangster film, the musical, the Western, biography, marital comedy, historical romance - were the studios most valuable Commercial assets. The dominant cinematic style in the studios of the 1930s was clean, bright lighting, along with smooth, junctional editing and unobstrusive Camera work that did not detract from the dialogue, for most studio films were "talkies".

2-1.7 THE STUDIOS

Within the general pattern, the two giant studios: M-G-M- (Metro-Goldwyn-Mayer) and PARAMOUNT, were stylistic and intellectual opposites. M-G-M was a studio with almost dictatorial central control by Louis B. Mayer and Irving Thalberg. PARAMOUNT under Adolph Zukor was a much looser organisation, alc wing individual producers and directors greater freedom. M - G - M was a studio of stars (e.g. Greta Garbo, Jean Harlow, Joan Crawford, Norma Shearer, Judy Garland, Clark Gable, Lionel Barrymore, Mickey Rany, Spencer Tracy) while PARAMOUNT was a studio of directors and writers. (e.g. Ernst Lubitsch, Josef Von Sternberg, Cecil B de Mille, Leo Mc Cavey, Preston Sturges, Billy Wilder, Samson Raphaelson).

In the early 1930s PARAMOUNT was the Iconoclast's haven - the home of Mae West, who ripped up the sentimental clichies of feminity and ramance.of W.C. Fields.

PARAMOUNT permitted the sexual excesses of Von Sternberg and the Sexual SnicVering of Lubitsch. M-G-M on the other hand flattened all excesses into a shiny respectable wholesomeness. When M-G-M inherited the Marx Brothers, it smoothed their chaotic clowning with elaborate production numbers and trite plots. Lubitsch films for M-G-M were heavier, shinier and sweeter than his breezy films for PARAMOUNT. M-G-M gladly Sacrificed Vitality and energy for its glossy, pseudo-elegant style.

None of the other studios was as distinct as these two at the extremes.

2.2 FILM INDUSTRY IN AFRICA

Africa imports almost all her films from foreign producers. It is therefore not difficulty to grasp the salient fact that Africa has long been dominated by the infusion of foreign cultural values which have consequently paralysed the active interpretation of African Cultural values into real practical life.

The life of the African has been submerged and engulfed in foreign failures and successes to such an abysmal extent that to think now independently without making references to foreigners become almost an impossibility. The establishment of a film industry in Nigeria will go along way to ameliorate the massive importation of foreign films, African films produced, no matter how many will have a ready market in Africa. It is not a must that our films must be acceptable in America, Europe or Asia, afterall only a small number of films produced in Asia, reach audiences outside the continent.

The essential thing is that we would have succeeded in teaching ourselves and internalizing our own cultural values, intellectual freedom will come our way and hence independence in both Economic, Social and Educational programmes will ensue.

NO OF FILMS PRODUCED A YEAR BY WORLD'S MAJOR PRODUCING COUNTRIES

COUNTRY	NO OF FILMS PER YEAR
JAPAN	900
PEOPLE'S REPUBLIC OF CHINA	400
ITALY	200
U. S. A.	280
U. S. S. R.	250
FRANCE	150
FEDERAL REPUBLIC OF GERMANY	150
GREECE	150
SPAIN	150
TURKEY	150
CENTRAL AMERICA	150
MEXICO	150
UNITED KINGDOM	90
EGYPT	60
BRAZIL	50
CZECHOSLOVAKIA	50
ARGENTINA	20

SOURCE: UNESCO PUBLICATION ON MASS COMMUNICATION.

2-2.1 THE USE OF THE FILMS BY OTHER LANDS

American Films export American life, culture, foreign policy, commerce and Scientific research. In the field of foreign policy, during the World War II, Hollywood presented an American domination by Force of arms as a 'crusade for freedom' and at the same time, the ultimate purpose of the crusade was larger profits from new markets. So that from the movies, audiences in Lagos or New Delhi, or Camberra are impressed with the wealth, the abundance of various gadgets and modern ways of clothing, or new trends in fashion as typified by the Americans.

The Soviet Union uses the Cinema as the main medium of Commissariat of Education, for the instruction of the people. The primary aim of the Soviet Government therefore is to carry the principles of communism by means of the Cinema, not only throughout Russia, but, to the farthest corners of the World.(1)

The British cherish tradition, and their films portray their people as traditionalists. The films exploit the great writings of William Shakespeare, the institution of the British Monarchy and their Lordship of the Empire.

Germany has used the film medium to show the superiority of her language over any other language. Most foreign films shown in West Germany are first dubbed into German. The only exception is the ALLIED FORCES CINEMA in West Berlin.

In ancient Indian, the idea of drama was inseperably linked with song, dance and music.

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(1) Paul Rotha and Richard Griffith in THE FILM TILL NOW (1963 Edition).

ANALYSIS OF THE FILM INDUSTRY IN AFRICA

Country	Population	No of Gnemas	Total Seating Capacity	Seats Per 100 People	Total Amual Attendance	Annual Visits Per Capit[a]
ALGERIA	15,270,000	Fixed 640	218,758	14	89,323,000	6
ANGOLA	5,430,000	35	28,000	5	2,900,000	0.5
BOTSWANA	690,000	11	3,000	4	, 75,000	0.1
BURUNDI	3,620,000	2	600	0.17	151,500	0.04
CAMEROON	5,840,000	30	20,000	3		
CAPE VERDE ISLANDS	246,000	6	2,700	11	300,000	1
CENTRAL AFRICAN REPUBLIC	1,640,000	8	2,000	1	500,000	0.3
CHAD	3,800,000	9	6,000	2	1,300,000	0.3
COMORO ISLANDS	271,000	4	1,300	5	100,00	0.4
CONGO (PEOPLE'S REPUBLIC)	980,000	24	6,500	7		
DAHOMEY	2,760,000	6	9,000	3	1,211,000	0.4
EGYPT (ARAB REPUBLIC)	34,840,000	246	219,626	6	62,444,000	2
EQUATORIAL GUINEA	290,000	11	6,300	22	500,000	2
ETHIOPIA	25,250,000	30	26,138	1	9,540,370	0.4
FRENCH TERRITORY OF AFARS & THE ISSAS	97,000	8	6,700	69	216,000	2
GABON	500,000	2	1,700	3	385,000	0.8
GAMBIA	375,000	15	?	?	?	?
GHANA	8,858,000	13	14,400	2	1,027,796	0.1
GUINEA	4,010,000	28	10,000	2		
IVORY COAST	4,420,000	88	80,000	1[illegible]	11,500,000	3

Country	Population	No of Cinemas	Total Seating Capacity	Seats Per 100 People	Total Amual Attendance	Annual Visits Per Capit[a]
KENYAN	12,420,000	32	,18,800	2	7,300,000	0.6
LESOTHO	950,000	1	?	?	?	?
LIBERIA	1,571,000	8			825,266	0.5
LIBYA	2,080,000	28	19,100	9	3,400,000	2
MADAGASCAR	6,750,000	43	15,000	2	4,500,000	0.6
MALAWI	4,670,000	13	5,335	1	?	?
MALI	5,260,000	19	17,100	3	2,500,000	0.5
MAURITANA	1,200,000	The first Mauntanion Featune Film was produced around 1970. All the main town have one or more Cinemas, and there are also 6 Mobile projection uluts.				
MAURITIUS & DEPENDENCIES	836,000	53	52,000	62	8,275,000	10
MOROCCO	15,830,000	260	150,000	9	18,200,000	1
MOZAMBIQUE	7,376,000	22	22,000	3	2,500,000	0.3
NAMIBIA	574,000	17	6,600	11	?	?
NIGER	4,210,000	4	3,800	0.9	828,000	0.2
NIGERIA	55,074,000	183	36,800	0.7	68,750,000	1
PORTUGUESE GUINEA	563,000	4	1,500	3	300,000	0.5
REUNION	470,000	20	7,000	15	1,200,000	3
RHODESIA	5,690,000	90	51,443[4]	g[4]	?	?
ST. HELENA &DEPENDENCIES	5,000	1	650	130	25,500	5
RWANDA	3,827,000	4	800	0.2	?	?
SAO TOME & PRINCIPE	70,000	1	1,000	14	105,000	1
SENEGAL	4,022,000	87	50,415	13	5,200,000	1
SEYCHELLES	53,000	2	546	10	150,000	3

Country	Population	No of Gnemas	Total Seating Capacity	Seats Per 100 People	Total Amuel Attendence	Annual Visits Per Capita
SIERRA LEONE	2,600,000	10	5,500	2	122,000	0.04
SOMALIA	2,948,000	26	23,000	8	4,700,000	2
SOUTH AFRICA	22,990,000	685	498,000	22	?	?
SPANISH SAHARA	50,000	4	1,768	35	455,000	9
SUDAN	16,490,000	52	04,000	5	16,000,000	1
SWAZILAND	430,000	2	800	2	100,000	0.2
TANZANIA	14,000,000	36	14,500	1	5,000,000	0.4
TOGO	2,022,000	4	2,000	1	600,000	0.3
TUNISIA	5,137,000	104	44,800	9	8,500,000	2
UGANDA	10,460,000	17	1,600	1	2,000,000	0.2
UPPER VOLTA	5,491,000	6	2,000	0.3	1,000,000	0.2
ZAIRE	22,480,000	57	17,000	0.8	1,100,000	0.05
ZAMBIA	4,520,000	29	13,359	3	?	?

That was why in Bombay, the formula for film making as dictated by exhibitor and distributor, called for at least half a dozen songs and a few dances. The subject matter with increasing concentration, was romance though the Indian woman would not kiss on the screen, she might in private.(1)

But one wonders what is Africa's policy on the Film. Infact there has been none up to date. If there has been any however, anywhere it would have been an extension of the film policy of the former Colonial masters.

One country has, however, consistently shown Africa what she believed Africa was and still is inspite of high level of diplomatic treatment she gives Africa. That country is America.

America has, through the Hollywoodian eyes, seen the African as a savage and the continent on which these savage live, as the "dark continent". It is peopled "by cannibals on the one hand and the docile primitives always on the other hand to make up safaris for some English thrill-seekers slumming in the jungles."(2) This image has been developed in films like TARZAN, KING SOLOMON'S MINES, TRADER HORN etc. In every country of the world where Cinemas persuade movie goers to part with their hard earned money at the box office, there will be found a film of Hollywood origin exhibiting the African as a savage, a Cannibal and the black American as a second rate citizen of God's own country.(3)

There has been protests galore on this attitude of Hollywood to Africa, an attitude to which successive United State Governments closed their eyes under the guise of operating a Libertarian and or Social Responsibility theory of the Media.

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(1) Erik Barnouw and S. Krishnaswamy in INDIA FILM (Orient Longman)

(2) Winthrop Jordan - the Myth of the Savage, extracted from AFRICA ON FILM: Myth and Reality by Richard A Maynard (Hayden Film Attitudes and Issues series, Page 70).

(3) Americans believe their country is God's own.

The Official American Policy towards Africa and Hollywood propaganda are irreconcilable.

A well-known Bishop intimately acquainted with India stated in a speech at a Conference in England in 1925:

> "The majority of films, which are chiefly from America, are of sensational and daring murders, crimes, and divorces and, on the whole, degrade the white woman in the eyes of the Indian."(1)

In 1956, some African students at the Delhi University complained about Hollywoodian distortions of Africa. In response the Indian Central Board of Film Censors banned eight foreign films on Africa. Six of these were American: SNOWS OF KILIMANJARO, BELOW THE SAHARA, MOGAMBO, TANGAYIKA, AFRICAN ADVENTURE and UNTAMED. The other two, THE AFRICAN QUEEN and WEST OF SANZIBAR were British.(2)

Those were the various ways by which America has used the film medium to disparage the African. Francis Oladele, a notable Nigerian Film Producer, giving "Another Point of View" in INTERLINK magazine stated that America has and is still misusing the Film medium. He describes it as 'a one-sided arrangement in which America is enhanced on the screen, but other cultures suffer great distortions in American feature films.'(3)

To use the medium of film for a deliberate distortion of facts against a people who 'have done nothing to warrant it constitutes an insult to the integrity of Africa'.(4)

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(1) Report of the Indian Cinematograph Committee (Page 3) extracted from INDIA FILM by Eric BARNOUW and S. KRISHNASWAY.

(2) Oladipo Onipede - Hollywood's Holy War Against Africa - AFRICA TODAY Volume III July - August 1956.

(3) Francis Oladele: Another Point of view (Page 26) of INTERLINK No. 47 (a Nigerian - American Magazine).

(4) Oladipo Onipede op. cit.

2-2.2 THE DEVELOPMENT OF THE FILM IN AFRICA

The development of the Film in Africa, especially Nigeria, followed the trail of the colonial governments: France regarded her colonies as part of herself and so there was greater film activities in the French Colonies than either the British or the Portuguese Colonies.

The first real film policy for Africa was in East Africa, Northern Rhodesia and the Belgian Congo. The Bantu Educational Cinema Experiment was formulated in 1935 by the International Missionary Council. An Advisory Council for the experiment was headed by Lord Lugard, then Chairman of International Institute of African Languages and Culture. One of the four aims of the Council for making films was:

> "To conserve what is best in African tradition and culture by representing these in their proper setting as stages in racial development and as an inheritance to be cherished with pride". (1)

The first attempt at a cultural film by the Bantu Educational Cinema Experiment was "THE CHIEF", It was to portray the conflict between the old and the new.

"THE FARCE" was an experiment to test if films of the slapstick comedy type could be made and whether they could be popular with African audiences. This particular film showed the pranks played by a naughty boy. It was criticised by senior Africans on account of the disrespect shown by the boy to his elders. They did not think it right to show such behaviour on the screen, even though the boy had a beating at the end.

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(1) Major L. A. Notcult and G. C. Lathary: THE AFRICAN and THE CINEMA published 1937 by the Edinburg House for International Missionary Council.

Though the establishment of the Cinema Experiment was to provide entertainment for the natives in the mine areas and teach them new methods of planting, it at least attempted to preserve on celluloid the cultures of the people they governed.

2-2.3 THE FILM IN WEST AFRICA

The story has been different in West Africa especially in NIGERIA. Films shown were newsreels about the fighting allied forces during the Second World War. Films of SHELL dealing with oil and technology were also shown. Even those war newsreels were criticised C.R. Niven, then Public Relations Officer in charge of Lagos complained in a letter to S.H. Evans at the Resident's Office, Accra, that "people here are disappointed that we have had so few films of West Africans in action or even approaching actions".(1)

The call for a Unit in West Africa featured at the 1943 Conference of Public Relations Officers (Sec 53) and the 1944 Conference (Sec 38) put on record its view "that the fortuation of a section of the Colonia Film Unit to work in West Africa should continue to be an objective, and that every effort should be made to achieve this end".

Despite all these weighty recommendations and the fact that Public Relations Officers agreed that "any visitor to a film show.... would be convinced that African material is the more effective, more interesting, and more instructive than any other"(2) it was late before a unit was established in Lagos. Even then, the emphasis was not on culture but on publicity for the Governments.

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(1) Adegboyega Arulogun - Genesis of the Nigerian Film (unpublished material).

(2) Extract from a letter from A Campbell (PRO) of Information P.O. Box 745, Accra to Mr. C. R. Niven, PRO Lagos - 13th April, 1945.

2-3 THE DEVELOPMENT OF THE FILM IN NIGERIA

It is necessary to have a brief historical perspective to understand the late development of the Film in Nigeria and the apathy of Successive Nigerian Governments, both colonial and indigenous, to the cinema as an avenue for cultural identity.

Early Nigerian Films were mainly documentaries. Feature Films were rarely produced. The real first attempt was FREEDOM (a non-Nigerian enterprise) produced for the Moral Rearmament in 1957. Its cast was mainly African and the location, Nigeria. The script was written by Ezekiel Mpalele, a South African, then teaching in the University of Ibadan.

In 1962, during the reign of Chief T.O.S. Benson as Federal Minister of Information, the late West Indian Actor, Edric O' Connor, directed a mini-feature (30 minutes duration), titled BOUND FOR LAGOS for the Ministry of Information. The film shows social and economic progress in Nigeria with emphasis on the country's means of transportation and communication.(1)

It was not until the 70s that any commercial activities started in local feature film production. KONGI'S HARVEST (1970) was among the significant film made by private film makers. This is a film version of the play, written by world famous Nigerian playwright, WOLE SOYINKA who also wrote the filmscript. The film which has Nigerians to be over 90% of the actors was produced by Francis Oladele, directed by a black American - OSSIE DAVIS, and released by CALPENNY FILMS of Nigeria KONGI'S HARVEST is a satrical commentary on the First Republic of Independent Nigeria.

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(1) BOUND FOR LAGOS: Federal Ministry of Information Film Catalogue No. 497 (as revised October 1968).

THE SON OF AFRICA and GOLDEN WOMEN (1971) were produced by FED FILMS LTD., followed by THINGS FALL APART, which briefly went under, the title of "BULLFROG IN THE SUN". It was also produced by FRANCIS OLADELE for CALPENNY-NIGERIA FILMS LTD.

The next was Dr. OLA BALOGUN'S ALPHA, (another Nigerian director) which broke new grounds as an Anglophone's initiative receiving the support enjoyed by Francophone film-makers and therefore with a good chance of distribution in French and English speaking areas.(1) AJANI-OGUN, AMADI and MUZIKNAN were also directed by Dr. OLA BALOGUN and produced by AFROCULT FOUNDATION Ltd.

Another recent Nigerian full length feature film is DINNER WITH THE DEVIL - co-scripted by SANYA DOSUNMU, WOLE AMELE, and SEGUN ADEOYE, directed by SANYA DOSUNMU and released by STARLINE FILMS NIGERIA Ltd. The film has been described as .... a landmark achievement by Eseoghene Barret(2) "DINNER WITH THE DEVIL", Barret wrote is remarkable for being the first Nigerian film that attempts to translate common incidences recognisable in day to day Nigeria life Stylised along the lines of the pupular psychological dramas of popular Western Cinema. At the same time, its technical hitches are over-shadowed by such things as SUNNY ADE'S (a Nigerian popular JUJU musician) truly innovative use of juju sound as incidental music and the delineation of national traits through characterisation rather than through language intonation".(3)

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(1) Workshop seminar paper presented by FRANK AIG - IMOUKHUEDE, Secretary National Council for Arts and Culture (Nigeria) on: A NATIONAL FILM INDUSTRY: ASSESSMENT OF PROBLEMS AND SUGGESTED SOLUTIONS (August 1977) Page 6.

(2) Barret, Eseoghene, "WORTHWHILE EFFORTS IN FILM MAKING" Daily Times June 24, 1976 Page 17.

(3) Ibid.

LADI LADEBO'S CINE VENTURE PRODUCTION OF COUNT DOWN AT KUSINI and MY GOOD FRIEND were produced by the Federal Film Unit.

Just before festac '77, SHEHU UMAR was produced and directed by LAHAJI HALILU of the Federal Film Unit, Kaduna. Another one just recently produced is BISI DAUGHTER OF THE RIVER, directed by JAB ADU and produced by LADI LADEBO'S CINE VENTURE PRODUCTION.

2-3.1 THE ROLE OF NIGERIAN FILMS

The pattern which Nigerian films should follow is that of projecting the cultural, social and economic outlook of the nation and of Africa.

The film has been found useful in war for propaganda, in peace for projecting the national image and aspirations. Because of its importance as a medium not only of amusement and entertainment but also of instruction, education and propaganda, its control by indigenes is very desirable for economic political and nationalistic reasons. The full control of the film industry by indigenes provides a nation with a vehicle for regulating its image at home and abroad, for rallying its citizens round important national goals and for furthering progressive thoughts and ideas.

Today, ganster films constitute about 80% of what we see on our cinema screens.(1) In the Ekotedo (in Lagos State) a Cinema house in Ibadan was infested with young men dressed in jeans and hats with scarves tied round their necks like the cowboys in American Western Films like the JOHN WAYNE type or the WILD, WILD WEST series on Television.

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(1) Alhaji Adegboyega Arulogun's paper at the Workshop/Seminar titled THE ROLE OF FILM IN CULTURAL IDENTITY; presented at University of Lagos on July 26th 1977.

One may ask, "How did these men come about their dresses and occasional pranks?" It was through the influence of films shown in theatres in Lagos and Ibadan. Infact Ekotedo soon became a den of robbers, street fighters and rascals.

The present wave of violence, robbery and murder committed daily in the country are likely to have been influenced by films shown in our theatres and on television. The New Nigerian Cinema should not wear an Hollywoodian toga.

2-3.2 CULTURAL ROLE

Culture, as "..... defined by the Peguin English Dictionary (1973) is "..... improvement of mental faculties, refined taste of judgement, high intellectual and aesthelic development; state of intellectual, artistic and social development of a group, type and degree of civilization; social group characterized by a specified level of material achievement".

CULTURE, therefore "is a vast apparatus partly material, partly human and partly spiritual, by which societies are organised into permanent and recognisable groups.(1)

Culture should no longer be seen only in terms of Music, Dance, Drama and art. It should be seen as an interwining of artistic fibres of a nation with the science and religion of its people; the law and moral expectation of the community, the wisdom of their past and the education of their present and future. From these definition it becomes crystal clear that Nigerian Film makers have an unlimited opportunity to operate under a wide umbrella.

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(1) EKPO EYO, - THE CONCEPT OF BLACK CIVILIZATION and PRIVITIVIS.. a lecture delivered at the Museum in Lagos.

African culture is essentially oral. There is today a more urgent need than before to preserve and uphold it in the face of encroaching extinction by foreign and written cultures. It is not, of course possible to preserve our culture in its totality because:

"Culture is dynamic and the dialectics of change would even in the absence of the mass media, ensure that some aspect of our culture decay and die while others evolve and flourish".

Cinema goers abroad want to see a change - not sex, murder or the old Western movies. The white man is always suprised to hear that an African marries more than one wife. How does he share his love? How does he manage his home? What is the consequence of polygamy? These are themes that can be explored in film.

In some parts of the world, the African is still the man with a tail. That was why a white girl once asked an African boy of his tail. His reply was that "African men grow their tails in front like any whiteman.

Since the mass media are the mirror through which society sees itself, our films must reflect us the way we are. It is only then we know how wer are that we may know who we are.

Films produced here with an African or Nigerian setting will bring a greater understanding of the continent to the world. By it, a lot of erroneous ideas will be corrected. We can only achieve this by giving authentic presentations of our work. To be authentic, Nigerian Film makers must be culturally faithful to our society. Whatever films produced, documentaries or features, educational or instructional, must be able to evoke and relate certain social, cultural and political feelings or sentiments in our target audience.

2-3.3 THE PROBLEMS OF THE FILM PRODUCTION, DISTRIBUTION AND EXHIBITION IN NIGERIA

The first problem of the Nigerian film-maker is that of finding financial backing for his project. Although quick financial profits are the characteristic expectations of film, the Nigerian businessman's expectation is based on a dream of even quicker accrument of profits. Such expectations have often led to unfulfilled dreams and future avoidance of film finance by the businessman involved.

It is however clear that an effective system must be evolved to a make available adequate funds to film producers since cost of film productions are terribly high. The following analysis of the cost of 250 movies made by Hollywood studios in a typical year may throw some light into the understanding of the expensive nature of film production.

* PICTURE COSTS	NO OF PICTURES	% OF TOTAL
Over 1 million Dollars	19	7.6
500,000 - million "	60	23.9
250,000 - 500,000 "	40	15.9
Under 250,000 "	132	52.6
	250	100

Costs of such magnitudes are possible only because Hollywood commands the patronage of a stupendous number of ticket buyers.

Right now the Nigerian Industrial Development Bank provides loans for film makers alongside other applicants.

* Data from HOLLYWOOD by Leo C. Rosten

What Nigeria needs is a special fund reserved for films and administered by a body which is aware of the problems of the film industry and can relate management practice to expert knowledge of the medium and marketing processes. The management board should be insulated from discriminatory stances against particular producers or directors for reasons unconnected with professional ability or ability to manage funds.

A new entertainment tax arrangement should evolve to provide a film fund through levy on admissions in the Cinema theatres.

The second provision is the provision of necessary facilities for production. Since there is a serious shortage of skilled manpower an organisation should be established to provide a pool of skilled personnel who will in addition to producing films also provide facilities for hire of crews to private film-makers. This will serve to control indiscriminate importation of overseas crews. The same organisation must in addition hire out equipments which are too costly to acquire by individual film maker. Sophisticated and up-to-date equipment would be made available at very reasonable rates that help keep down film production costs.

The fourth measure is the provision of processing facilities through the establishment of a laboratory with large enough capacity to handle the country's requirements and satisfy demands from neighbouring areas. Such a measure will be very viable and would include the processing and printing of coloured stills and 8mm films which have become very popular in the country.

2-3.4 MARKET ANALYSIS AND REALITIES

Another problem facing the Nigerian Film makers is EXPLOITATION.

A study of the market reveals the prevalent taste of Nigerians. When a sampled population was asked questions as:

1. If there were more Nigerian produced film, would you rather see them than foreign film?
2. Have you ever watched any films produced in Black Africa?
3. If films produced in other African Countries were available would you rather see them than foreign produced films?

The answers are tabulated below:-

*SHOWS PREFERENCE OF NIGERIAN and AFRICAN PRODUCED FILMS OVER FOREIGN IMPORTED FILMS BY NIGERIAN AUDIENCE

FILM PREFERENCES

	Prefer Nigerian fo Foreign Films	Ever Watched other African Films	Prefer African to Foreign Films
YES	54%	39%	53%
NO	20%	42%	26%
DON'T KNOW	26%	19%	21%
TOTAL	100% N=205	100% N=205	100% N=205

Out of a day's billings in the Lagos Cinema, the following results were obtained in classifying the categories of films shown in various theatres.

INDIA	CHINESE	ENGLISH/AMERICAN
45%	33%	22%

Source: From classified advertisement DAILY TIMES, July 20, 1977.

On other days the percentage of Indian film rose to 70%. Available information on joint productions have revealed no report of box-office success of such films abroad. Because of the distribution arrangements which determine circuits of primary or secondary exploitation a film jointly produced by Nigerians and Europeans costs a lot more per copy if arrangement is made for priority exposure in this country. The takings, after tax and the exhibitor's share are usually not encouraging.

For the Nigerian produced films to have ready market both at home and abroad, a quota system should be introduced. By it, 35% of the films shown in Nigerian theatres must be of Nigerian origin, 15% must be black films. Since we must continue to improve our standard, 50% could be foreign. This system is not a strange phenomenon. Britain introduced it when America flooded cinema market in Britain in the early forties with Hollywood thrash.

Distributors in Nigeria must take in exhange for every five film, whatever to Nigeria, ONE NIGERIAN film, whatever its quality must be taken and distributed abroad.

Co-production must be worked into our cultural agreement with foreign countries. It is not just enough to exchange dancers and National troupes. Where there is no cultural agreement, film Co-production agreements could be signed with some countries especially America, Britain and India. By this costs will be reduced and much needed technoligcal exposure would be established.

The potential markets for the Nigerian Films are many: namely:-

1. THE HOME MARKET
2. THE WEST AFRICAN MARKET
3. THE CONTINENTAL MARKET
4. THE AMERICAN MARKET
5. THE LATIN AMERICAN MARKET INCLUDING THE CARRIBEAN
6. THE INTERNATIONAL MARKET INCLUDING EUROPE

(Serving the Diaspora) and those who constitutes the international audience.

The home market will be served by production in the local languages for limited exploitation and by films relying on a common lingua franca. The other way out is the use of substilling a possiblity which create problems (if the film is prjected on T.V.) either through loss of lettering outside projection frame or illegitility because of the letterings colour. A way out is probably to produce the films first without any sound tracks so that they are duffed later in as many languages as possible. In the case of the Nigerian film IBO, HAUSA, YORUBA, ENGLISH which enjoy wide and commerically exploitable distribution and could be tried. FRENCH and SWAHILI could also be included after a proof of feasibility.

As for the International avenues for Distribution, this could be exploited widely in the West African and Continental markets. The American and Latin American markets will require special studies and would draw heavily on nostalgia and sentimental affinities between the 40 million Blacks of those regions and black Africa. Europe could be exploited the same way our musicians do through clubs and facilities specializing in African programme.

PART THREE

FILM PRODUCTION

"Because of Hollywood's Racial Typologies, many people think that all Blacks are Lazy, Light-Hearted and Dance-Loving who know nothing, Except how to sing spirituals".

- Prof. Alfred E. Opubor,
  Dr. Onuora E. Nwuneli,
  Dr. Onuma O. Oreh
  all of the University of Lagos.

FILM PRODUCTION

3-1 INTRODUCTION

It is preponderantly necessary for the Architect to have an idea of how a film is made right from the inception of a theme to the end of the production of the film ready for the screen. It is through this knowledge that an efficient design functional and aesthetically pleasing can be evolved.

In the present section of this report, a well comprehensive description of film production proceedures will be made. This will consequently lead to the categorization of functions with the aim of delving into space requirement alocations. It is as from there that I shall deal with the architecture of the film studios.

The initiation of a picture and the overall Financial responsibility for it lie usually with the producer. As the impresario of the film industry, he will guide a film through from beginning to end, either personally or by delegation of authority. The actual creative process of making the picture is the responsibility of three main groups represented by the director the Scriptwriter (who may be a professional Screenwriter providing original material, a novelist, or a playwright), and the actors (stars, featured players, small-part actors and crowds). In order to carry through the technical processes involved, this team is backed by the four technical branches of film production, i.e., design (including art direction, set construction, costume design, make-up, handressing, property work and set decoration), photography (including special effects), Sound (including floor recording, effects, post-Synchronization, re-recording and music); and editing (including assembly cutting, track-laying, laboratory liaison, and post-production processes).

3-2 INITIAL PLANNING OF A MOVIE

The degree of success achieved by a motion picture is directly proportionate to the thoroughness of planning that precedes the actual production. An inadequately planned movie almost invariably costs more than a comparable film that was well prepared.

3-2.1 DEFINING THE OBJECTIVE

There are two major requirements for the objective of an in-plant movie:

a. The objectives should be stated in terms of the desired change that is to take place in the attitude of the audience as a result of viewing the film.

b. The objective should be measurable; after the film showing, it should be possible to determine whether the desired change has occurred.

3-2.2 THE TREATMENT

The treatment (or Synopsis, as it is usually called by producers of entertainment films) is a brief statement of the content of a film and is written to explain what moviemakers plan to do and how they plan to do it. The introduction contains information about the film to be used (35mm, 16mm, super 8, 8mm colour or black-and-white), the anticipated length, whether sound will be used (and if so, what kind), and any plan for distribution. The body of the treatment tells the story or outline of the film and indicates how the message will be treated in terms of motion picture technique.

3-2.3 THE SHOOTING SCRIPT

Ideally, a shooting script is a technical Script which interprets a TREATMENT in terms of shots, sequences, camera distances and angles, effects, dialogue or commentary (if required) and perhaps indication of individual shot length. It deals with these matters in such detail as the director of the film may think necessary, and is followed fairly strictly when actually shooting - with, again as in the case of a treatment, the possibility of variation should show some better idea or some opportunity which is pertinent to the theme present itself during production. For an adequate knowledge of the Film Language, the reader is adviced to turn to the APPENDIX for definition of terms.

3-2.4 WORKING UP A SHOOTING SCRIPT

Handling a Cine Camera effectively demands some basic knowledge of planning technique, and a similar knowledge is necessary for preparing a shooting script - indeed, the script is fundamentally the handling of a camera on paper, and handling it in such a way that it tells the story of the film in terms of motion pictures.

In addition to bare technique, the task of preparation calls for exercise of the immagination: shots and sequences have to be visualized, to be conjured up in the minds eye, roughly as they will eventually appear, edited and in final form on the screen.

This Visualization is not easy at first, but can quickly become so the more a simple treatment is reduced to a shooting script and the shooting script is converted into shot footage

The following notes will assist in translating a treatment into terms of shooting script and shot films.

3-2.5 THE SEQUENCE

Just as a book is divided into chapters, any sequence may be defined as a succession of shots which while following the theme of a film, can almost stand alone as continuous action. It is often opened and closed by a fade in and a fade out, or it may be preceded by a title and ended by the title of a following sequence, or it may be dissolved into a following sequence by means of a mix.

Whether fades and dissolves are possible or not depends upon the construction of the lens apertures and the incorporation or not of the backmind on the camera. Fades and mixes can be produced chemically by processing laboratories on 16mm stock (such fades and mixes being known as 'opticals'), and they can be produced during actual shooting so long as the camera has a continuously variable diaphragm (which can be closed gradually over a given number of frames), or if a fade wedge is made.

3-2.6 BASIC SHOTS

Within any sequence there are a number of shots, varied from one to the other by camera distance and camera angle. The shots are, broadly:

LONG SHOT:

a comprehensive shot taken at a comparatively long camera/subject distance and giving an impression of a scene as a whole.

MEDIUM SHOT (or Mid-Shot)

a shot taken at a shorter camera/subject distance, say to isolate some object within s scene but to show that object as a whole.

CLOSE UP

a shot taken at a short camera/subject distance, showing, say, part of the object isolated in the previous type of shot.

BIG CLOSE UP

a shot taken at a very short camera/subject distance to throw visual emphasis on some quite limited area of an object, for example, the features only of an artiste who is expressing emotion, or some small object like a telephone which a hand is seen to pick up.

3-2.7 THE SCRIPT BREAKDOWN

In a film of any size or complexity, the shooting script will reveal that there are a number of shots which can be grouped for making together - say in one set or on one location, and/or perhaps because of the limited availability of one particular artiste or property.

As a simple example, if a film calls at the opening for some shots inside a house, followed by shots on the bank of a stream, and ending by a return to the house, it is obvious that all the interior shots can be taken together, even though they are not to be screened in successive sequences.

To facilitate such out-of-order shooting the shooting script is analysed, the result being a script-breakdown. This is nothing more than an indication of which shots can be taken together while a set is standing or the unit is at a certain location, or an artiste or special property is available.

The very simple example given above will have an equally simple breakdown e.g.

SHOTS 1 - 15)
) INTERIOR
31 - 47)

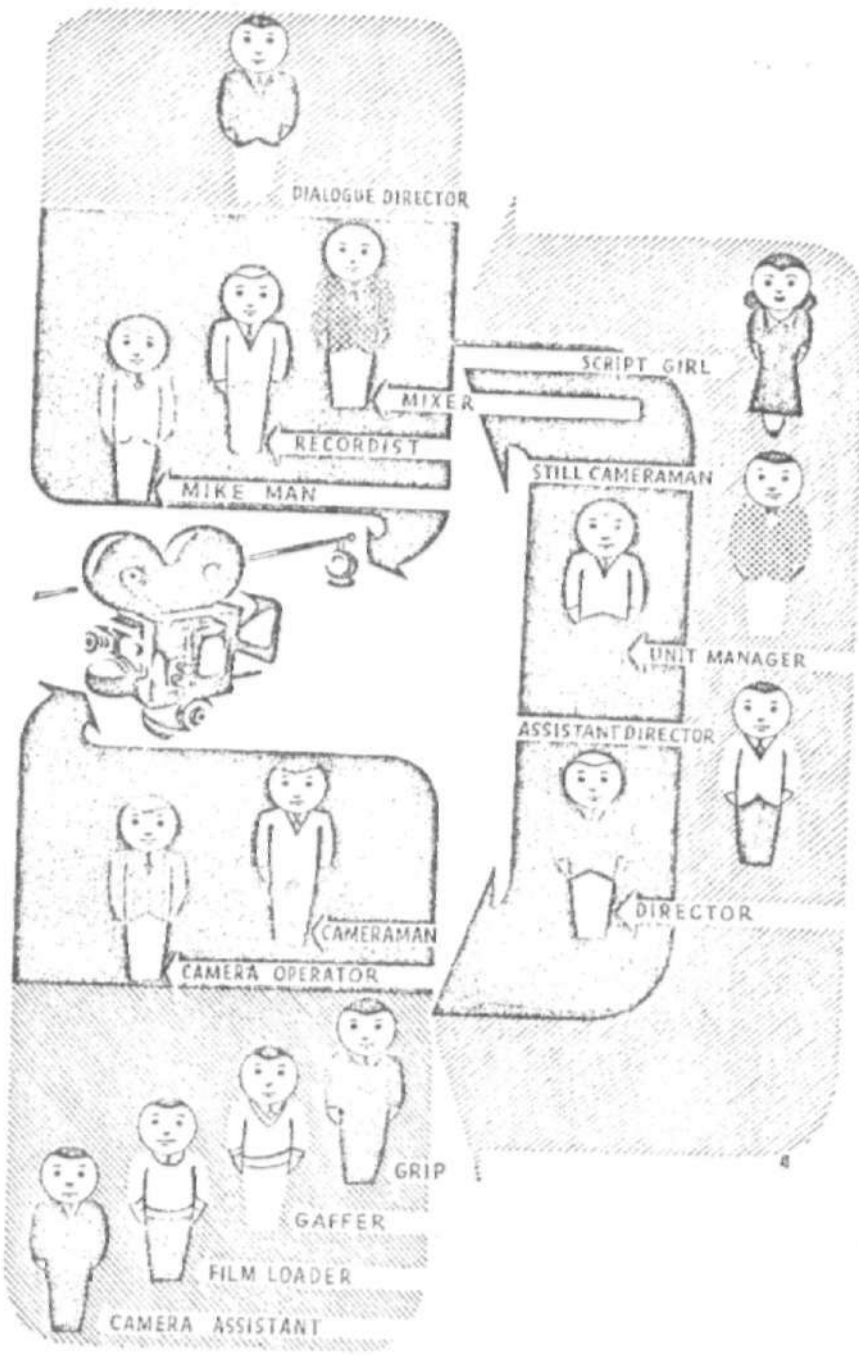
16 - 30 BANK OF STREAM.

The breakdown thus serves as a sort of index to the shooting script to save time when actually filming and to ensure that no essential shot shall be missed.

3-3 THE FILM PRODUCTION TEAM

The production **unit** is the technical group responsible for converting a script into a length of uncut film. It is the tool by which the image is impressed. It manipulates the medium to record a small section of the visual and audible world, and also adapts this small section of the world to the peculiarities of the medium. Both these tasks are delicate and complex.

Before the Unit goes on location shooting, it is often wise to send a representative on ahead, charged with making arrangements, selecting places for shooting, estimating the difficulties of recording sound, insuring adequate power supplies for lighting, and in general providing for work to start immediately the unit arrives.



[redacted] Basic and supplementary units for location shooting. Basic unit: Black area. Supplementary unit: Shaded area.

[redacted]

Sometimes the Script writer does those things, sometimes it is the director himself, sometime the unit manager. Usually the cost of such an advanced trip is money well spent. The size of a location will depend upon the budget of the film whether a union or a nonunion crew is chosen, and the type of film which is being made.

The nuleus of any unit will consist of the following:

A PRODUCER

A DIRECTOR

A FIRST CAMERAMAN

A SECOND CAMERAMAN

A UNIT MANAGER

If much lighting is to be done, one or more ELECTRICIANS will also be needed, while sound recording will requirer a MIXER, A RECORDIST and a MIKEMAN.

A slightly more elaborate unit will add a second CAMERA ASSISTANT, A SCRIPT GIRL and perhaps a STILL CAMERAMAN.

The Electricians may be put in charge of a gaffer and the props of a grip. Thus without exceeding the limits of a modest scale or production, a location unit may expand from a basic 4 persons to 8 or even 12. While a unit in a studio will be able to dispense with the Unit Manager, it will usually add an a ASSISTANT DIRECTOR.

It must not be supposed that it is impossible to achieve professional results with smaller units. The Solitary-director - cameraman with his 16-mm or ultra-light 35-mm equipment is still a figure to be reckoned with.

But shooting under complex conditions, and achieving the standards of quality expected today calls for a high degree of elaboration, as the following analysis of the functions and physical equipment of a production unit will show.

3-3.1 FILM PRODUCER

This is the person who exercises general control over production, acting as link between the financial investors and the director who actually makes the film. He may not always have first hand directing and editing experience. He will probably supervise several films at the same time.

3-3.2 THE DIRECTOR

Once the producer has agreed on the shooting script. It is the sole responsibility of the director to realize it in material terms, that is, to get it unto the film. No matter how brilliantly the writer has Visualized his ideas, the director will find that some of them cannot be carried out as the script prescribes and so must be presented in some other way. And on the other hand, the physical materials - sets, locations, the actors themselves - will often suggest to the director's mind all sorts of improvements on the script.

He is the technician who directs the actual shooting of the films, supervises the actors and cameramen and tells them what to do. Occasionally the director may write his own script or do his own editing, in which case the film may bear a more distinctly individualistic mark, but this is by no means a general practice.

In documentary film production, the producer is more closely concerned with actual production and in all cases has had previous experience as a director and editor. The director too normally takes a far greater part in the work of scripting, editing and recordings.

The skillful director will take advantage of these opportunities, while never losing sight of the over-all line of the script. He is the final responsibility for each setting, for the pace and action of the scene which takes place in it, and for the dovetailing of each scene into those which are to precede and follow it.

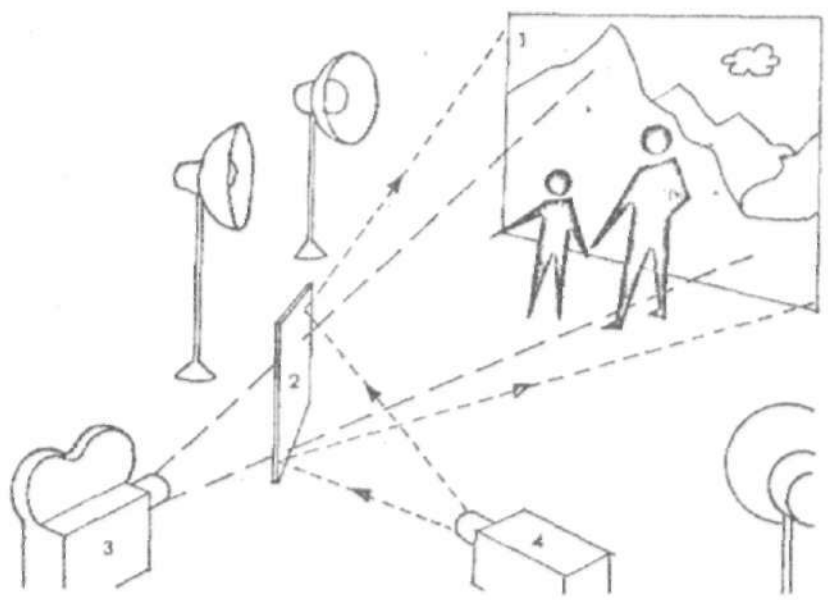
In consultation with the cameraman he must decide on each camera position and must rehearse the action before it until it is perfect.

3-3.3 THE CAMERA AND ITS CREW

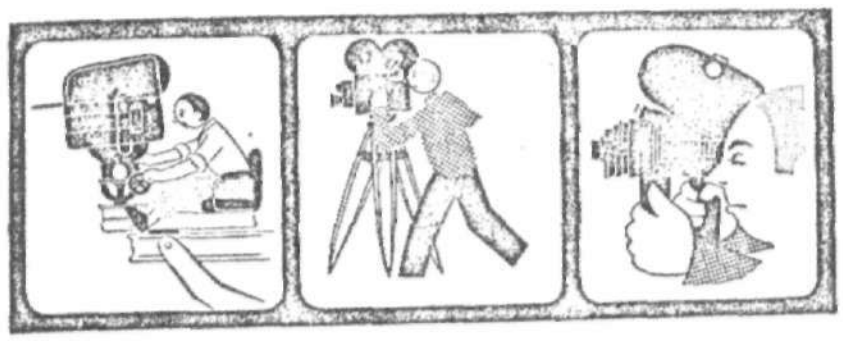
A standard movie camera requires many adjustment before and during its operation. It is usually set on a tripod.

The Cameraman in the studio can control lighting effects at will. Even out of doors, lighting can be influenced by the choice of angle in relation to the sun, and by the use of reflectors to redirect sunlight and brigten areas which would otherwise fall into deep shadow.

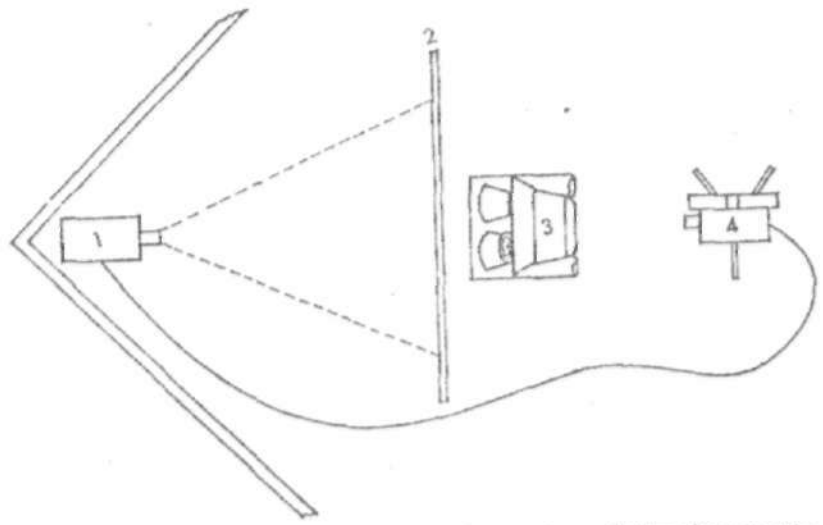
Since a 35mm camera and tripod may weigh as much as 68kilogram, appreciable effort will be needed to move it from one setup to another. A quite normal succession of shots may call for the camera to be mounted on its tripod for one shot, moved down to the ground on a high hat for the next, and set on a dolly for the third. To make these changes rapidly is work for two people; delays here hold up the whole unit. 16mm equipment has the advantage of much greater portability, but all the other settings and adjustment mentioned require just as much manpower on the smaller type of camera, for they hinge on the complexity and professionalism of the shots to be taken.



Front projection set-up. A "plate" is projected via a half-silvered mirror onto a special high-reflectance screen placed behind the subject or in small sections cut to correspond with the shapes of foreground objects behind which the subject will pass. The camera, shooting through the mirror, is optically aligned with the projector, recording the *subject and plate combined.*



[redacted] Basic types of standard 35 mm. camera. Characteristic appearance of the studio, the field, and the combat camera.



Layout on shooting stage for rear projection. (1) Rear projector. (2) Translucent screen. (3) Mock up foreground, car. (4) Film camera, interlocked with rear projector.

[redacted]

It is for these reasons that it is regular practice to use a FIRST CAMERAMAN (in Studio production often called DIRECTOR OF PHOTOGRAPHY), who consults with the director on the type of shot required to translate the script into film, plans the dollying, panning, or boom movements, and above all decides how the shot is to be lighted.

THE SECOND CAMERAMAN (or camera Operator) actually makes the initial settings on the camera and controls it during the shot. He is helped by the FIRST ASSISTANT CAMERAMAN, who is usually entrusted with following focus, and if necessary, by a second assistant. Sometimes a FILM LOADER is used to load magazines with exposed film and unload exposed film into cans

3-3.4 GRIPS AND GAFFERS

Obviously, a camera unit of such size and complexity will require very efficient auxillary services if it is to shoot enough film each day to justify its high operating cost.

If the unit is shooting with props, as it usually will be, whether on location or in the studio, it will need the services of a grip, whose business it is to have on hand all the props that are needed, and to make those last minute adjustments and alterations which are discovered when the camera is ready to turn.

In the studio, the carrying out of the cameraman's lighting plan is in the hands of a gaffer and his staff of electricians. The gaffer does not usually handle the lights himself; but he is a past master in the art of placing lights and using gobos and barn doors and the various diffusers by which light can be softened, directed and redistributed.

3-3.5 THE SOUND CAMERA AND ITS CREW

Sound recording adds a further complication to location work, for the small unit must economize on staff here as elsewhere, and usually cannot afford a man for each separate job.

THE MIXER, who is in charge of the Sound crew, will often not find the acoustics to his liking if he is recording in an enclosed space which has not been specially designed for the purpose. He must therefore determine how to deaden (or, less often, liven) this space by artificial means; and from long experience, he will be able to apply the properties of ready-to-hand materials - plywood, sheets, rugs, blankets, etc - to improve the acoustics of the scene.

But the mixer's task is not merely the negative one of removing imperfections. He has the responsibility of producing a recording in which the wanted sounds are as clear and prominent, and the unwanted sounds as inaudible, as his skill can make them. He must be adept at controlling wind noises out of doors and diagnosing a multitude of resonances and reverberations which will interfere with the good quality of his recording.

The mixer usually works with headphones at a moveable console or tea wagon on the set; but he may occasionally monitor with a loudspeaker from the sound track which carries equipment to a location, and which in certain studios is used in place of fixed equipment.

The task of recording sound on film is entrusted to the RECORDIST, who has charge of the sound camera and its associated multiplicity of amplifiers, compressors, fitters, etc, each with many adjustments and a routine of highly expert maintenance.

The microphone is in charge of the MIKEMAN, who has the skillful and delicate task of keeping it always in the position from which it will pick up the dialogue of the person speaking most clearly and usually most loudly. This he accomplishes with the aid of a sound boom, a kind of elaborate fishing rod on the end of which the mike is mounted. A multiplicity of controls enables him to run the microphone in and out, twist it around and alter its angle, so that he can follow dialogue as it passes from character to character, often as they are moving about the set.

3-3.6 THE SCRIPT GIRL (ALSO CALLED CONTINUITY GIRL)

This is the person on a set or on location fro keeping a record of all scenes and takes which are shot, recording technical notes on them, and putting all this information in a form useful to the cutter.

Many changes in the script may be made during production, it is the scritp girl's job to keep track of them, and to prompt the director in matters of completeness and continuity. If she has been successful, when the film comes to be laid out in the cutting room for assembly, there will be no vital connective shots missing, no directions of movement confused and tangled, no changes in the character of some conspicuous object like a man's tie in scenes which were shot days apart but which are now to be welded into immediate relationship.

3-4 THE FILM STUDIO

Early film studios had glass roofs but the uncertainty of sunlight soon led to all studios being darkened and lit artificially. The sizes of stage range from 67 metres x 33 metres down to 18 metres x 12 metres or less.

They are usually large bright as large halls with highly absorbent enclosures so that sets can contribute their own acoustical characteristics as required. Economy in construction and efficiency of operation suggest that several large-size motion picture studios be grouped together. This allows set construction and preparation to be carried out in one or more studios while normal production continues in the adjacent one. Provision for the required Reverberation Time and for high degree of noise and vibration isolation within these studios is the main acoustical obective.

The illuminants consist chiefly of tungsten filament incandescent lamps in sizes ranging from 500 watts to 10KW. The demands of colour have, however, led to the revival of popularity of the arc lamp, which is used at currents ranging from 65 to 250 amps.

In addition to the actual stages a studio includes the sound department responsible for the recording and the dubbing of sound; the art department, where set and costumes are designed, carpenters plasterers and engineers workshops, wardrobe and make-up departments and executive department.

One of the chief expenses on the introduction of the sound film was the sound proofing of the stage. It is essential that a stage should be non-reverberant when supposedly out-of-doors scenes are shot in the studio, and it is equally important that external noise should be excluded.

The microphone is mounted on extensible boom, and the transmission from it is controlled, both in loudness and quality, by the mixer seated at his 'Console' before being passed to the actual recorder.

3-5 *ELEMENTS OF FILM PRODUCTION*

*SHOOTING A FILM

The production of a motion picture is a complex and tedius operation. Progress is incredibly slow; a mere minute or two of usable footage is obtained from each day of shooting. A great deal of time is spent in moving lights around, setting up the camera, and testing for sound.

During all of this preparatory work, the stars are generally off the set, either in their dressing rooms, or rehearsing their lines with the director. While the lights are being placed, the stars in height, build and colouring - take their places on the set.

Among the dozens of figures on the set are electricians, sound technicians, cameramen, propmen, script girls, make-up people, costumers, and hairdressers. Their contributions to the picture are spasmodic and brief: pushing a camera for a dolly; shot; repairing a wig or a hairdo, just before the camera rolls, or placing a chair in its proper position for the scene. But since every moment of delay during the shooting cost literally thousands of Naira, producers have decided that it is more economical to keep such craftsmen on the payroll and always available than to hold up production and send out for them as they are needed.

For hours on end, the movement around the set seems aimless and idle. But once the chief cameraman has tested and approved the lighting for the next set up and checked the results through the view-finder of his camera, the assistant cameramen, the sound men and the electricians have taken their positions, the production is ready to begin. The stand-ins disappear, their places taken by the stars themselves. The director turns his attention to the cast, and they begin to rehearse the next shot; these rehearsals involve not only the actors and their dialogue but camera movements as well.

After repeated rehearsals of performers and camera, there may be yet another runthrough for the benefit of the sound man, who must plan the movement of the microphone boom from point to point to record the dialogue clearly.

When the director finally signals his readiness, a red warning signal flashes on and off above each exit in the shooting studio, a warning bell rings sharply, and suddenly the huge stage is absolutely quiet. The big overhead lights flood the set, and everything is ready.

The recordist sits at a portable monitor panel that commands full view of the set. On his nod, an assistant darts in front of the camera with a hinged slate on which is chalked the name of the Film and the number of the shot, an identification for the printers and editors.

As the camera reaches sound speed of 24 frames a second, he claps the hinge sharply against the top of the slate to produce a distinctive, easily seen modulation on the sound track, a mark that will serve as a guide to the editors later when they must Synchronize the sound with the visuals. The "take" has begun.

It is customary in big, expensive production to film an entire sequence in one long master shot - a scene of family farewells in a drawing room, for example.

The master shot includes all the major action contained within this sequence and setting. The cover shots (the brief shots that punctuate and vivify the sequence) will be made later - a close up of the star actor in tears, a two-shot of the hero and heroine in tender embrace, and perhaps medium shots of various member of the family in dramatic grouping. The first effort, however, is to get a master that plays well that is letter-perfect and technically satisfactory.

An actor may have forgotten his line or failed to deliver them to the director's taste. The lights may need adjusting. The hand-propelled camera may have been dollied in too quickly or too slowly. Or the sound recordist may have thought he heard a fly buzzing near the microphone. Whatever the reason, it is always more prudent to be sure.

It is too late to discover, while viewing the days "rushes", that not a single take was free of flaws; even a minor flaw is hugely magnified by the camera lens or the sound amplifiers.

When at last director, cameraman, soundman and producer are all satisfied, the direcotr will "Print nine", (the ninth take).

Two other takes might also be sent to the laboratory, for there is always the possibility that there have been some undetected error in the best take and something worth salvaging in the other takes.

At this point the tedius detail work of picture making begins- the cover shots. Into the master shot are spliced close ups, medium shots, long shots, and dollies, fragments of the scene that, edited into the master, give it a rhythm and the proper dramatic emphasis from moment to moment.

But each shot, however tiny, involves a new camera set up. And each new camera in turn set up involves a new placement of lights, microphones and actors. The action must again be rehearsed, while a script girl checks to ascertain whether, in the master shot, the heroine had set her highball glass down with her left hand or her right, the action from shot to shot must always match.

Cover shots for a scene are relatively short takes, they may be a line or two of dialogue, or merely the closeup of a gesture. But the aggregate amount of time spent in making them far exceeds that spent on the master shot.

3-5.1 TRICK SHOTS

Trick shots are often employed to increase the dramatic impact of scenes. The following are among the many trick processes in general use:

(1) 'MINIATURES'

These are settings made in reduced size and then photographed to appear in their normal proportions. They are used most frequently for scenes of buildings or ships being destroyed. So when one sees large ships being blown off with a bomb or aircrafts being shot down from the air, one must not be deceived, for they are just miniatures that have been constructed and destroyed through this cinematographic trick.

(2) "PROCESS PRINTING"

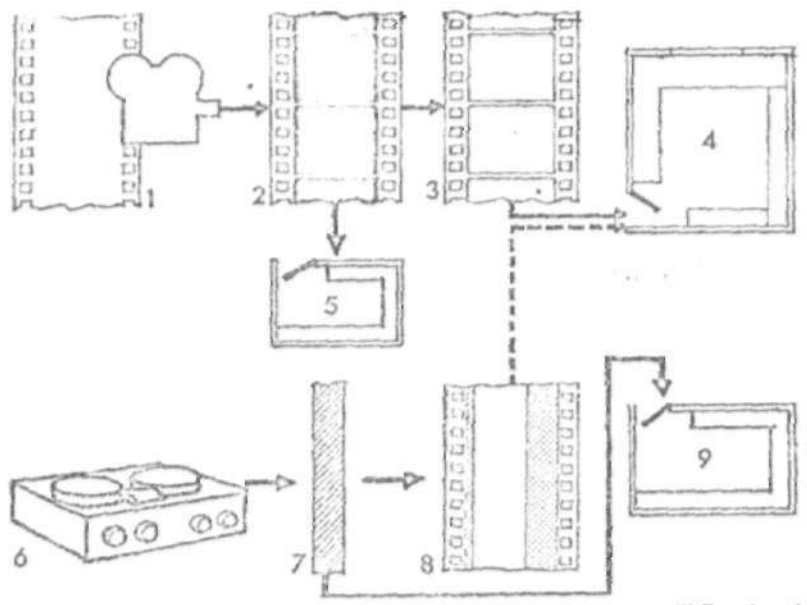
This requires the co-operation of photographers but is achieved primarily by chemicals and the special optical mechanisms of the film - processing laboratory. It is employed in the creation of an impossible or supernatural event (e.g. an actor removing his head and carrying it in one hand)

(3) THE "TRANSPARENT SCREEN" PROCESS

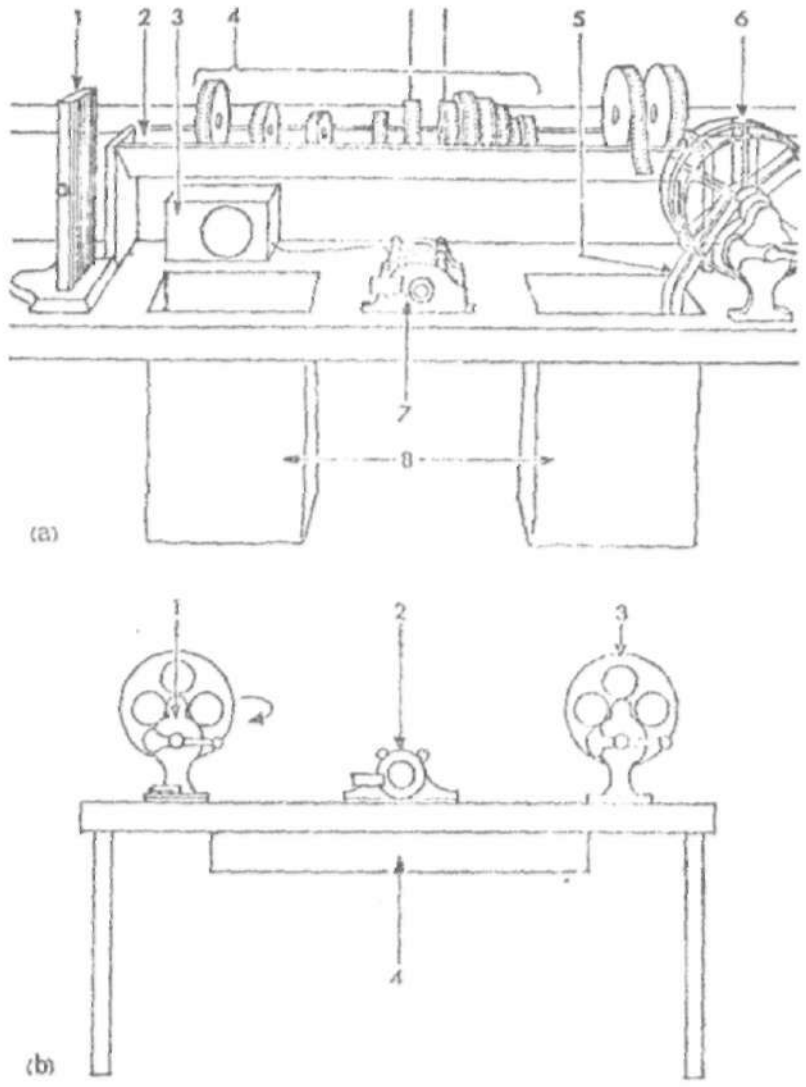
This is a process by which the image of a street is thrown on a transparent screen from a projection booth; actors in a taxicab are photographed in front of the screen and will seem, when the final picture is shown, to be riding down the street.

3-5.2 PRERECORDED SEQUENCES

Somewhat more complicated is the shooting of a musical sequence whether singing or dancing or both. Invariably, the music has been prerecorded on a special, accoustically perfect sound stage. No actress can look her best while straining for a high music note C nor can she sing her best while going through a strenous dance routine. Furthermore, the complexities of shooting a big dance number are such that it would mean the presence of an additional hundred or so musicicans upon the stage. And so the music is record first - the orchestra, the star's voice (or a reasonably exact fascimile), and even the taps of the dancers. The film shooting is done to the accompaniment of these recordings, leaving the director and the cast free to concentrate on the purely visual aspects of the scene and on the co-ordination of the action with the prerecorded sound. The star simply mimes her song without distorting her features or straining her vocal cords. Dances can be photographed without concern for microphones or mike booms; the taps will come through cleanly and precisely at all time.



Original shooting, sequence of operations. (1) Exposed picture negative. (2) Developed negative. (3) Positive work print, delivered to (4) *Cutting room*. (5) Negative storage vault at film laboratory. (6) ½ in. magnetic recording machine, producing (7) ¼ in. magnetic master. (8) Editor's cutting sound transfer. (9) Sound master storage vault.



Cutting bench layout. (a) European style. (1) Film horse. (2) Film rack. (3) Amplifier/speaker for synchronizer sound heads. (4) Broken down film to be cut, picture and sound wound together. (5) Picture and sound leaders. (6) Take-up spools. (7) Film synchronizer. (8) Film bags. (b) American style. (1) Winder, capable of being swivelled. (2) Film synchronizer. (3) Winder. (4) Under-lighting.

PART FOUR

FILM PROCESSING

"Through the movies, Americans have effected a Cultural Colonization of the World".

- Annonymous

FILM PROCESSING

When the shooting of the film is finished either in the exteriors or in the studios, it is unloaded from its magazines and placed in light-tight cans - as far as the door of the laboratory ready for the necessary processing. During the night, it is developed and printed, and in the morning the print is screened for the producer, director, editor, and cameraman. Thereafter the print goes to the Cutting Room, where it is worked on for a period at least as long as that required to shoot the picture.

4.1 THE FILM PROCESSING LABORATORY

This is an establishment organized and equiped to provide services such as processing motion picture film, produce pre-release duplicating internegatives, master positives, duplicate negatives, and workprints , as well as completed release prints for distribution.

The following is a list of some of the principal services offered by commercial motion picture (Film) laboratories:

A PROCESSING

Developing colour or black-and-white camera film, (special overnight, pickup and delivery, or weekend service is available in some places by pre-arrangement,)

B FURNISHING ADVICE

- to help technical or even aesthetic problems.

C. PRINTING AND DUPLICATING

- from camera films for workprints or release prints.

Most laboratories will print or duplicate the camera film after it is processed. They may also hold the original in their vault and forward the print to the photographer for use as a workprint. The original is then protected from damage in handling until it is needed for final conforming.

D. BLACK-AND-WHITE PRINTING

- from a colour original to produce a workprint or a release print.

E. EDGE NUMBERING

- of originals and workprints to facilitate editing.

F. EDITING

- cutting, splicing and assembling as directed by the producer.

G. CONFORMINGS

- Matching the original camera film to the workprint as edited by the producer.

H. OPTICAL EFFECTS

- This is the alteration of a motion picture scene commonly introduced in duplication including "fades, dissolves", and 'wipes", as well as many more spectacular effects.

I. TITLING

This is the process of inserting the name or designation of a film into 'frames'. This is done as a purpose of conveying information about the film, with its story to the viewer. This also includes Design of artwork, lettering and photography.

K. ANIMATION

This is the technique of synthesizing apparent mobility of inanimate objects or drawings through the medium of cinematography. The term is also used for the sequence of drawings made to create the movement and for the movement itself when seen on the screen. This includes Design and production of artwork and photography.

L. STOCK LIBRARY

- This provides footage of standard scenes and events for use in the producers film; i.e. plane in flight, ship at sea, mob scene, sports event, street scene, monuments, parks, out-of-season weather scenes, etc.

M. SPECIAL PHOTOGRAPHY

- requring facilities or equipment not available to the cameraman.

In all the production processes thus far described, and the many other required before the picture is complete, Film passes and repasses through the laboratory - or the lab as it is colloquially but Universally called in the Film Industry. There are however other functions which give the laboratory a special character.

The figure ..... shows in summary form how these functions are organized. The laboratory Superintendent has charge of a number of semi-independent departments. The office routes and reroutes the many orders that come in, and works closely with the Accounting Department.

A CLEANING DEPARTMENT prepares the negatives and other materials for processing - a generic term which covers all laboratory operations.

A CONTROL DEPARTMENT Supervises the many chemical and physical processes within the laboratory, and tests the variable characteristics of the processed film.

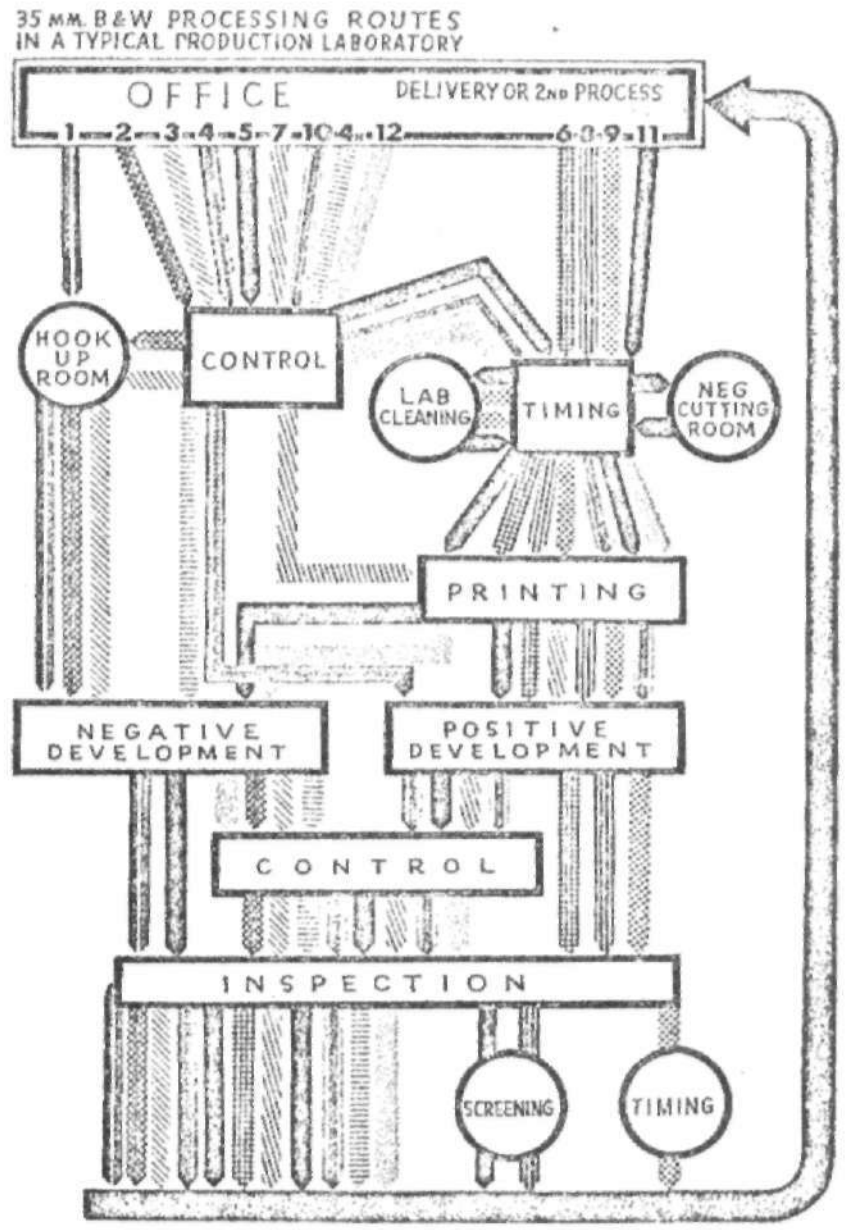
A TIMING DEPARTMENT is required to even up to produce a smooth and well balanced print.

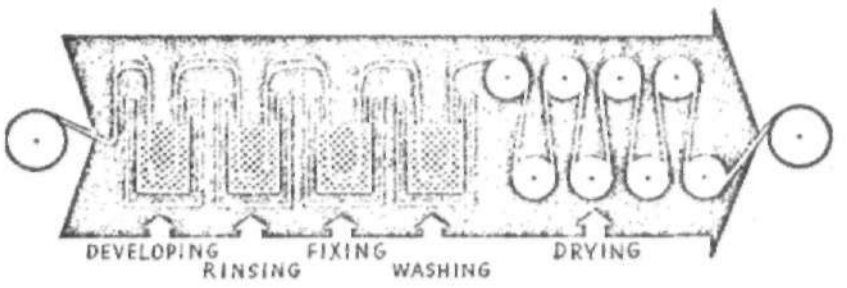
PRINTING concerns itself with the high-speed transference of an image from one piece of film to another, which next requires Development.

CHEMICAL MIXING looks after the supply of the Solutions which are pumped to and from the developing machines. These are grouped together into two further departments, one concerned with 35mm film, the other with 16mm. When the film comes off the developing machine, it must be inspected to see that no mistakes have been made, no unsuspected damage caused.

DEVELOPMENT is at the centre of the process; flanked on both sides by control. Positive (print) development is preceded by timing and printing. All finished material is inspected. Everything that requires a second laboratory process must return to the office and be fed once again through the whole system.

The Technical functions carried on in a laboratory are fairly complex. Dealing with the chemistry and physics of film, they have much less contact with the world of ordinary experience than direction or camera work or even cutting. Unless the underlying principles of processing are well understood, a visit to a laboratory will seem rather like a visit to the Catacounts - a strange world of darkness and mysterious happenings.





Processing sequence in a continuous developing machine.

4-2 THE PROCESS OF FILM DEVELOPMENT

All the laboratory processes stem from the very simple operations carried out by any amateur who develops and prints his own film. The simplest kind of apparatus which the amateur uses, is a series of shallow trays in which the solutions are placed. The first tray contains the developing solution. The strip of exposed film is drawn backward and forward through the tray, while the solution is agitated as much as possible so that fresh developer is constantly brought into contact with the surface of the film. This must be done in total darkness or in a faint light of a colour to which the negative is comparatively insensitive - usually red or green. The next step is to rinse the negative in water in order to remove all trace of developer and so stop the development process.

At this stage, the latent image on the film produced by the original exposure in the camera has been made visible by development. But if it were to be exposed to light, it would rapidly vanish.

4-2.1 THE CHEMISTRY OF DEVELOPMENT PROCESS

Light-sensitive emulsions consist basically of a silver halide ( ). Suspended gelatine Silver Halides are compounds containing metallic silver combined with one of the halogens - bromine, iodine, chlorine, fluorine - and have a peculiar characteristic which is the basis of photographic chemistry.

When light strikes them, it produces a change which is visually quite undetectable. But there are certain other chemicals called developing agents, which have no effect on the silver-halide emulsion if it has not been exposed to light, but which, if the emulsion has been exposed, reduce it to pure metallic silver. If, therefore a surface coated with light-sensitive emulsion is exposed to a scene containing varying highlights and shadows, and invisible image of it (called the latent image) will be formed on the emulsion. When developing agents are allowed to flow over the emulsion they will discriminate between the exposed and exposed parts, attacking the former and reducing to silver, but leaving the latter untouched. If we now look at the film under a faint light, we shall see an image on it, formed in silver. But if a bright light were turned on, it would immediately expose the hitherto unexposed areas of silver halide, enabling the developer to attack them and reduce them to silver. This is equivalent to making the image disappear, for it now consists of undifferentiated silver all over. An overall exposure of this kind is called FOGGING.

4-2.2 FIXING

In order that the image may be exposed to a bright light without danger of its Suddenly Vanishing away, it is necessary to fix it. In the developing agent there is a chemical which will single out the exposed silver halide and attack it, reducing it to silver.

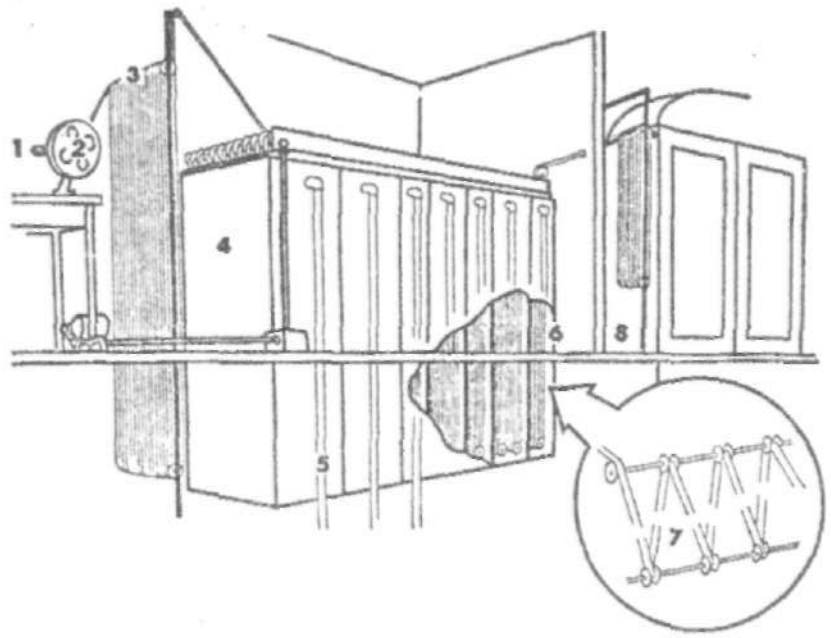
Now we want a chemical which will attack only the unexposed silver halide and wash it away. This chemical is called Sodium thiosulphate, commonly known as HYPO. By immersing the developed films in a solution of hypo, we clear away all the unexposed silver halide, leaving an image consisting of nothing but silver suspended in gelatin.

The HYPO now contains a quantity of silver. If in a large scale laboratory, the used hypo is thrown away much money in lost. Hence a process called SILVER RECOVERY, which electrolytically plates or chemically precipitates the silver in the hypo, is often applied to the circulating system. The pure silver thus recovered is sold, and at the current price, the proceeds will usually pay for all the chemicals used in the laboratory.

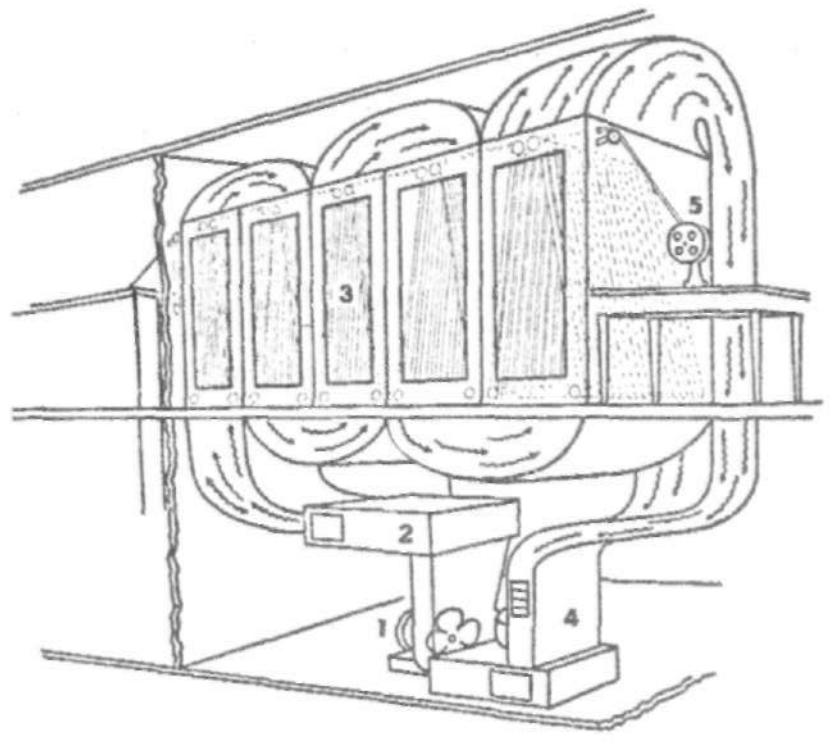
If the hypo were to be left in the emulsion, it would gradually bleach out the image. Consequently the film must next be thoroughly washed in running water, and then must be dried, either by hanging in a room at ordinary temperature or preferably by passing a current of warm, dry air across it. The negative is now ready for printing.

Thus, in brief, the exposed film has to be developed, rinsed, fixed, washed, and dried (see fig -)

Basically the developing process is quite simple, involving only the reduction of silver bromide or iodide to metallic silver to form the opaque image; the bromine and iodine which are released immediately combine with other elements present to form soluble salts which wash away.



A continuous developing machine: wet end. At this end of the machine the film is developed, either in darkness or very subdued light. A table (1) holds the exposed but undeveloped reels of film which the operator receives through a light-trap from the room where they are unloaded from magazines. The reel is then mounted as shown at (2) and passes onto an elevator (3), the lower spindle of which is able to ride upward freely, so that film can continue to feed into the tanks (4), even when (2) remains stationary for a minute or so, as it must do when a new reel is being spliced on. The processing tanks are fed with fresh solution from pipes at the bottom on the far side (not shown), and the overflow is returned through the circulating system by other pipes (5). At 6 is shown a cutaway section of the tanks, wherein the film racks are threaded as shown at 7, where the individual spools are shown with exaggerated separation for clearness. After washing, excess moisture is removed from the film by a squeegee, and it then passes through a light trap into the dry end of the machine. At 8 is seen an additional [illegible] in the dry-[illegible] there is a break in the dry-[illegible], thus preventing loss of film through total stoppage [illegible]



A continuous developing machine: dry end. The dry end of the machine serves no other purpose than to dry the film under precisely controlled conditions of temperature and humidity. A blower (1) forces air into a chamber (2) where banks of heating elements raise it to the correct temperature for the drying cabinets or dryboxes (3). Note that the air first enters the cabinet where it will pick up the most moisture. After passing through the last cabinet, the moist air returns for recirculation through a dehumidifier (4) where it is deprived of its excess moisture. The dried film winds up on a reel (5). (The mechanism shown in these figures is greatly simplified.)

The developing agent is a reducing agent, and a reducing agent is simply a substance which is able to convert a metallic salt such as silver bromide to the free metal, which is itself oxidized to form another compound.

4-2.3 THE DEVELOPING SOLUTION

The developing agent is by far the most important element in a developing solution. But to provide the conditions necessary to make it work properly other substances are needed, and the complete developer contains:

i. one or more developing agents
ii. a preservative
iii. an alkali
iv. a buffering agent
v. a restrainer.

To these may be added auxilliary constituents such as:

a. antifogging agents.
b. wetting agents
c. repressers.

The statement which lays down the relative volume of these chemicals, and usually advises on the order in which they are to be mixed, is called a FORMULA, i.e. A DEVELOPING FORMULA. The different components which go to make up such a formula act separately and so can be considered one by one. But this is only a first stage of approximation, for complex cross-reactions also take place. Even today, in spite of lengthy and brilliant researches in photographic chemistry, 'there are still gaps in our knowledge.'

i) DEVELOPING AGENTS

These are the most important materials to be found in any developer. While certain inorganic chemicals possess the property of reducing silver halide, they are not used in film processing because of their slow speed and staining properties. Instead, a long search through the vast field of organic chemical have revealed a number of organic developing agents which have been successfully used in different branches of photography. But only two of them are today widely used in film processing. One of these, MONOMETHYLPARAMINOPHENOL usually known by the trade names of ELON, METOL, PHOTOL, or RHODOL is a very rapid and energetic developer which brings out fine detail in the image but is somewhat lacking in contrast. The other, PARAHYDROXYBENZEN (HYDROQUINONE, sometimes abbreviated HQ), acts more slowly to give images of great contrast and density but somewhat lacking in detail. By blending these two agents it becomes possible to combine the advantages of both, and to provide within certain limits images of high or low contrast and density. In a developing formula for high-contrast positive prints the ratio of hydroquinone to elon will be much higher than in a formula for low-contrast negative development.

Developers containing metol and hydroquinone are generally known as MQ developers. Two points regarding their use must be borne in mind. First, the effect of hydroquinone falls off very rapidly as the temperature of the developing solution is reduced below the normal 18°c, until about 10°c ( ) it becomes practically inoperative.

Since metol is much less sensitive to changes of temperature, the effect of reducing the temperature of the developing solution is not merely quantitative but qualitative, ie. the preclominance of metol at the low temperatures will tend to give an image lacking in contrast.

Second, hydroquinone will act only in a solution of relatively high alkatinity. Consequently, its effect is very slight in solutions of relatively high alkatinity, such as those frequently used to develop variable - density sound track.

ii) PRESERVATIVES

Since developing agents, being reducing agents, must have a strong affinity for oxygen, they must be protected from aerial oxidation in the processing tanks. For this purpose Sodium Sulphite is usually added. It combines with the developing agent to form complex sulphonates, which maintain their reducing properties but resist oxidation. The quantity of sulphite added is limited by two factors:

a. it slows the developing action, and

b. it has a strong solvent action on the gelatin emulsion and would tend to dissolve away both exposed and unexposed silver halide before development had properly started.

iii) ALKALI

The developing agents reach their maximum practical effectiveness within certain narrow ranges of acidity or alkalinity. As a general rule it may be said that acid baths are slow, and that solutions develop to a given density and gamma faster as they become more alkaline.

To achieve the desired activity, alkaline substances such as sodium tetraborate (borax) and sodium carbonate are added. The effect of these activating agents must be carefully controlled to avoid sudden and unexpected accelerations of developing speed, tending to cause grainy and over developed negatives.

iv) BUFFERING AGENTS

During the life of a developing solution, changes in chemical activity take place because of, among other things, dissolved silver halide content and aerial oxidation of hydroquinone. These changes tend to unbalance the activity of the developer, making it necessary to add a buffering agent - a compound which dissociates slowly to counteract changes in acidity or alkalinity. Borax (an alkali) is often used to counteract acidity and therefore increase the activity of the developer. Contrarily, boric acid is used to counteract alkalinity and so decrease the activity of the developer.

Buffering is also used to adjust the activity of a developer to suit the speed range of a particular developing machine. For example, if a negative stock is found to develop to the required gamma in seven minutes, and if the equivalent of eight and a half minutes developing time is needed in this machine to give adequate fixing when the film reaches the hypo tanks - then careful buffering with boric acid will reduce the speed of development by the required amount.

v) RESTRAINER

Freshly mixed developing solutions will cause a slight chemical fogging (i.e. produce a density not caused by light exposure). To combat this, potassium bromide is usually added to the new bath. After processing has started, sufficient potassium bromide is formed in the bath as a reaction by-product from the bromide contained in the emulsion to render further addition unnecessary. Indeed, it would be unwise to go on adding potassium bromide, since it tends to depress the image density, and thus causes a falling off in contrast and a general appearance of underexposure on the negative. In some formulae, atric acid and potassium metabisulphate are added as restrainers.

These, then are the basic ingredients which will be used to mix the developer. While, in theory, large variations can be introduced into the quantities of the ingredients used, and a satisfactory image still be obtained, in practice the choice is much more limited. This is because with machine development, unlike hand development, only a certain range of developing times is available and this range will vary widely according to the design of the machine.

4-2.4 THE CONTINUOUS DEVELOPING MACHINE

The process of development are the same whether film has been exposed in the simplest Kodak or the most complicated movie camera. But the developing machinery designed around each of these processes is altogether different, for it is suited to physical convenience and to the accuracy of control desired.

Plate - or cut-film cameras expose each picture separately; roll-film cameras usually take eight to sixteen pictures on a roll. Leica type cameras take about 36 pictures. But in a 300 metres of 35mm movie film, there are 16,000 pictures, and this presents complicated new mechanical problems to the designer of processing equipment, as developing machinery is usually called.

Tray development is quite out of the question. Tanks in which the film is wound statically on large racks or spools become very cumbersome if long lengths have to be developed. They were used in the early days, under the title of rack-and-tank development, but are now obsolete.

The answer to the problem is the CONTINUOUS DEVELOPING MACHINE, which is universal except in the smallest laboratories. This type of machine can take many forms, but in all of them the film is driven continuously through the different solutions. In some designs the film runs up and down vertically between pairs of horizontal spindles, and each strand of film is surrounded by a narrow tube through which the solution is passed. This ensures constant movement of the solution past the film. Carrying this a step further, machine, have been designed in which the film does not pass through tanks or tubes, but is sprayed with solution from a series of fine jets. The difference, in fact, is very like the difference between a bath and a shower. In a bath by far the greater part of the water never touches the body at all, while the water close to it may actually become saturated with dirt. In a shower each drop of water comes in contact with the skin and carries away a small quota of dirt.

In the same way, in a spray developing machine, each drop of developer contributes its quota to developing the ~~image~~ before passing back to the main supply.

Most developing machines are not of such advanced design, and merely consist of a large number of strands of film passing up and down in tanks and full of developing solution. These strands of film are wound round spools and sprockety (or rollers in sprocketless machines) on horizontal spindles at top and bottom of the tanks, something like strands of wool in a skein. The structure which carries each pair of spindles is called a rack, and there may be two, three, or more racks in each tank.

In order to increase the agitation or turbulation of developing solutions near the film, a submerged spray is often placed in the developer tanks and fed with solution under pressure. In fact, the whole volume of solution in the developing tanks is being constantly circulated. At a rate of 1.5 litres per second or more, it is pumped to circulating tanks and thence back again to the developing machines. The object of this is to replenish the solution, thus making good the loss of developer sustained in developing the film.

The replenisher is fed from a bleed tank into the main circulating tank. When new solutions are needed, they are made up in mixing tanks, from which they are pumped into the circulating tanks to start their travel round the circulating system.

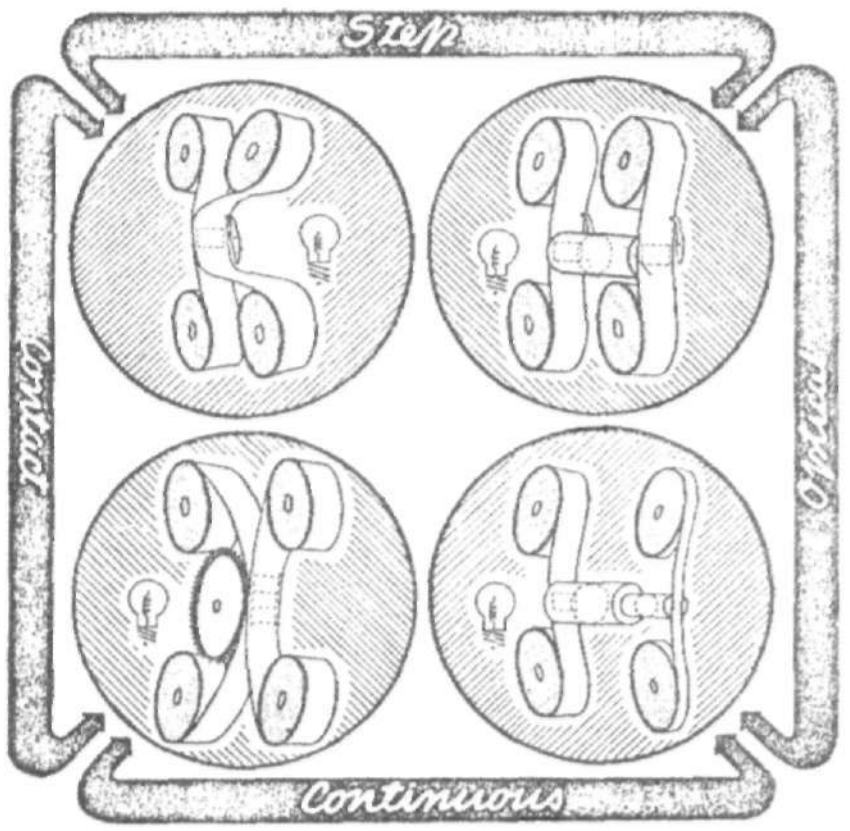
When film passes out of the developer into the rinsing tank, or out of the wash into the drying cabinets, it is usually sprayed with compressed air from very fine nozzles to remove droplets of liquid and prevent them from being carried over into the next section of the machine.

To keep the film from fogging, the tanks so far mentioned must either be self-enclosed or contained in a dark or dimly lighted room which is therefore called the dark end or wet end of the machine. The film image having by now been fixed, the film can pass into the drying cabinets or dryboxes which are known as the dry end of the machine, this section of the machine can be brightly lighted, it is sometimes called the light end:

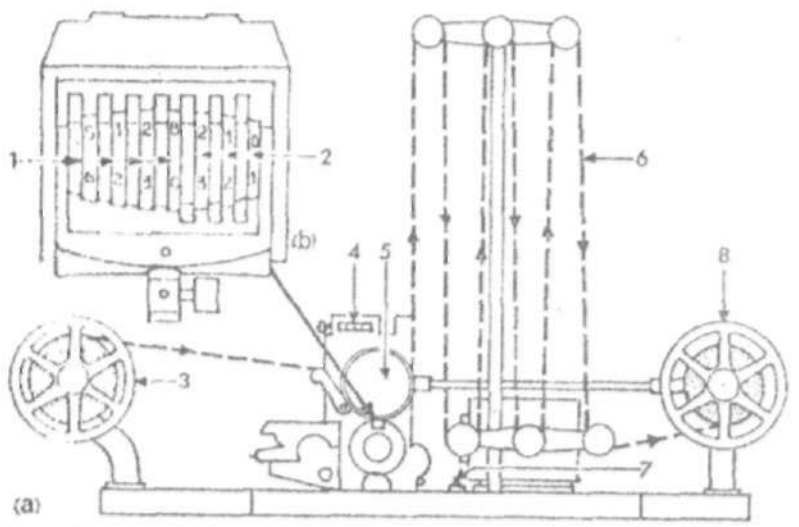
In the drying cabinets the film continues to pass up and down in long skeins, but it is now subjected to a current of warm dry air. The air must not, however, be too hot (lest it cause reticulation or breaking up of the emulsion) or too dry (or the base will curl unduly and become brittle). Finally, the film is wound upon a reel and is ready for use.

Thus, in an over-all view, exposed film comes off a spool or reel at the dark end by the machine, is driven continuously through a series of tanks and cabinets, and finally wound up on a spool at the far end.

Developing machines vary greatly in capacity. Small negative machines may develop 6 metres per minute or 360 metres in an hour - large positive machines 60 metres per minute or 3,600 metres an hour. This is more than twice as fast as film runs in a projector. The speed can be adjusted within wide limits, as a rule, to develop different kinds of stock to different degrees of contrast. This is because the faster the film is run, the shorter the length of time it stays in the developer. The slower it is run, the longer it stays in the developer. The relation between the developing time and contrast is one of the basics of laboratory control.



. The four types of film printer.
Step-contact. Step-optical.
Continuous-contact. Continuous-optical.
(Small claw in upper diagrams indicates intermittent movement.)



Editorial code-numbering machine (a). The numbering block (b). In this example, the first four rings (1) remain static after being set by hand. (2) These three rings are set at 000 and, during the numbering operation, automatically increase by one unit per foot of film passing through the machine. (3) Feed spool. (4) Footage counter. (5) Sprocketed main driving wheel. (6) Film passing through the drying period. (7) On/off switch. (8) Take-up spool.

4-3 THE FILM PRINTING PROCESS

Printing consists essentially of the tranference of a photographic image from one piece of film to another. There are four types of printer in common use, this number being arrived at by combining two sets of two principles (fig.....)

Printers may be either continuous or step: that is, the printing and printed films may either move along at uniform speed, or may be advanced intermittently a frame at a time, as in a camera. Again printers may be either contact or optical type: that is, the printing and printed films may either be in contact with one another while printing takes place, or they may be separated by an optical system which transfers the image from the printing to the printed film, with or without modification. Four types of printer result from these combinations:

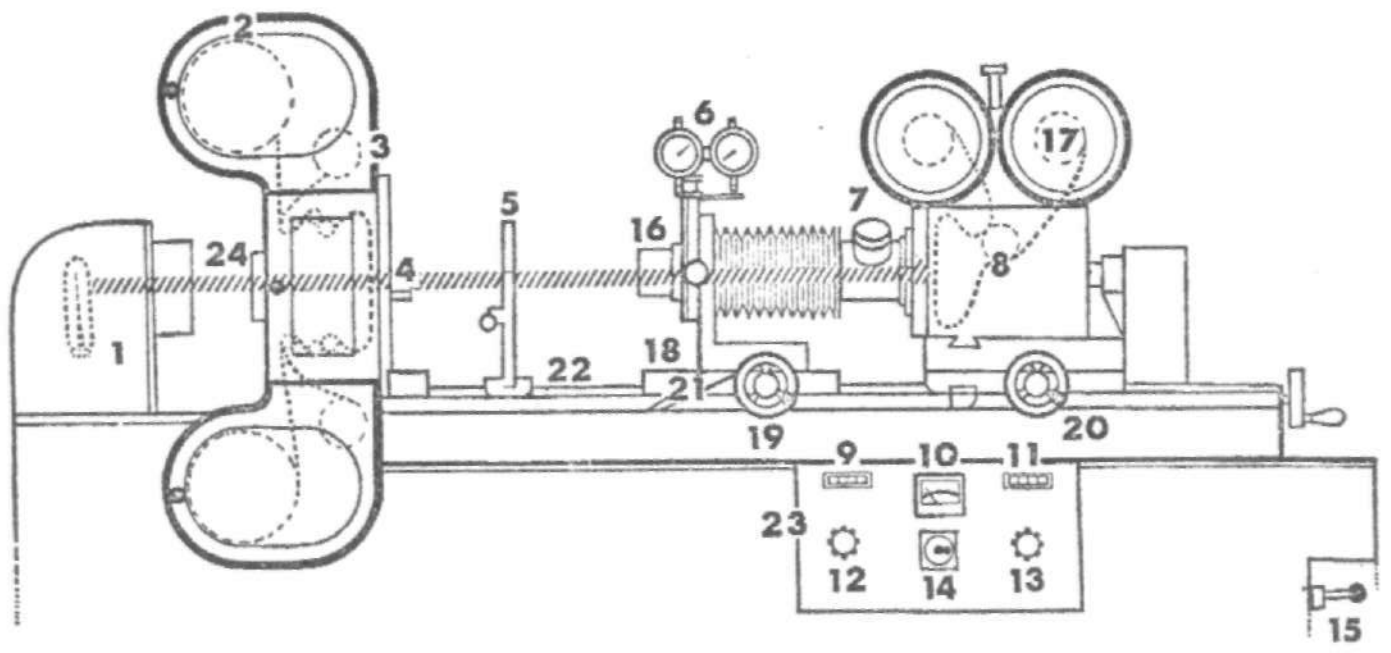
a. the Continuous - Contact
b. the Continuous - Optical
c. the Step - Contact
d. the Step - Optical

THE CONTACT PRINTER

This is the method of printing in which the raw stock is held in intimate contact with the film bearing the image to be copied.

THE CONTINUOUS PRINTER

This is a printer in which the printing and printed (i.e. modulating and modulated). Strips of film are moved continuously along.



. An optical printer. An optical printer consists essentially of only two parts: a projector (2) through which moves intermittently a length of film; and a camera (8) which photographs the image on this film. The projection lamp (1) focuses a beam of light on the film in the aperture (4) of the projector (2). The lens (16) of the camera (8) is focused on the image in this aperture, thus rephotographing it on the film in the magazines (17). The purpose of all the other devices in the optical printer is to make this rephotographing operation as flexible as possible, so as to introduce image modifications of various kinds, as explained in the text. In bipack contact with the projected film in 2 it is possible to run various

THE OPTICAL PRINTER

This is a printer in which the printing image is transferred to the film to be printed via an optical system. Optical printers are used in the production of optical effects because they allow modification of the original image.

THE STEP PRINTER:-

A printer in which the modulating and modulated strips of film are moved intermittently frame by frame as in a camera or projector.

4-4

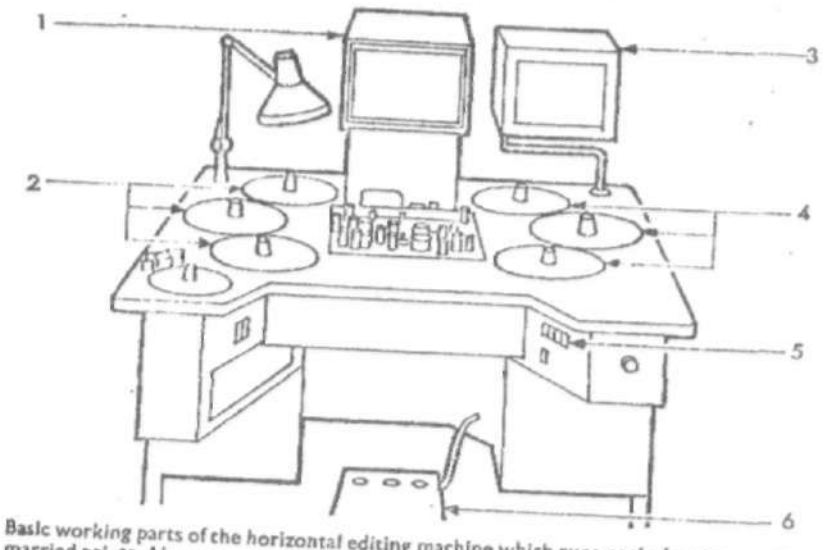
FILM CUTTING ROOM

When the film has been exposed, it is unloaded from its magazines and placed in light-tight cans - as far as the door of the laboratory. During the night, it is developed and the first prints called the RUSHES are made. In the morning the print is screened for the producer, director, editor and cameraman. Thereafter the print goes into the CUTTING ROOM, where it is worked on for a period at least as long as that required to shoot the picture.

The CUTTING ROOM is a place where the film is assembled - that is to say, where a new order in the shots is brought out of the random order in which they have hitherto existed, and a new creative life is given to them. It is an obvious characteristic of the film, that there is no necessity to film the scenes in the order in which they are finally to appear on the screen.



Typical film cutting room layout. (1) 4-spool winder. (2) Film bin. (3) Synchronizer. (4) Bench cut-outs with suspended cotton bags. (5) Film horse. (6) Film waste bin. (7) Window. (8) Viewing machine. (9) Storage shelves. (10) Trims bin. (11) Rewind table.



Basic working parts of the horizontal editing machine which runs optical and magnetic married prints. Also separate picture and two sound tracks. (1) Viewing screen. (2) Feed plates for spooled film. (3) Speaker. (4) Take-up plates. (5) Hand controls. (6) Foot controls.

It is a less obvious characteristic of film shooting that the juxtaposition of two shots and their accompanying ideas can give rise to a third idea which has no physical embodiment.

This is the root of the film editor's power. Instead of dealing with intractable lumps of reality, he deals with highly tractable pieces of film. By clever intercutting, he may so arrange shots of a weeping child, a violent explosion, and a blazing house hence that his audience will think that the child has lost his home and family through bombing. Yet the shots may in truth depict something quite different. "The child may be a Brooklyn Kid who is crying over the loss of his pet kitten; the explosion may be that of a wall of rock dynamitted ten years before to make a railroad cutting in New Zealand, the fire, a peacetime accident in Buenoz Aires". Films has therefore two great powers.

i. it can produce a new synthesis of space

ii. it can produce a new synthesis of ideas.

This facile power of film to create an illusion of reality out of nothing may lead to an irresponsible sense of power among editorial film makers who know that a well stocked film library will furnish them with the materials for constructing any interpretation of world affairs they have a mind to impose without regard to outward actuality or inner truth.

One may ask: " what, then, is reality in film? Is it no more than a literal joining of fact to fact? Or is it an interpretative synthesis of pieces of film, guided by the film makers own perception of the truth?" In that event film becomes as much a subjective art as painting or writing, or any other art which has never made the camera's bold claim of pictorially representing reality as it really is.

This should be sufficient to alter the whole status of film in the public's eyes. It should induce a much more critical watchfulness in the movie audience, and a much more responsible awareness in the documentary director of his power of creating and therefore distorting the truth.

It is therefore now clear that film has a medium with such immense capacities for building a new framework of reality which obviously cannot be upset by a mere rearrangement of the order in which the pieces of a story are shot. The last shot may have been made first, the middle section at the end and the beginning shot in the middle.

4-4.1 EDITING PROCESS

Long before the shooting of the film has been completed, the director begins to supervise its rough assembly. The DAILIES or "RUSHES" - the raw takes just as they come from the camera - are generally viewed sometime during the following day by the director, his producer, and the film editor.

At these secluded conferences, the relative merits of the shots are discussed and the best ones chosen for "rough cut" - the first tentative editing of the footage that come rolling in day by day. The director makes his suggestions and the editor makes his. If a shot went out of focus for a moment, the editor, through repeated screenings of the material, may find that he can cover the lapse by cutting to one of the medium shots. If the film star gave a better suggestion of fright or panic in a two-shot that in any of the close ups, the editor might recommend an optical blow - up that would transform the shot of the two actors into a close up concentrating on the star abuse.



The artist draws directly on film. With the film held lightly in a cutaway camera aperture, the artist draws on it in ink, a dope-sheet at his side indicating the musical rhythms and the sequence of movements required. The film is advanced a frame at a time by a treadle. In a more elaborate development of this machine, an optical system images the immediately preceding frame below the frame being drawn, so that the artist knows exactly what differences of position to introduce.

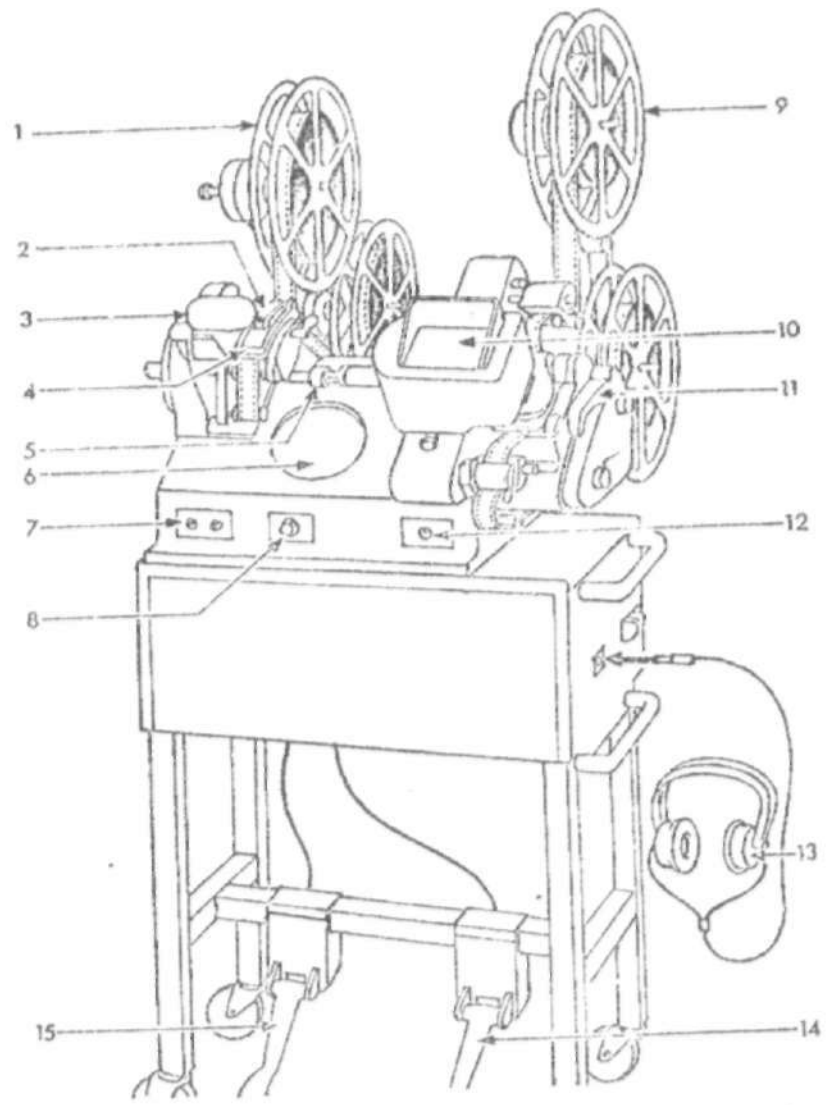
The director carrying the overall plan of his picture in his mind, weighs the editor's recommendations against his own scheme for the sequence and its relation to the entire film. The producer has his decision to make too. He might prefer going back to the sound stage and shooting more footage for that sequence, or perhaps assembling a satisfactory scene from the many takes already printed.

As the weeks go by, the director keeps a close check on his steadily mounting footage, running the roughly assembled work print again and again to insure smoothness and tightness of action. He may look again at the "out-takes", the discarded material from a certain scene, searching for a glance, a gesture, a nuance , which, when added to the earlier footage, will enchance the emotional quality of later sequences. In all of this he works closely with his chief editor, who in turn supervises a squad of assistant editors, cutters, and negative cutters.

It is really the editor's sense of timing, his feeling for the psychological moment to switch from long shot to close up, and his ability to create a smooth, almost imperceptible transition from one shot to the next that give the picture its fluency, its place, and its visual impact.

4-4.2 THE DESIGN OF FILM CUTTING ROOM

The cutting room is the editor's workshop. All handling, editing, filming and storage of the positive film in production takes place here. The actual size of the room or rooms in use and the number of staff required to handle a film are largely determined by the size of the production itself. Adequate cutting number facilities must be provided so that all material can be sensibly tabulated and not allowed to accumulate in an atmosphere of confusi



Basic operating parts of the Moviola. (1) Sound take-up. (2) Magnetic reproducing head. (3) Photographic sound reproducer. (4) Sound gate. (5) Coupling bar for synchronous picture and sound viewing. (6) Speaker. (7) Constant speed motor switches. (8) Amplifier/volume switch. (9) Picture take-up. (10) Viewing screen. (11) Hand-brake. (12) Variable speed motor switch. (13) Optional head-phone outlet. (14) Variable speed foot switch. (15) Constant speed foot switch.

4-4.3 BASIC REQUIREMENTS

Several simple mechanical actions form the basis of film handling in the cutting room, however unelaborate it may be. For these tasks, the cutting room is fitted out with certain items of equipment - everyday tools of the editor.

The most practical way of handling any material of great length is by winding from one spool on to another. At all stages of editing the film mus' be wound back and forth many times during the day. Benches are therefore equiped with winding and rewinding mechanism.

Even the simplest film sequence requires the handling of separate picture and sound film rolls. As they must be syncrhonized with each other, side by side, there must be some means of maintaining synchronization of both rolls of film as they are wound. For this, there is a film synchronizer.

The editor has to examine all the film in his room, viewing and reviewing, as he decides the pictorical shape of each sequence. He must have some means of quickly and easily doing this without the complications of intricate film - treating. So there is a viewing machine.

The editor, working on his first assemblies examines the film, and selecting or rejecting various pieces of film, he gradually builds up the sequence. Therefore, apart from having some means of physically cutting through the film, he needs bins and containers fitted with rags and pegs, or pins on which to hang the separate pieces of film.

The sound track too requires editing. As most sound tracks are recorded invisibly on magnetic film, he requires some means of listening to the sounds and "searching" for individual words.

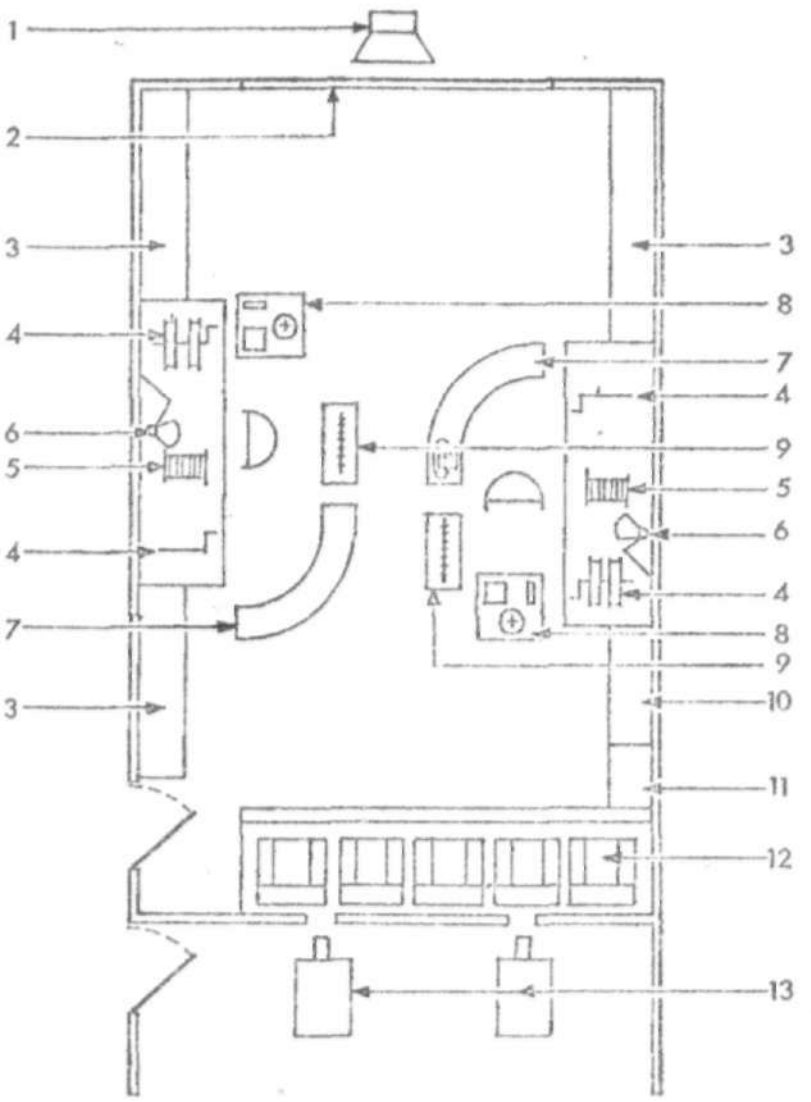
Film which has been cut into sections must be joined together and some means of fast and accurate splicing is necessary. Unused sections of film, and film as yet uncut, is stored and filed with some easy reference for locating the pieces. Labelled film tins or boxes, storage shelves and film racks are required for this.

The large amount of paperwork which accumulates; negative reports sound reports, laboratory reports, continuity reports, and so as will rapidly get out of hand unless a system with clips and hooks mounted in strategic positions in the room is instituted.

The whole organization of the room and equipment needs to be one of calm order if the general air of efficiency is to be maintained as large masses of film begin to accumulate.

4-4.4 DUST FREE CONDITIONS

All floor and bench surfaces should be made of a material which is neither rough nor dirt-accumulating. Film being wound across the surface of a bench is bound to come into contact with it occasionally and the smoother and cleaner the better. The film is certain to meet the floor, too, once a while. No matter how careful one is when handling large quanititics these are occasions when it seems to come alive and fly out of one's grasp: Sometimes bins become overfull and spill their contents on to the floor. So a smooth clean floor will cause less damage. Static electricity builds up surprisingly in film when it is being wound and handled, and can attract dust wherever it may be.



Layout for cutting/projection room. (1) Sound speaker. (2) Screen. (3) Storage shelves. (4) Winders. (5) Synchronizer. (6) Bench light. (7) Table with shelves. (8) Viewing machine. (9) Trims bin. (10) Cupboard. (11) Waste bin. (12) Viewing chairs. (13) Forward/reverse "cold light" projectors. Items duplicated for editor and assistant.

It gathers in the layers of a film roll and the abvasive action can cause much damage, especially when the film is new and soft.

General cleanness and careful treatment of the film by all who work with it is essential at all times, even though only positive, working prints are likely to be handled. As more and more is done sequences, built and rebuilt, changed and cut again, physical damage done to the film will cause much distress when viewings take place in the projection room. It is extremely dififfcult to judge quality and effect of scenes when there is such evidence of careless handling and brutal scratching.

An ideal perfect cutting room has been described by Ernest Walter in his book: THE TECHNIQUE OF THE FILM CUTTING ROOM

> "The Space is quite adequate for three people, all with excellent benches and each with room for viewing machine and film bins. Walls and surrounded by shelves, racks and cupboard space. Swivel chairs are mounted on rollers and benches of correct height, so that you don't have to sit at the viewing machine and then stand up at the bench; it is only a simple matter of shunting back and forth on the chair between the two. The editor and assistant each have a table, curved at their side and to the rear with shelves and drawers for script, reports, pencils and notes. But the most attractive aspect of all is that the cutting room is also the projection room. A screen at one end and a small booth installed at the other with "cold light" projection machine capable of forward and reverse running available at all times to the editorial crew. The cutting room should if possible not be too distant from the prjection room. And, when within the studio should not be too far from shooting stages where the film unit is working".

P A R T F I V E

S O U N D D E P A R T M E N T

"Unless the underlying Principles of Film Processing are well understood, a Visit to a Laboratory will seem Rather like a Visit to the Catacombs - A Strange world of Darkness and Mysterious happenings".

- Raymond Spottiswoods.

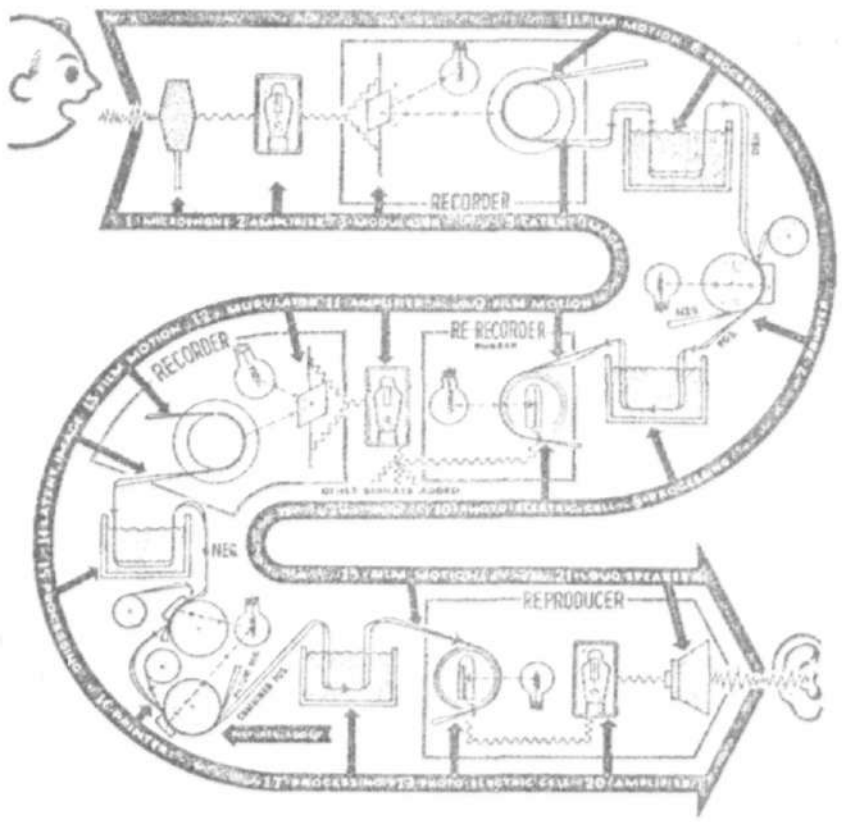
5-1 SOUND DEPARTMENT

The aim of the sound department is to produce a single strip master dubbed sound track, correctly balanced for each red of picture. This is then combined with the cut picture negative at the laboratory to produce exhibition prints.

By a series of "pre-mixes", many dialogue, effects, and music tracks are gradually grouped together. Thus, the final result can be mixed from a relatively small number of pre-grouped sound components.

The sound engineers work in a projection room equipped to project the picture on to a screen while many synchronous sound reels are simultaneously running on sound reproducers. To achieve the correct balance of overall sound they have individual volume and tone controls for each sound reel. These are arranged on a special console. Each sound machine sends out the individual signals contained in the assembled sound tracks. After rebalancing, that is matching them with one another for loudness and quality, they are transmitted through the console to the single film roll on the recording machine.

Each machine, or "re-recorder", handles one reel of sound film at a time. There are therefore several re-recorders, and they can be in synchronism with each other and with the picture projector. The number of these re-recorders in use at any one time is governed by handling capacity of the mixing console. They are designed to reproduce either magnetic or optical sound and, when of the magnetic type they can be converted to reproduce single-track, three-track, four-track or six-track multiple recordings.



. The recording, re-recording and reproduction of sound on film by the optical method, from the speaker's voice to the listener's ear.



. The three sources of film material.

The recording machines receives signals as they are finally balanced by the sound mixing engineers. It can be a film or tape recording machine, fitted with single or multiple recording heads and there are magnetic and photgraphic film versions for whichever may be required.

TYPES OF SOUND RECORDED

There are about three different types of sound recorded in the film studio. These are:

i. DIALOGUE

ii. MUSIC

iii. SOUND EFFECTS.

All these after being intricately recorded in acoustically designed rooms, are technically mixed together before finally being married with the picture to produce a single film.

The art of sound recording for motion pictures has developed dramatically, Apart from a continuous improvement in sound quality two particular developments have markedly affected the technology and practices.

The first was the discovery that there was no need to record the sound on the same film and in the same camera as the picture. On many occasions several pictures are taken from different points of view of the same scene which has only one sound record. Or several sound records may be taken. It is far more flexible for subsequent handling (starting with the developing, which can be specialized)to take the sound recording or recordings in a separate box under the care of a specialist.

In later editing processes, the editor can cut in such segments of the picture film as best fit the development of the story, but they are all anchored to the same time sequence of the sound tracks.

For this, it is necessary to have absolute synchronism between the various picture films and sound recording.

The second change in technology was the advent of Magnetic Sound Recording. The big advantage of this technique is that it provides improved sound quality, thus permitting greater flexibility in editing procedures. When a sound track is copied, the copy is not as good as the original, and a copy from the copy is poorer yet, and so on as successive copies are made, the amound of degradations of each step, however is less if the process gives a more faithful rendering in the first place. Thus magnetic recording permits the use of successive copies in editorial process while still giving the fianl copy adequate quality for exhibition purposes.

Also Magnetic tape or film does not need to be developed but can be used as soon as made and does not need to be protected from light. The result is that most of the present original sound recording for motion pictures is done magnetically. On the other hand, most of the 35mm film projected in theatres carried a photographic sound track, as most theatre projectors in current use are equiped with optical sound reproducers, thus requiring the magnetic sound track in the exhibition print.

5-2.1 CHOICE OF MICROPHONES

Much of the equipment and proceedures in Motion Picture production is more or less the same whether the process used is optical or magnetic. The microphone is an example. Microphones of many different kinds have been used for sound recording. These may differ in sound quality in directional characteristics, in practical conveniences of use and in other characteristics.

Conditions that may dictate the choice of a particular microphone include the presence of minor echoes from objects in the set or reproduction of speech in a small room, as distinct from that in a large hall. Painstaking adjustments are made by careful attention to the choice of microphones, by:

i. the arrangement of walls and furniture on the set
ii. the exact positioning of the actors.

For recording a conversation, the prefered microphone is sensitive in a particular direction to reduce extraneous noises. It is moved toward each actor in turn. The boom used to hold the microphone in these cases resembles that used for small lights. Microphones can also be mounted on a variety of other stands. If necessary, a chest microphone that is hidden under clothing may be used.

When several microphones are used on the set their outputs are often mixed and reproduced on a single film or tape. The mixing is done at a small console, and the operator must use a high degree of skill. Sometimes this is done in the later editing or dubbing processes.

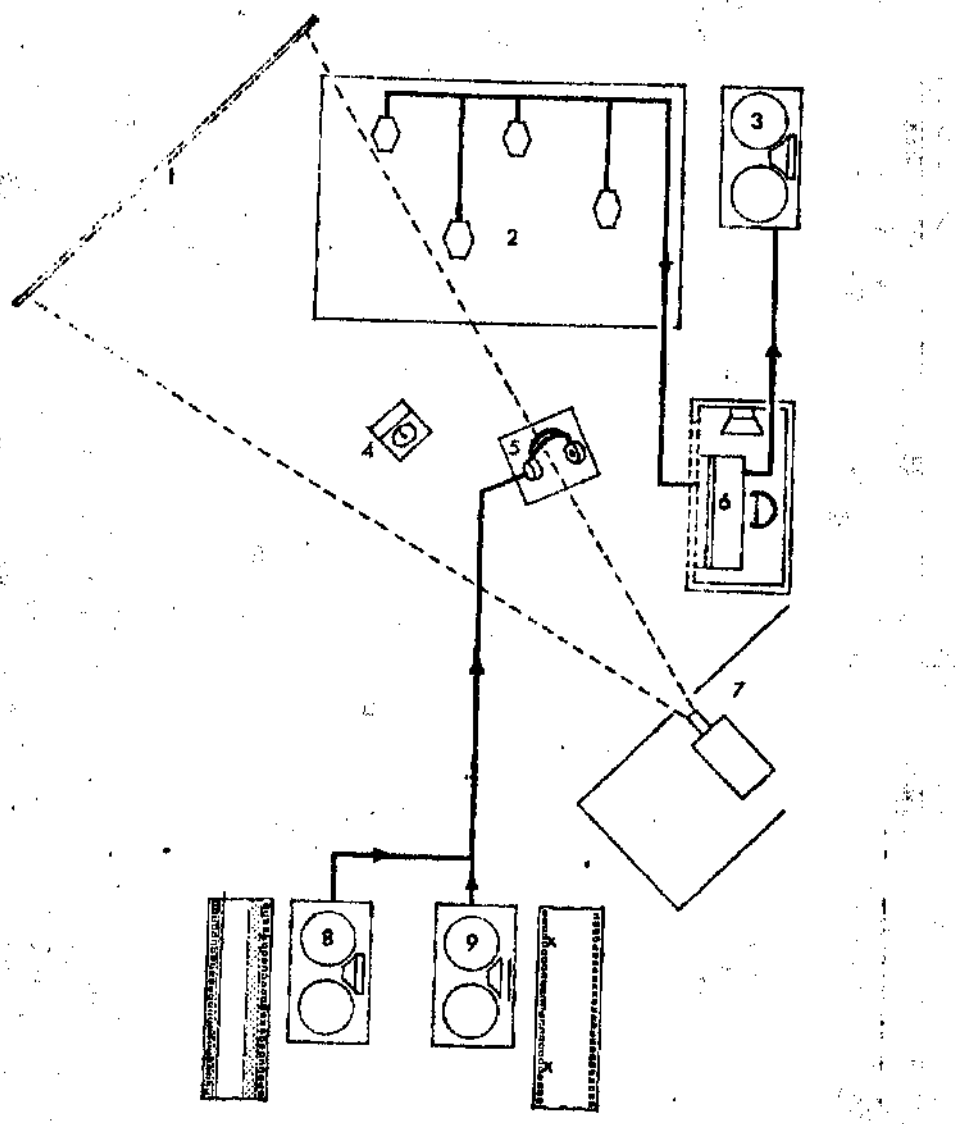
5-3 MUSIC EDITING

Film music can be divided into two main groups, each with its particular function. The pure musical sequence and the featured visual music section of any scene perform an obvious function. But scored music for background use is rather a different problem. Not only must it be written with great thought and skill but also the areas of the film which are to be enhanced with such music must be chosen with care. Just as the sound editor assembles his sound effects to create an almost musical effects in some sequences, so the music composer creates the instrumental background, to become at times an additional sound effect in itself. Often, it is an augmented effect blending with a dialogue scene so that one is almost unaware of its musical presence yet, adding so much to the value of the scene.

It is generally during the shooting phase of a production that the composer enters into the creative team. Although most studios still matintain a music department with a permanent staff of conductors, composers, and arrangers, a composer is frequently brought in from outside of a particular film.

5-3.1 MUSIC COMPOSER

His first job is to capture the "feel" of the film under way by reading the script, looking at the rough cut, and consulting the producer and director on their ideas of how, where and what music should go into the picture.



The music recording stage. (1) Projection screen. (2) Many microphones suspended over the orchestra. (3) Magnetic sound recording machine. (4) Visual timing indicator for the conductor. (5) The conductor. (6) Sound mixing position in the monitor room. (7) The film projector. (8) Re-recording machine reproducing the working dialogue track. (9) Re-recording machine (photographic system) reproducing the click track.

Most directors, aware of the emotional colouring and emphasis that can be added to a scene by the score, will use music to establish the mood of a scene. Ideally, the development of musical themes and ideas takes place while the film is still in its shooting phase so that once the camera work has been compltd, the composer is left to concentrate on the more mechanical aspects of his art - developing his score against specific scenes and timing it to fit. He works with the rough cut studying the tempo of each scene, noting where the dialogue falls, and where any other significant sound might be obscured by a flourish of the trumpets or a blast from the tympani. Beyond this be knows no limitations.

There are no rules to say that for every hour of picture there must be thirty minutes of music, that every love scene must have violin, or that every act of villainly be heralded by a menancing theme in a minor key. The kind and amount of music for a picture is an artistic decision dependent upon the taste of the producer, the director and the composer himself.

Once a score is completed, it goes into rehearsal with a studio orchestra, sometimes the composer conducts his own work; not infrequently, however this is done by a studio staff conductor for there are many technical details quite apart from the sound of the music, that must be considered.

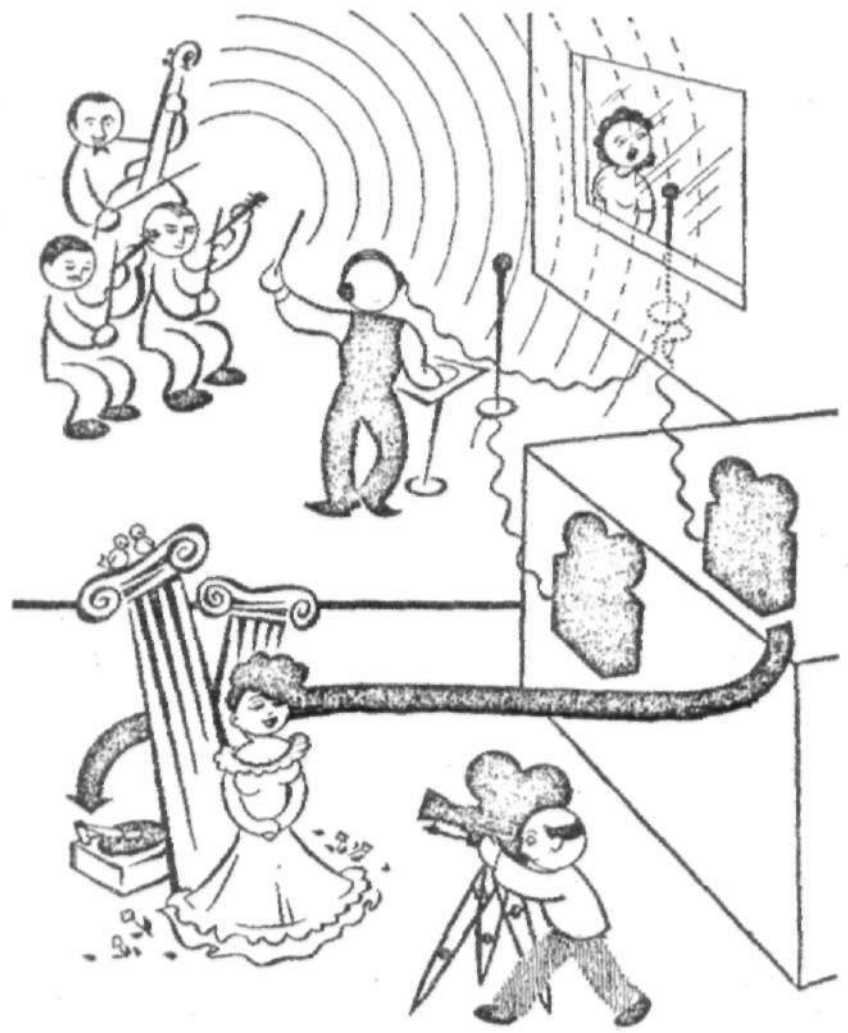
5-3.2 THE RECORDING SESSION

At the recording session the conductor, wearing earphones, stands facing his orchestra and a screen placed high above their heads.

When the sequence to be scored flashes on the screen, punch marks on the sound track indicate precisely where the music is to begin. As the orchestra plays, the conductor attempts to synchronize the music and the action to make the two to complement each other. Through his earphones he hears not only the dialogue and sound effect, for the scene on the screen but also a "click track" that acts as a metronome to establish his tempo.

He listens for the balance between the words, the natural sounds and the music, alert to any blurring that might obscure the sense of a scene. Often the composer is also present at these sessions ready on the advice of the conductor to hastily extend a phrase or eliminate a few bars and thus enhance the overall effect.

Music - and all other elements of sound as well, including the dialogue is recorded on separte strips, or tracks of film. Throughout the shooting, wherever the director looks at his rushes, the picture is shown to him on one maching, while the sound is played on another projector, interlocked to the first. In this way the cutting can proceed freely, without being chained to the sound track. Often a scene may be altered so drastically during the editing that the dialogue must be re-recorded. Or it may develop that a scene which photgraphed well proves to have a faulty track. Or a sequence taken on location may have been shot "wild" without its proper synchronized sound. For all of these reasons, the post-recording session has become an accepted practice once the shooting is over. Specifically it is a time to correct and complete the recording of any faulty sound sequences in preparation for the final session when all the sound tracks for the picture will be brought together and "mixed" with each other.



. The technique of prescoring and playback with singer and orchestra. The conductor, tapped into the singer's recording line, is able to hear her voice through headphones, while she hears the orchestra by controlled acoustic leakage into the voice recording studio. Voice and orchestra are separately recorded, and additional discs or magnetic records of the voice part are played back on the studio floor to enable the actress (who may be beautiful but dumb) to synchronize her lip movements while appearing to sing. All equipment shown here must operate synchronously. (Many variations of this basic technique are in use in the studios.)

Post-recording is generally done in a small acoustically treated room where every sort of sound quality can be achieved synthetically. By adjusting panels and altering the textures of wall surfaces, the recordist can produce the closed-in sound of a "satiny boudoir", the bomming reverberations of a railway station, or a clear, live, outdoor sound. For this session, the shots are broken down into loops that can be run continuously over and over again without pause, through the projector.

The actors, standing before a microphone, watch the film repeatedly until they can synchronize their words to the moving lips in the picture. The sound take is made and the resulting track added to the mounting reels of sound that will be brought together in the final recording or mixing session. (This process, incidentally, is identical with that used to "dub" foreign films into other languages - with the sole exception that in foreign films the entire picture must be dubbed, and the actors must try to fit the language used to the original lip movement).

5-3.3 THE MIXING SESSION

The mixing session - which can last for several days - generally takes place in a studio about the size of a large room with a small screen at one end, a large desk covered with dials and knobs at the other. Near the screen is an illuminated meter, very much like an oversized mileage counter in an automobile; it keeps track of the footage as it races through the projector. At least three men sit at the desk, the chief recordist and his assistants each with several sound channels that he can control by twisting the knobs before him. For here is where all the many separate tracks - at least a dozen, and in elaborate stereophonic productions, upwards to thirty - that will make up the final composite sound track are combined together, balanced against one another, synchronized to the visuals and mixed.

These tracks include:

i. Voice tracks recorded at the time of shooting

ii. the pre-recorded song or dance material

iii. the post-recorded changes and addition

iv. the "wild" tracks of natural sounds recorded on location

v. the musical score

vi. the studios library of recorded sounds, the numerous special effects that add realism or illusion to a scene.

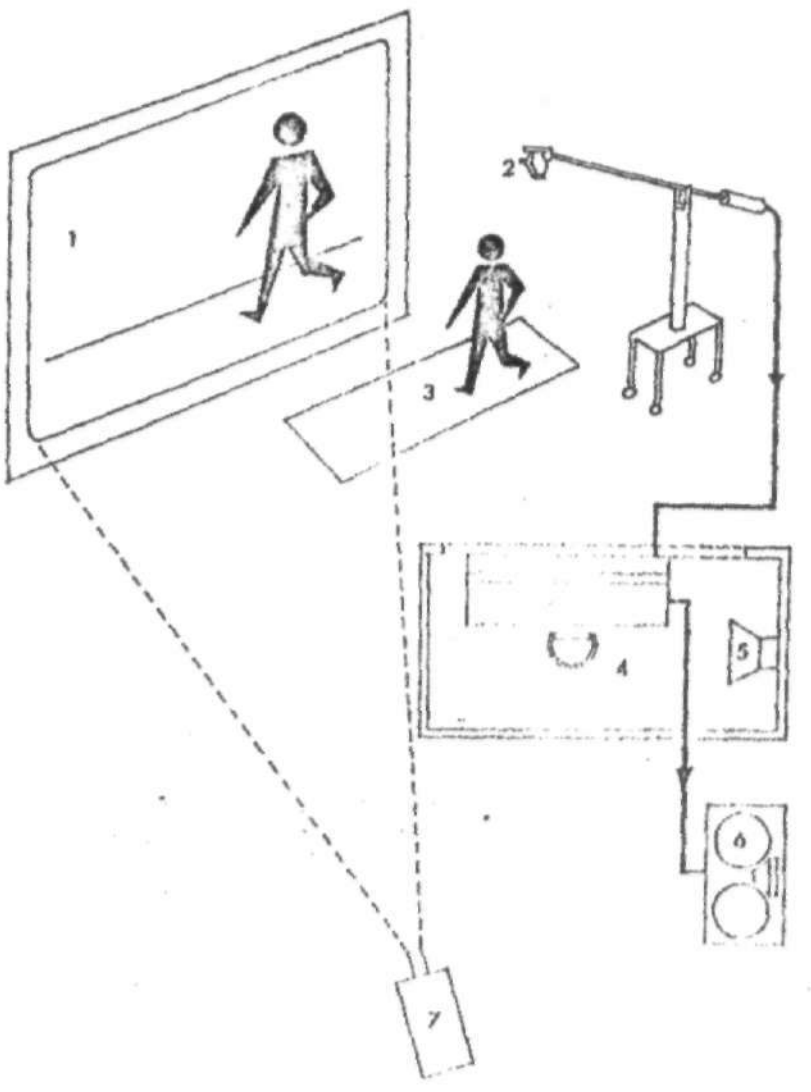
Each sound is mounted on a separate reel and each reel is assigned to a separate recording channel. Some of these - the dialogue, the music tracks - unreeled with the picture, others - galloping horses, a ranging torrent, a forest fire are spliced into continuously running, endless loops that can be faded up or down as needed.

As each scene unfolds, the recordist turn their dials, combining the various sounds and sound levels from each channel into one carefully balanced master track.

5-4 SOUND EFFECTS

Perhaps the simplest special effect is the gradual dissolving of a scene by a slow reduction of contrast until it disappears into either a uniform field or another scene. This is frequently carried out in a preparation of the final film negative.

Another method involves "wipe" patterns in which the scene grows from a small part of the frame until it emcompasses the whole frame. This is accomplished by the use of a "travelling mask" on an auxilliary pair of films (one the negative of the other). On the first print through the positive mask the first scene is exposed on the fresh film.



Post-synchronizing footsteps in the effects theatre. (1) Screen. (2) Recording microphone. (3) Various surfaces, as required. (4) Sound recordist in monitor room. (5) Monitor speaker. (6) Recording machine, carrying a virgin loop of magnetic film. (7) Projector, running the picture loop.

On a second printing through the negative mask the new scene is printed on the exposed part of the fresh film.

To print conveniently and simultaneously requires a special-effects printer, which is usually a specially designed optical printer. The machine becomes relatively complicated when several films are involved in the special effects.

Another type of special effect is the projected background. If, for example, it is desired to photograph the actors before a remote background, such as a street in a foreign city, or say the Pyramids of Egypt, an ordinary shot of the location perhaps taken from stock, is projected in the studio onto a transluscent screen. Necessary precautions involve synchronizing the taking film with the projected one and adjusting the colour. It is usual also to use a pin-registered intermittend for the projected film so that the background scenes do not show vibrations, with respect to the actors. Some very convincing pictures can be taken this way.

The term SPECIAL EFFECTS also include more ambitious simulations. A background can be painted on a backdrop as in the live theatre. Sometimes a large glass sheet is used; the actors and the immediate surroundings are photographed with built-up scenery, but the more distant objects are painted on the glass with the junction merged into a feature of the locale.

It may even be desirable to compress the actual distance in a condensed background by falsifying the perspective with exaggerated building and street angles that merge with the foreground. In this technique the camera point cannot be changed as it would reveal the false perspective at the merger.

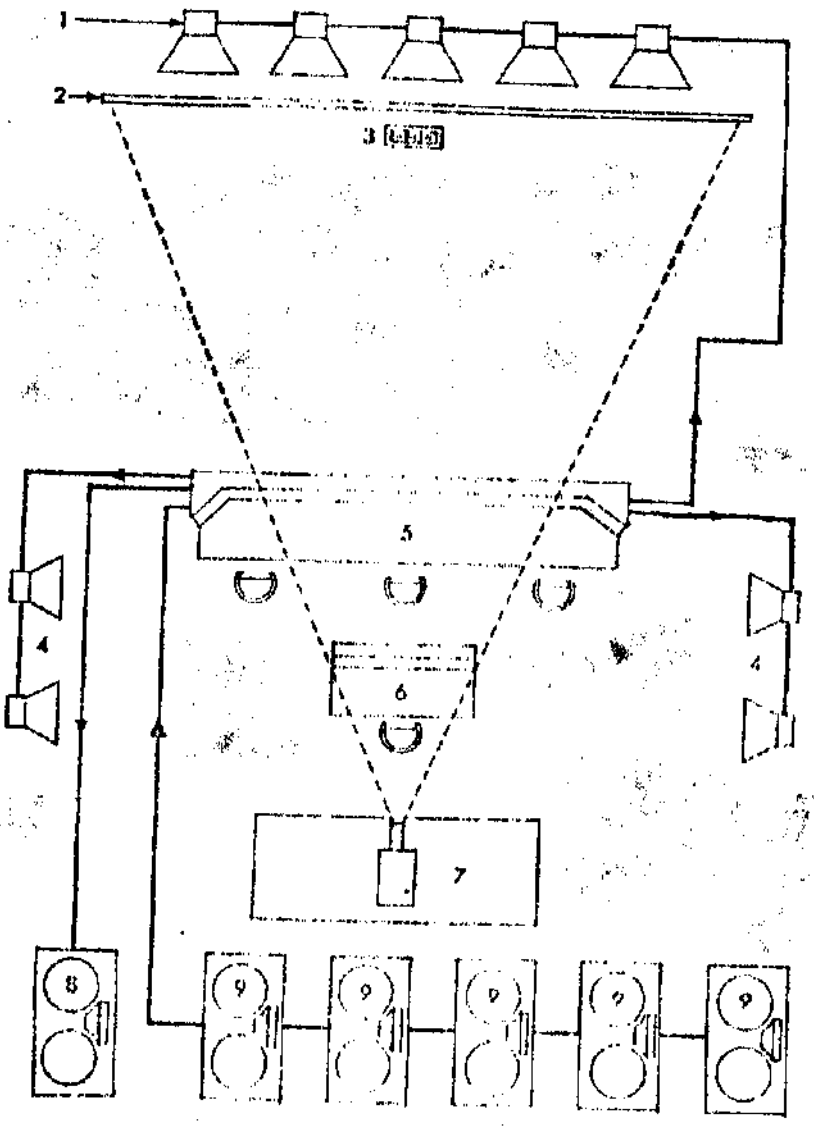
A large proportion of scenes accepted by audiences as genuine, such as country scenes, aeroplanes or motor-car crashes, parts of large sets, even apparently simple scenes such as close-ups of characters in a dance as well as more obvious fakes such as earthquakes and ghost effects, are actually the work of the special effect department.

5-4.1 Use of Models for Special Effects

A practice that is not really a special effect but can be noted is the use of full-scale models of heavy stone, brick, or other materials made in cast plastic foam. Some remarkably convincing structures, inexpensive add light to handle can be built up in this way. Scale models often require changes in the time scale and a great deal of care about perspective. A disaster at sea for example, or an automobile plunging of a cliff can be simulated with scale models and a speeding up of the frame-taking speed.

5-4.2 Effect Props

Many props are required in the recording studio to recreate suitable sounds. Bottles, glasses, cuttery, doors telephone typewriter, water tank etc; are only a few examples of quite a formidable list of items the sound editor must get together. Some synchronizing sound studios are designed purely for effects shooting. Strips of permanently laid flooring of various types such as wood, concrete, gravel and sand are an important feature. Various door mountings, beels, etc are among the various items always available.



Multiple track re-recording theatre set up for 6 track system. (1) The five main channels for the behind-screen area. (2) Projection screen. (3) Footage indicator. (4) Surround speakers. (5) The main three-position mixing console. (6) The second, single-position console from which travelling sounds will be "panned". (7) The film projector. (8) The master magnetic recording machine. (9) A series of re-recording machines, synchronously reproducing the working sound tracks.

5-5 SOUND DUBBING

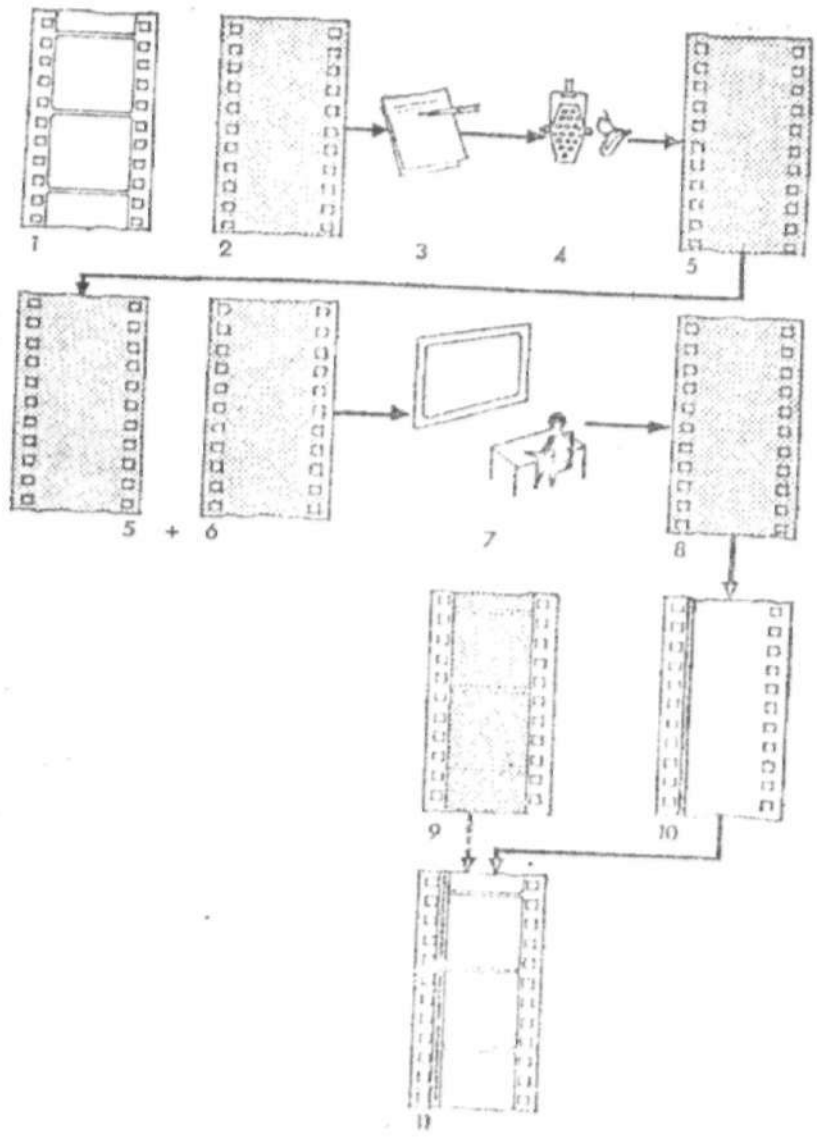
This is the process of mixing and balancing many sound tracks into one final sound track. It is also used to describe the post-synchronizing of original and foreign language dialogue. In some countries, dubbing specifically refers to such post-synchronizing and in this case the final sound track mixing is called re-recording which is an electrical process of transfering sound records from one or more films or discs to other films or discs.

Dubbing is a term generally used to indicate a sound track that was added during an editing stage rather than recorded at the same time as the picture. It can include:

a. the addition of incidental background noise to add to the realism of a scene.

b. provision for the substitution of a voice recording made under more favourable conditions than those prevailing during picture taking and can be made before or after the picture is taken.

In pictures that present singing or operatic quality, for example, the singing may be accompanied by facial expression that are not attractive in close-up (which in an opera would not be noticeable to an audience) such scenes can be pre-recorded or post-recorded due care being taken to assure exact synchronism between the sounds and the lip movements. In musical productions in general, a better recording of the music can be obtained in a separate session in a sound studio than on the picture set, with the result that filming is made with only a taken orchestra. Some times an addition dubbed in can be only a commentary on the action in a picture. In all of these cases the sound and the picture recordings are merged in an extra editing session of the production film.



Foreign versions. (1) Picture dupe work print and (2) working dialogue track sent to foreign dubbing centre for dialogue translation (3). (4) Foreign dialogue post-synchronizing to produce (5), foreign synchronized dialogue track. Foreign dialogue track combined with M & E track (6) in foreign dubbing theatre (7). This produces foreign master dubbed sound track on magnetic film (8) which is then transferred to the photographic sound negative (10). (9) Duplicate picture negative combined with (10) photographic foreign sound negative to produce foreign combined print, (11).

P A R T S I X

. PREPARATION FOR PICTURE NEGATIVE CUTTING

. Final Responsibilities

The whole power of the Film lies in the Representation of Themes and Motives, Presenting them Filmically for the pleasure or sadness of the Spectators, According to their Degree of Sensitivity".

- from Film Till Now

by Paul Rotha and Richard Griffith.

6-1 THE IRREPLACEABLE NEGATIVE

The work print of a film contains material from three different sources:

a. Cameras shoot part of the footage in the studio and on location.

b. the library supplies some from its files;

c. some comes from the filming of inaminate objects like maps and title cards or the rephotographing of other shots with special modifications such as fades and dissolves.

The work-print is a positive, which has been used most often for all editing processes. It is like the succession of snapshots in a photograph album - pleasant to look at, but valueless if a great number of copies have to be made. The whole essence of film lies in its power of being multiplied almost indefinitely. Until a feature picture has been duplicated hundreds of times for running in thousands of theatres before millions of people, it has little chance of returning its original cost, which may amount to two or more million dollars. Hence, like the amateur who puts his negatives away in an envelope ready for reprinting, the professional must have his own negative amounting to many hundreds of thousands of metres accurately and safely filed away in the film library.

When the workpint has been finally approved by the editor and producer of the film, it goes to the NEGATIVE CUTTER, whose duty it is to pick out the negatives (or reversal oringals) for every shot in the film, and cut them to match exactly with the shots in the workprint.

Before negative cutting, the cutter usually makes a shot list which number the shots in the film form beginning to end, and lists the edge numbers, a description of shots, the source, and the footage.

The purpose of the shot list is to enable all material from the same shot to be grouped together and to make sure that nothing has been forgotten.

Armed with the shot list, and with the negative (or reversal original) of the film gathered together and broken down into numbered rolls of convenient size, the negative cutter is able to start work.

With a properly prepared workprint, edge numbered negative which is broken down, labelled and arranged in order, and a good shot list, the negative cutter should be able to cut and splice a reel of negative (or reversal original) in from three to four hours depending on the number of shots. The tools required are the same as for positive sound cutting - a synchronizer, a pair of double rewinds, scissors, and cardboard or celluloid patches. If the negative is spliced as it is cut, the patches will not be needed.

What has been said so far about the mechanics of negative cutting gives little feeling of its peculiar flavour, which results from the irreplaceability of all original material. This original film is the film maker's most valuable possession. It is the delicacy of the negative - cutting process that gives it the peculiar flavour I have spoken of. A kind of ritual surrounds it!

6-1.1 PRESERVATION OF THE NEGATIVE (or REVERSAL ORIGINAL)

The preservation of the negative (and reversal oringal) requires thoughtful planning and scrupulous care. Among the many important points to be observed, the following are outstanding:

a. Original should be confined to two places only: the library and the negative-cutting department (as a section of the laboratory). In the library the original should always be kept in cans, and stored if possible at a constant medium temperature and humidity.

b. Handling of the originals should be confined to the negative-cutting rooms (and the associated laboratory), which must be designed for a minimum ingress of dust. Air conditioning is almost essential; but ifunprocurable, the windows should be covered with extremely fine (100 gauge) metal screens. Members of other production and laboratory departments should be excluded as far as is practicable, to avoid the continual coming and going which brings in dust on the soles of the feet and disturbs concentrated work.

The negative cutting rooms should be painted white with washable paint, the ceilings should be low enough to be easily cleaned, and inaccessible dust - collecting corners and crevices should be avoided. Unless cutting is to be confined to 16mm, cutting tables and cabinets, must be of metal and should bepanelled to make dusting easier. "Each room, in short, should look like a hospital ward". To remove the last traces of dust from the air, a Precipitron or other similar electronic dust precipitator may be installed, though the price is very high.

c. The surface of each cutting table should be frequently dusted and kept absolutely spotless. The inside of bins and other areas difficult to dust carefully, should be lined with detachable covers or spread with soft tissue paper.

d. The negative cutters should wear white uniforms and white gloves when they are working, and these should be washed at frequent and regular intervals.

e. Original films should always be handled by the edges. When they are fitted on synchronizers and taken off again, rough contact between film and metal must be carefully avoided.

f. Original film should never be assembled with metal clips, unless paper is inserted both over and under the clips so that they are completely covered.

The important thing about the Negative film is that while most other production departments modify or add to the film in some vital way, the negative department's chief care is to add nothing and to take away nothing from it, but to preserve untouched the irreplaceable image and its scarcely less delicate support.

6-1.2 THE ANSWER PRINT

This is the first combined picture and sound print, with picture correctly graded for density and colour and sound correctly synchronized - the first acceptable print although several may have been made before the standard was acceptable.

This is eventually subjected to a preview by a group of the censors body or even by the public which will be requested to fill out certain questionaire prepared by the film producer to ascertain public opinion on the production.

6-1.3 NEGATIVE RECUTTING

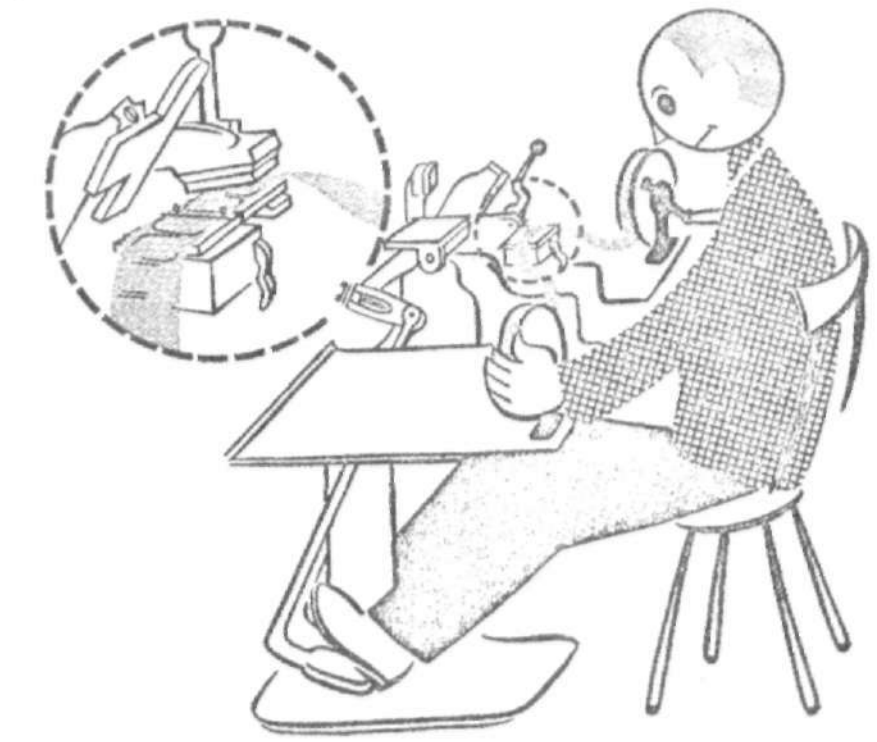
When changes are made and approved after the final preview, picture negative must be recut, and also sound negative unless a complete new negative is to be supplied as a result of redubbing.

Those changes made, temporarily, in the combined preview, print, must now be carried out on the editors work print and all the sound tracks involved. Crude alterations necessary with a combined print are now more carefully made in the work print as the operation is no longer tied to the advanced sound synchronism.

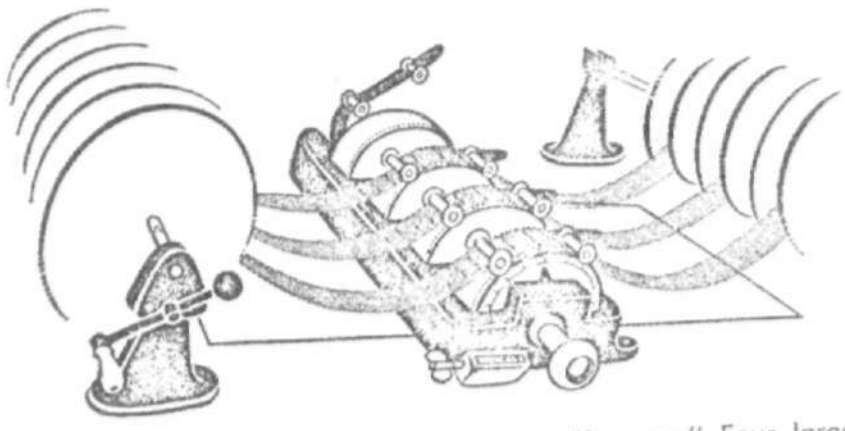
The editor's revised work print is once again sent to the processing laboratory for negative recutting with any new dissolves incorporated if necessary. The negative cutters at the laboratory know little, if anything, of what has been done as result of the preview. So wherever a picture change has been made, a paper in the workprint, inserted at the recut, will serve as a guide when negative and positive is rematched in the film synchronizer.

Sound negative recutting is done in the same way, if needed. Recut papers are inserted in the sound workprint where cuts can be made without redubbing.

Whether or not previews are held, negative recutting is eventually completed for both picture and sound, the ANSWER PRINT is made in combined form and approved, and RELEASE PRINT can take place as required for the production.



The machine splicer. Foot treadles raise and lower the upper blades which clamp the sections of film to be joined in exact relationship to one another.



The four-way synchronizer, or "fourway." Four large sprockets fixed to a common spindle hold the film tracks in precise relationship while they are wound to and fro by the rewinds at either end. A footage counter counts the feet in either direction, and marks on the nearest sprocket count the frames from a start mark which is often described as "zero-zero" (0–00).

6-1.4 DUPLICATE PRINTING FACILITIES

So far, only one picture negative and one sound negative is available for this mass printing. It may in some areas be necessary to provide further printing facilities for large scale distribution, not only to limit the possibility of damage to the existing negatives, but also to allow printing in various territories for the world market. Original language versions may be needed in other countries and printing may be required simultaneously in all areas. Duplicate printing facilities therefore have to be made available.

Duplication of the picture negative is straight forward. Fine grain positive duplicating prints, or inter-positives, are made from the original negative without going through the intermediate positive stage. Either system provides another synchronous picture negative which can be used for printing.

A direct colour internegative can be made without going through the interpositive stage, by using colour reversal film stock - the colour reversal internegative syste, or C.R.I. Film manufacturers produced a new type of reversal stock for this system and RELEASE PRINTS taken from the C.R.I. are regarded as being equal quality to those taken from original negatives. There are several advantages here. The original cut negative is only used to produce the required quantity of internegatives. It therefore has very little wear and tear and is then stored as a protective master. Whereas the original cut negative is full of physical splices, the C.R.I. taken from it has none and the release printing operation is less hazardous. The original negative can also be cut so that dissolves and fades are made direct to the C.R.I. by the auto-optical system. This cuts out one generation of film duplication and these effects are, therefore of higher quality

6-1.5 REDUCTION PRINTS

If the original negative is 35mm it does not necessarily follow that all release prints are to be made in this gauge. Many reduction prints are made on to 16mm and even super 8mm. The use of 16mm is widespread, particularly for "in-flight" movies used by airlines and on board ship. Improvements in super 8mm quality will, no doubt, see this gauge in much greater use in the educational field and in cassettes for home reproduction on television screens.

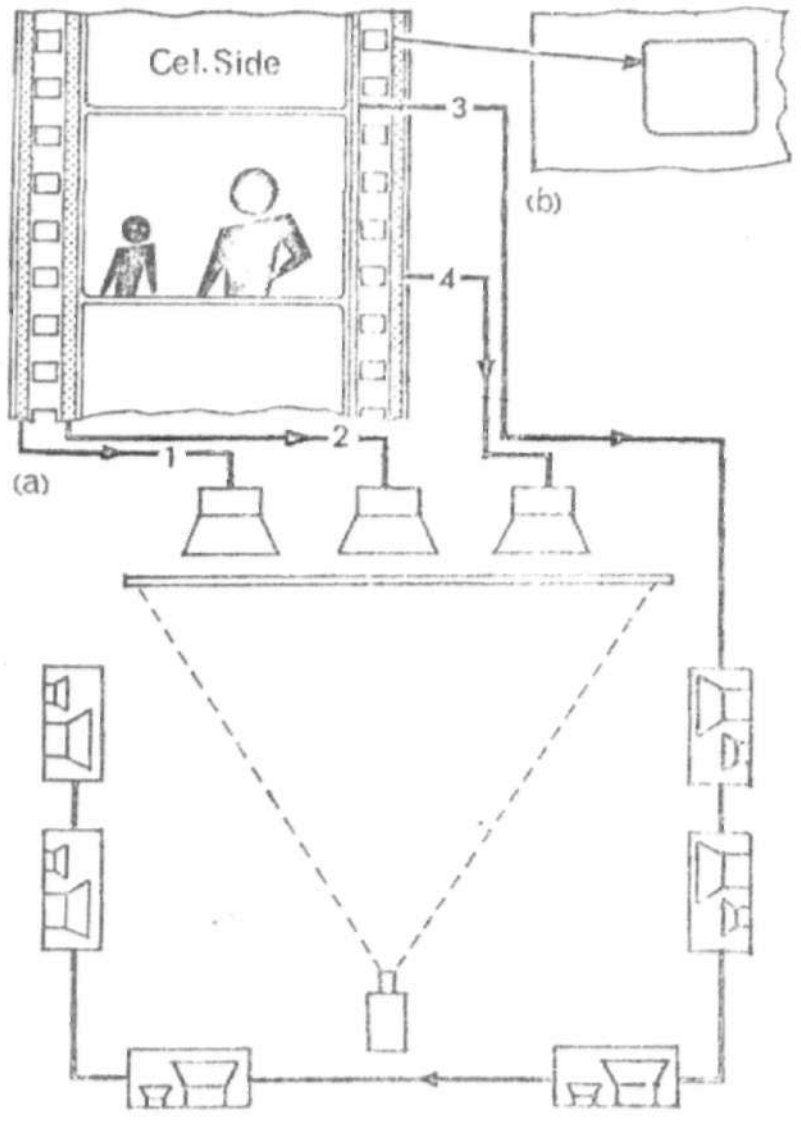
A duplicate picture negative is made, optically reduced to the required gauge on a special printer. Naturally, a similar gauge sound track negative will also be needed for the combined picture sound printing operation. To maintain high sound quality, these sound negatives should never be made by optical reduction. The result is far better when a transfer is made on to the required gauge direct from the 35mm master magnetic sound track. Combined printing sync will be different from 35mm of course and this is dealt with by the film laboratory.

6-1.6 70mm ENLARGEMENT PRINTS

A 35mm picture negative can also be used to make enlarged prints by using a special printing machine - mute 70mm reels being printed, then stripped and recorded with multiple sound tracks from magnetic printing masters specially made.

6-1.7 DYE TRANSFER PRINTS

Although the film editor is not directly concerned with printing systems, he should be aware of the dye-transfer method of colour release printing, if only to understand the different type of duplicating facilities he may have to order.



Striped release prints. (a) 35 mm combined 4-track magnetic stripe release print. (b) Special film perforation to allow more space for the magnetic sound stripes. (1) Left channel. (2) Centre channel. (3) Ambient (surround) channel. Note the narrower stripe. (4) Right channel.

With the Technicolor dye-transfer system, the original colour picture negative is cut to match the editor's final work print. If there are dissolves and fades, however the negative is assembled for the auto-optical process, no special dupe negatives incorporating these optical effects being needed.

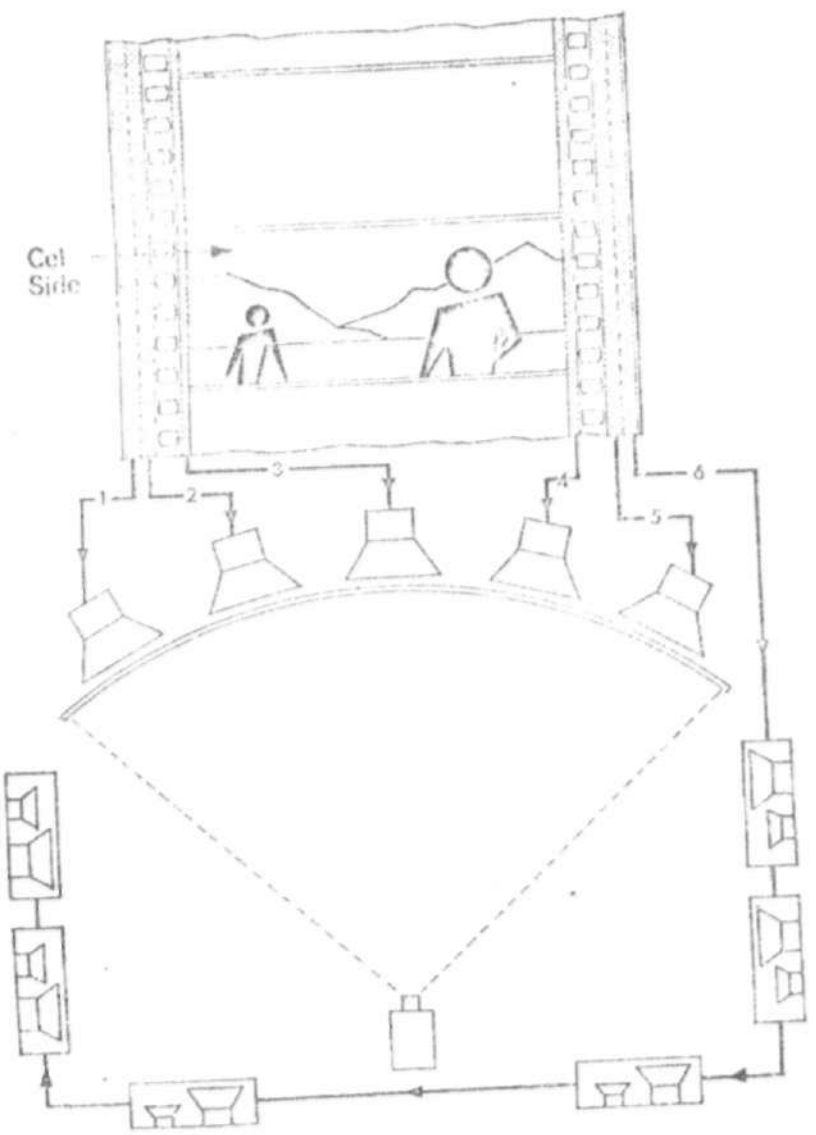
6-1.8 RELEASE PRINTS

These are the final projection prints, or show copy, of a completed film.

Release prints are not made from the original negative. It is the basis of making three special separation positive prints, each of a slightly different nature. Each reel of cut negative is printed three times, each time through one of the primary colour filters - first through a red, then through a blue, and then through a green filter. When these three positives are developed a relief image is produced, the emulsion varying in thickness according to the light and shade value of the subject.

Each separation print is really a type of mould known as a MATRIX. If a matrix is soaked in colour dye and then placed in contact with blank film, colour will be transfered to the blank according to the varying thickness of the matrix emulsion.

Each matrix, having being printed through a primary filter, will be used to transfer a dye of the appropriate complementary colour. The red filtered matrix will carry a mixture of the other two primary colours, blue and green (cyan); the green filtered matrix will transfer a mixture of red and blue (magenta); and the blue - filtered matrix, a mixture of red and green (yellow)



70 mm combined 6-track magnetic stripe release print. (1) Outer left channel. (2) Inner left channel. (3) Centre channel. (4) Inner right channel. (5) Right channel. (6) Ambient (surround) channel. Note that there are five film perforations per picture frame.

All such film must be stored for minimum periods as directed by the production company and kept in groups until disposal instructions are eventually issued. Some of the working film is soon destroyed, other film - sound masters and picture protective masters are kept for an indefinite period.

6-3.1 FILM SUITABLE FOR LIBRARY

The first consideration should be the preservation of any picture negative, or sound recordings, which may be of future use in the stock film library. Several of the sound effects, at least specially recorded for the film, may be difficult to repeat and well worth preserving for future use, even though they may not have been used in the final dubbed track. Selected effects can be transfered on to magnetic film, documented with all available detail, and filed in the film library for use in future productions.

Suitable uncut picture negative should also be preserved. Establishing shots made on location, for example, may be expensive pieces of film and there will almost invariably be more than one take or more than one angle but only one used in the cut version. Background films used for rear projection or for travelling matte shots are generally photographed for a specific purpose but are usually well worth preserving. The laboratory can be asked to separate such negative which, they are still holding and thus, together with the rush print which is still in the cutting room, can be filed in the picture stock library - again, documented for future use.

FILM STORAGE

The Film is usually stored under various temperatures and humidities depending on its nature.

Unexposed Film:

This is preferably stored in a refrigerator at $50^{\circ}C$ or less. One should be ware of frosting and condensation. If should be encured that cans kept for some time are:

(a) not allowed to rust and

(b) kept sealed by the sealing tape.

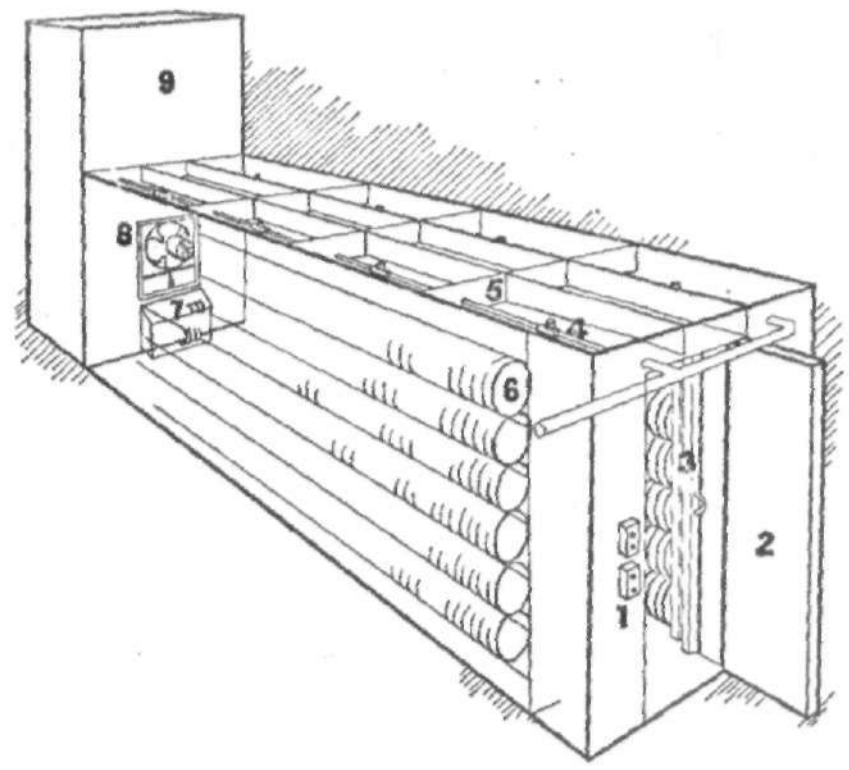
Exposed Film:

Ideally this should be stored at a temperature below $0^{\circ}C$. The colder the better the humidity must be kept down, as dampress causes more problems than high temperature.

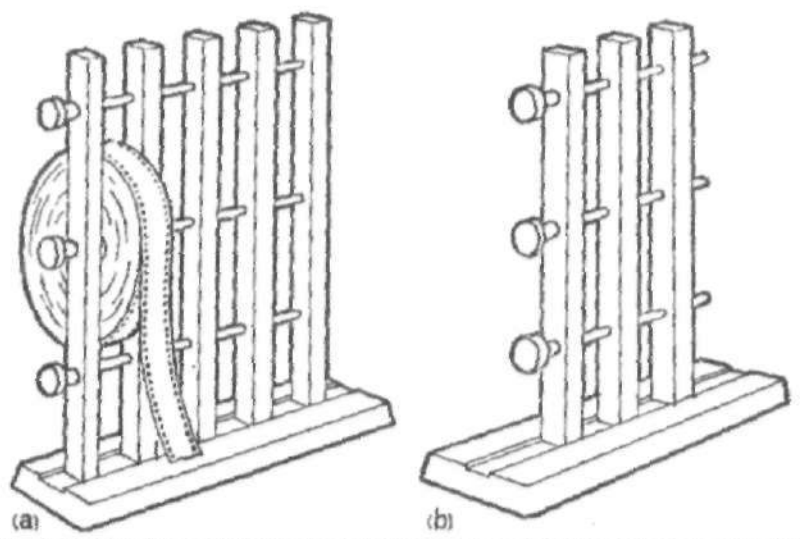
Recommendations:

1. Refrigeration:- at - $5^{\circ}C$ humidity at this temperature must be between 40 - 60%. Reseal the can before refrigeration.
2. No refrigerator available:- Use sealing tape to hold can together but do not reseal hermetically. Store in a cool shady place. If possible place a sealed polythere bag with fresh silica gel.
3. Tropics and humid conditions:- Use sealing tape to hold can together but do not reseal hermetically. Place each can in an individual polythene bag with fresh silica gel and seal bag hermetically

* Processed film can be stored in any cool, even temperature area and mthout direct sunlight. Humidity should be ideally 40 - 60% R.H. and temperature $10^{\circ}C$ or less.



[redacted]. A vault for storing inflammable film. Electric switches for the vault are mounted outside (1) to reduce sparking hazards. A steel door (2) provides a first line of protection in case of fire, and a safety door (3) slides to when released by a fusible link. An 8-head sprinkler system (4) is ready to dowse the film, while baffles (5) direct water downward onto the cans (6). The radiator (7) is protected by a well-spaced grille, and a fan (8) draws fresh air under the door and expels it outside. This fan is mounted so that it will fall outward if an explosive pressure builds up in the vault, a pressure which will then relieve itself through the large vent (9) into the open air. Vault shown holds 750 cans.



Film horses widely used in European cutting rooms. Many separate rolls of film are held in the way shown here with one roll. (a) 4-way model. (b) 2-way model.

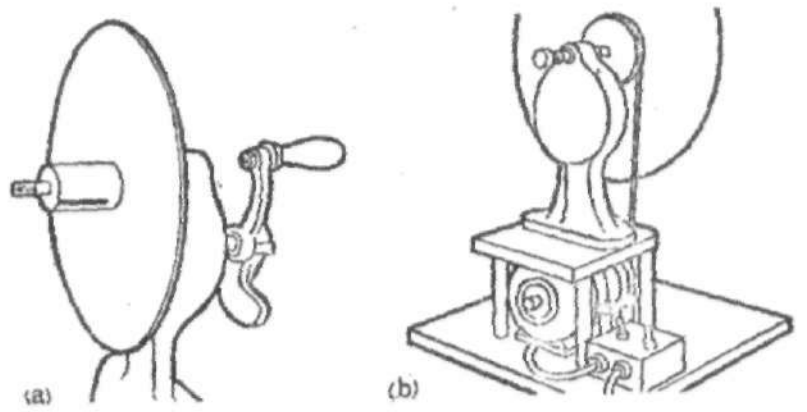


Plate rewinding. Rewinding mechanism used when film is not mounted on spools. (a) 35 mm rewind plate for approx. 1,000 feet of film on plastic centre. (b) Motorized version.

[redacted]

6-3.2 TYPES OF MATERIALS TO BE STORED

All remaining material can now be gathered and stored in film Vaults until disposal instructions are given. The following film groups are usually involved:

a. The editor's picture work print

b. All the unused positive rush prints, picture and sound and all the trims of used material.

c. All component sound track which were built for the final sound dubbing operation-dialogue, effects and music tracks together with dubbing charts.

d. The master magnetic final dubbed track; premixes and three-track magnetic mixes made to produce the single track dub.

e. The master magnetic foreign version music and effects mix.

f. A magnetic transfer of the entire music scored and recorded for the picture, whether or not use in the final version.

g. Original master recordings made at the time of shooting.

h. All picture negative trims and unused slates. Protective masters of the final edited version.

i. Cutting room records and documents.

6-4 FINAL RESPONSIBILITIES

Final editorial tasks include preparing information required by the accounts department in order to meet existing regulations and contracts.

If any film picture or sound, used in the final version was supplied from a stock library source, exact footages have to be given to the accounts department so that contracts can be met and appropriate payment made to the library concerned.

Normally, very little picture stock footage is used in a major production but sound effects are almost invariably used, sometimes in large quantities. The sound editor in charge of effects on the production must prepare this information before his assignment finishes.

6-4.1 MUSIC USED

Music used in the film must also be accurately documented whether it has been specially written for the film as an original score, or whether a re-recording has been made of some traditional or copyright work. Details may vary from country to country but the following are usually basic requirements:-

1. Title of production. Name of composer, arranger and where the recordings were made.
2. Copyright details where these apply.
3. Durations of each music section used in the final version, reel by reel.
4. Whether the recording made on each music section was entirely or partially used and whether it was visual or non-visual (i.e. featured or background music).

6-4.2 FINAL FOOTAGE

Individual requirement of accounts department vary but they often have to make returns which give details of the use of foreign labour in a film and the amount of material used when photographing on foreign locations. If this becomes necessary, the film editor provides a suitable breakdown of the final screen footage, sub-dividing the amount of film made in various circumstances as required by prevailing conditions. A sample would be:

Total footage used in the final version		
Studio interior footage	7,400	Metres
Studio exterior "	1,200	"
Footage made on domestic locations	850	"
Footage made on foreign locations	625	"
Footage obtained from stock library source	25	"
Titles footage, and where manufactured	250	"

These figures must be quite accurate, of course, and are prepared from a physical measurement of the final film.

The responsibility for preparing all these documents and returns rest with the editorial department of a large studio organisation rather than with the individual film editor.

P A R T S E V E N

- SPECIAL STUDIES
  - Acoustics
  - Airconditioning
  - Lighting
  - Waste Disposal

ACOUSTICS

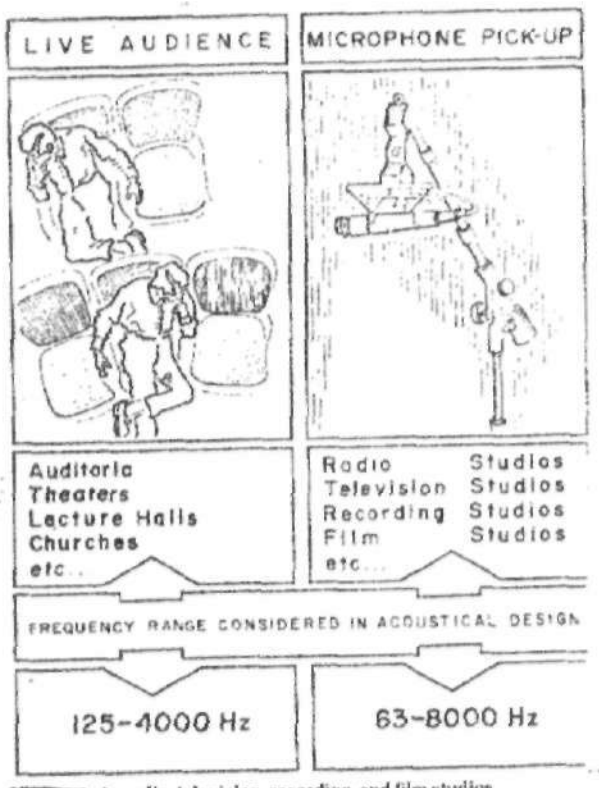
INTRODUCTION

In the design of Film Studios, the acoustic Consultant should be brought in right from the start of the design when sound insulation or acoustics are of importance. If the early stages of design are carried out without due consideration of the requirements of these factors, it may be very expensive or even impossible to satisfy them at a later stage.

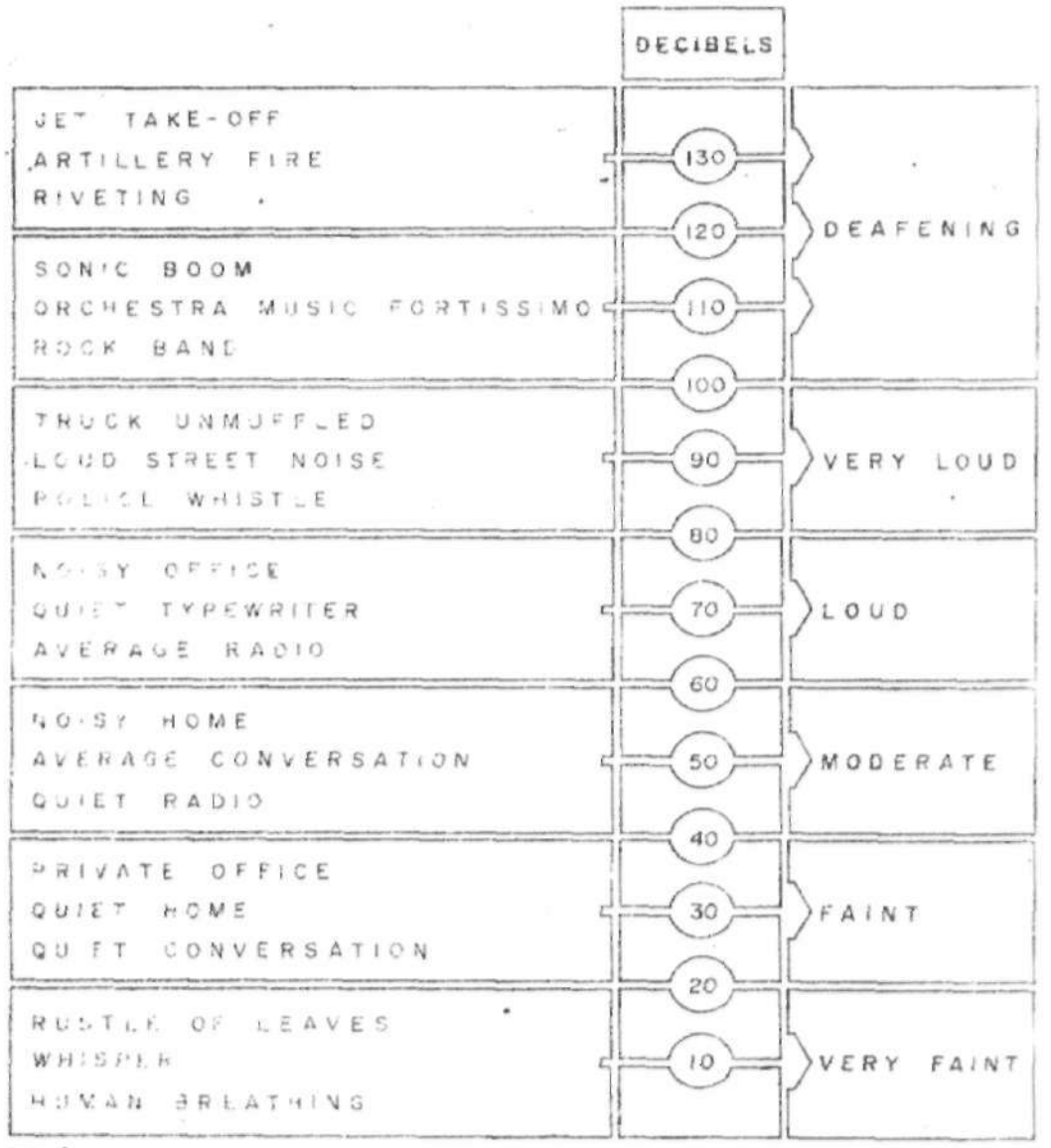
Even the choice of site should not be decided without a thorough noise and vibration survey.

It is nevertheless true to say that; inspite of widespread education of the architectural profession in the functional and environmental requirements of buildings, too many mistakes which result in serious shortcomings in sound insulation or internal acoustics are still being made in the basic design of buildings. It is always a great temptation to the architect to make appearance the primary criterion in the design and to follow current trends in external style leaving the structural engineer to look after the safety of the building and the environmental engineer and the acoustic consultant to do what they can when the design or even the construction of the building is virtually complete. This should not be, for acoustics noise and sound insulation cannot be relegated to the position of an after thought, at least in the design of Film STUDIOS.

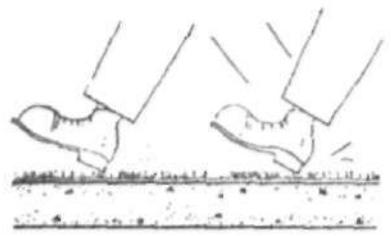
The emphasis so far laid on the importance of the acoustic consultant is not intended to put him on a pedestal whereby he becomes so egocentric as to assume that his requirements are the only ones that matter. The architect will have to keep in his mind the following parameters:



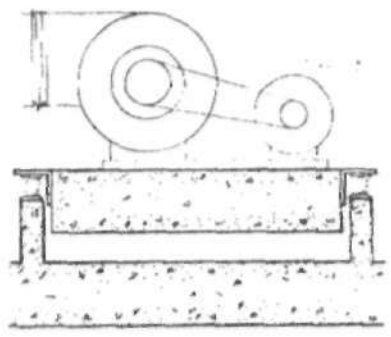
In radio, television, recording, and film studios the tolerant ears of a live audience are replaced by a most sensitive electronic instrument, the microphone.



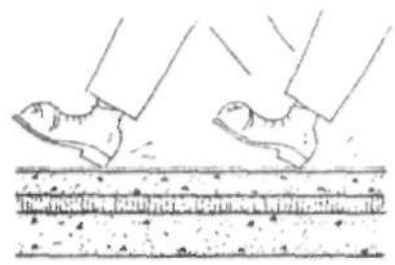
Sound pressure levels of representative sounds and noises.



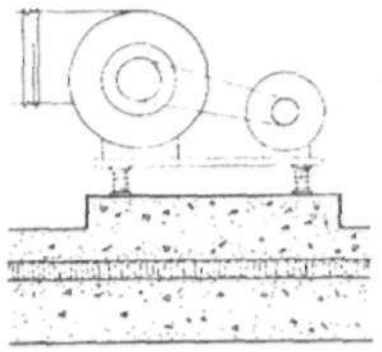
SPECIAL RESILIENT FLOOR COVERING



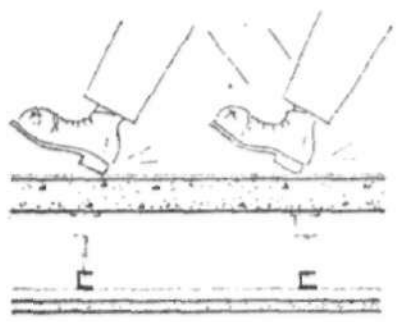
SPECIAL RESILIENTLY MOUNTED INERTIA BLOCK



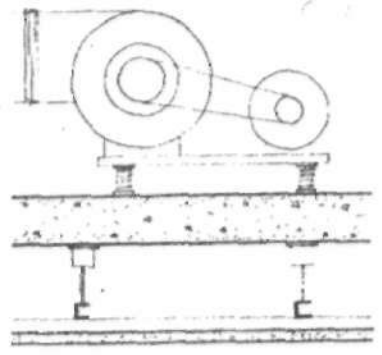
CONTINUOUS FLOATED FLOOR SLAB ON RESILIENT MATERIAL



CONTINUOUS FLOATED FLOOR SLAB ON RESILIENT MATERIAL

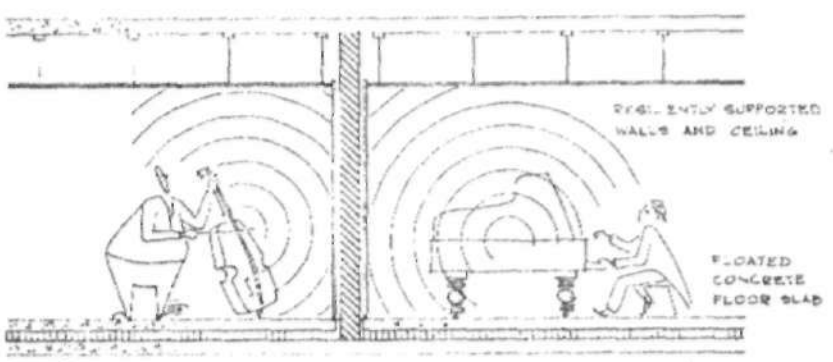


SPECIAL RESILIENTLY HUNG CEILING



SPECIAL RESILIENTLY HUNG CEILING

Fig. 24. Typical corrective measures for structure-borne sound problems involving (right) vibration-inducing noise sources and (left) direct impact sources



Schematic representation of constructions required to control the transmission of high levels of air-borne and structure-borne sound

*1. STRUCTURAL STABILITY

2. FUNCTIONAL VIABILITY

3. SPATIAL OCCUPATION

4. EXTERNAL APPEARANCE or AESTHETICS.

Apart from these he also thinks about the cost and the convenience of services provided.

It is rather fashionable to take the standpoint that if a design of a building, a piece of machinery or any other article fulfils its functions perfectly, it will on that account look right, this view of functionalism is too naive, for although it may appear to apply in certain fields of design, it takes no account of the independent aesthetic consideration such as:

a. the use of symbolic forms

b. compartibility with the surrounding environment

c. the natural urge and desire of the architect to produce an individualistic and recognizable edifice.

It is part of the functions of an engineer responsible for one of the aspects of a complex design to go as far as possible in meeting the paralled requirements of the design and in giving the architect the greatest possible freedom to work out his conception of the plan in its functional and aesthetic aspects. The Acoustic designer must know how to modify his own plans to meet other requirements where they tend to conflict with his, but he must know when and how to say "yes, there is no further compromise, this far and no further", when further compromise will result in unacceptable acoustics or sound insulation.

For this reason, it is necessary to know as accurately as possible not only the optimum design parameters, but also the limits on either side of the optimum to which may be shifted before degradation starts to be noticeable to a sensitive listener or viewer. In this work, an attempt has been made to define these limits so that a satisfactory design of the film studio can be carried out.

7-1 ACOUSTICAL PHENOMENA IN ENCLOSED SPACES

SOUND REFLECTION

Hard, rigid, and flat surfaces, such as concrete, brick, stone plaster or glass, reflect almost all incident sound energy striking them. This phenomenon of sound reflection is quite similar to the well-known reflection of light (fig....) since the incident and the reflected sound rays lie in the same plane and the angle of the incident sound wave equals the angle of the reflected sound wave (law of reflection). It must be remembered, however, that the wavelengths of sound waves are much larger than those of light rays, and the law of sound reflection is valid only if the wavelengths of the sound waves are small compared to the dimension of the reflecting surfaces. Hence the application of this law should be critically considered for low-frequency sounds.

Convex reflecting surfaces tend to disperse and concave surfaces tend to concentrate the reflected sound waves in rooms (fig....)

SOUND ABSORPTION

By definition, sound absorption is the change of sound energy into some other form, usually heat, in passing through a material or on striking a surface. Sound is absorbed by the dissipation of energy in the vibration of the building structures and by viscous loss in the penetration of sound into porous surfaces. The amount of heat produced by the conversion of sound energy is extremly small. The spreed of the travelling sound wave is not affected by absorption.

Practically all building materials absorb sound to some extent, but successful acoustical control of buildings require the application of materials with a high degree of sound absorption.

The following elements may contribute to sound absorption.

a. Surface treatments of walls, floors and ceilings

b. Room contents; such as audience, draperies, upholstered seats and carpet.

c. The air of the space.

Sound Absorption Coefficient

How efficient the sound absorption of a material is at a specified frequency is rated by the sound absorption coefficient. The sound absorption coefficient of a surface is the fraction of energy of the incident sound absorbed, or not reflected, by the surface. It is usually denoted by the Greek letter α. This varies between 0 and 1; for example at 500Hz if an acoustical material absorbs 65% of the energy of incident sound and reflects 35% of it the sound absorption coefficient of this particular material is 0.65%.

Hard, impermeable interior surfaces, such as brick, masonry, stone, and concrete, normally absorbs less than 5% of the energy of incident sound waves and reflect 95% or more; the absorption coefficient is less than 0.05. On the other hand, thick isolation blankets absorb more than 80% of the energy of incident sound; in this case the absorption coefficient is above 0.80.

The sound absorption of a surface (surface absorption) is measured in Sabins,

1 Sabin = $1m^2$ surface area having an absorption coefficient of = 1.00.

The total surface absorption (A) is found by multiplying each individual area by its absorption coefficient and adding the whole together - mathematically expressed thus:

$A = \leq S_1, \ _1, \ S_2 \ _2 \ \ldots\ldots Sn \ n$

where S_1, S_2, ..., Sn are the areas in m^2

$_1, \ _2 \ldots\ldots \ n$ are the corresponding absorption coefficients.

For example an acoustical treatment extending over an area of $S = 10m^2$ and having a sound absorption coefficient of = 0.50 has a surface absorption of S = 10x0.50 = 5.0 sabins.

The sound absorption provided by persons or exposed objects can also be expressed as a certain number of sabins per person or object. For example, a person in an upholstered theatre seat will provide at 500Hz an absorption of about 4 to 5 sabins.

SOUND DIFFUSION

If the sound pressure is equal in all parts of an enclosed space and it is probable that sound waves are travelling in all directions, the sound field is thus said to be homogenous; i.e., sound diffusion or sound dispersion prevails in the room.

Adequate sound diffusion is a necessary acoustical characteristic of Film Studios and certain other rooms like concert halls, radio and recording studios and music rooms. This is because:

i. it promotes a uniform distribution of sound

ii. it accentuates the natural qualities of music and speech

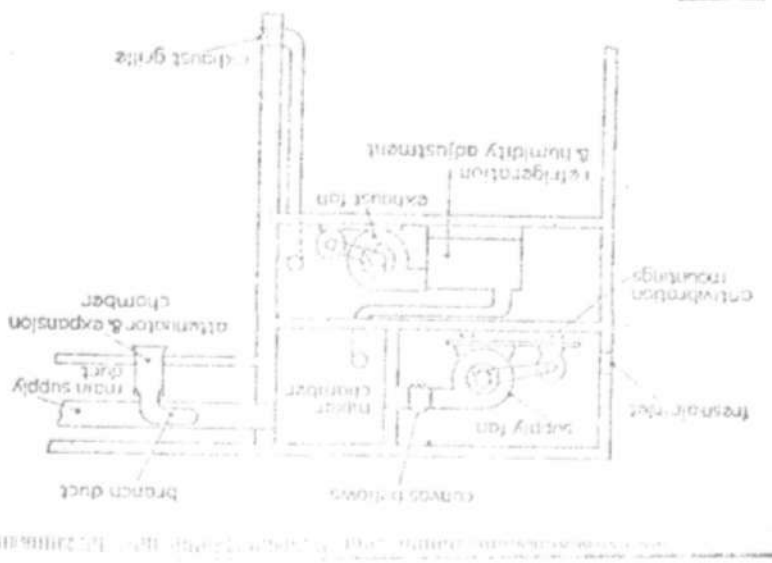
iii. it prevents the occurrence of undesirable acoustical effects.

Diffusion of sound in a space can be created in a number of ways among which are the following:

a. The generous application of surface irregularities and scattering elements, such as:
   - pilasters
   - piers
   - exposed beams,
   - coffered ceilings
   - Sculptured balcony railings and
   - serrated enclosures.

b. The alternate application of sound-reflective and sound absorptive surface treatments.





Typical ventilation system for large studio, showing main components

- SOUND REFLECTION AND ABSORPTION

ROOM CONTROL

ACOUSTICS MA

MOUNTING OF EQUIPMENT AND

c. The irregular and random distribution of differing sound-absorptive treatments.

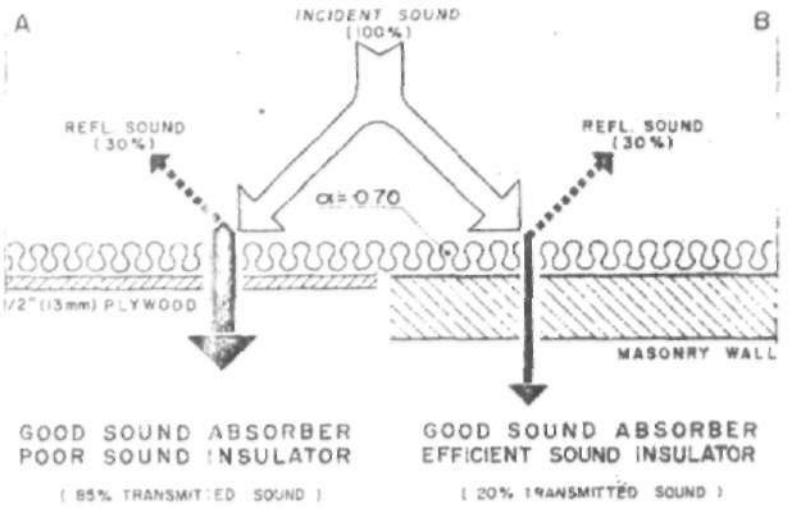
An important fact is, that:

"the overall dimensions of the surface protrusion and of the patches of absorptive treatments of the studio must be comparable to the wavelength of every sound wave within the entire audio-frequency range. The projections of the surface irregularities must reach at least one seventh of the wavelengths of those sound waves which have to be diffused" (fig.....)

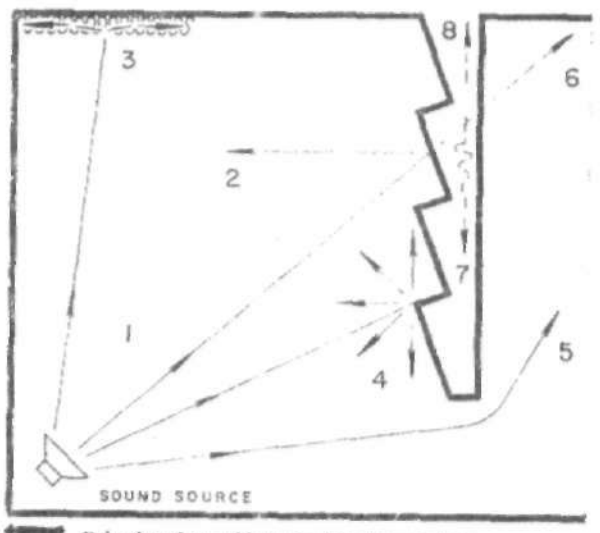
SOUND DIFFRACTION

Diffraction is the acoustical phenomenon which causes sound waves to be bent or scattered around such obstacles as corners, columns, walls, and beams. Diffraction, that is the bending and scattering of sound waves around obstacles, is more pronounced for low - than for high - frequency sounds, thus proving that the laws of geometric acoustics are inadequate for a precise prediction of the behaviour of sound in enclosed spaces because the obstacles usually encountered in the room acoustics are too small in comparison to the wavelengths of the audible sound waves.

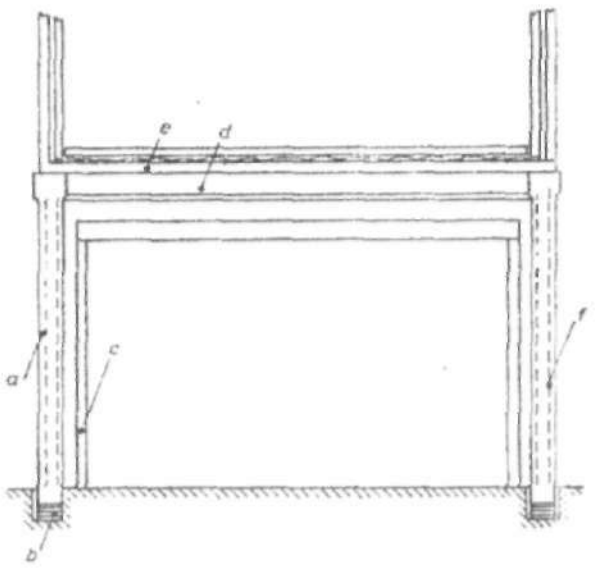
Although geometric acoustics is a useful approach in dealing with problems related to high-frequency sounds it is hardly applicable to frequencies below 250Hz i.e. Low-frequency sounds (of longwave-lengths) will not respect the laws of geometric acoustics if they encounter architectural elements of small dimensions. In particular they will not travel in rectilinear directions through an opening and will not diffract, or be scattered by, small-scale architectural elements such as beams, coffers, pilasters and cornices.



(A) A good absorber ($\alpha = 0.70$) attached to a poor sound insulator, such as plywood, will not prevent the transmission of sound through such an enclosure. (B) Instead of plywood, an effective sound-insulating barrier, such as masonry, should be used to reduce noise transmission through the structure.



Behavior of sound in an enclosed space: (1) incident or direct sound; (2) reflected sound; (3) sound absorbed by surface treatment; (4) diffused or dispersed sound; (5) diffracted or bent sound; (6) transmitted sound; (7) sound dissipated within the structure; (8) sound conducted by the structure.



Mounting of one large studio over another

a Columns
b Stable resilient mountings
c Double-leaf wall
d Void
e Base floor of upper studio
f Infill panels

$$RT = \frac{0.16V}{A+xV} \quad \begin{matrix}\text{(in metric)} \\ \text{(system)}\end{matrix}$$

where RT = reverberation time in records

V = room volume in m^3

A = total room absorption in m^2 sabins.

X = air absorption coefficient.

The absorption of a surface is found by multiplying its area S by its absorption coefficient , and the total room absorption A is obtained by the addition of these products with the inclusion of the absorption provided by the audience and other room contents (seats, carpets, draperies, etc). Thus A is calculated as stated on page (.....)

The values of the air-absorption coefficient X to be considered at and above 1000Hz has been included in the Appendix.....

Relevance of the Sabin Formula to the architect

The Sabin formula provides a reasonable approximation for the calculation of the RT, and it will enable the architect to perform a quick and easy control as he proceeds in the acoustical design of a studio or an auditorium where the room absorption is moderate. For more precise reverberation calculations for rooms with particular requirements such as concert hall or a radio or recording studio, with considerable sound absorptive treatments, other modified and improved formulas and methods are available; however I do not intend to delve into these because their use is outside the normal architectural design practice.

Application of Reverberation Formulas

All reverberation formulas apply only to auditoriums in which the sound is diffused, i.e., the sound energy is evenly distributed all over the room and therefore the sound dies away in a smooth, even manner, free from disturbing fluctuations.

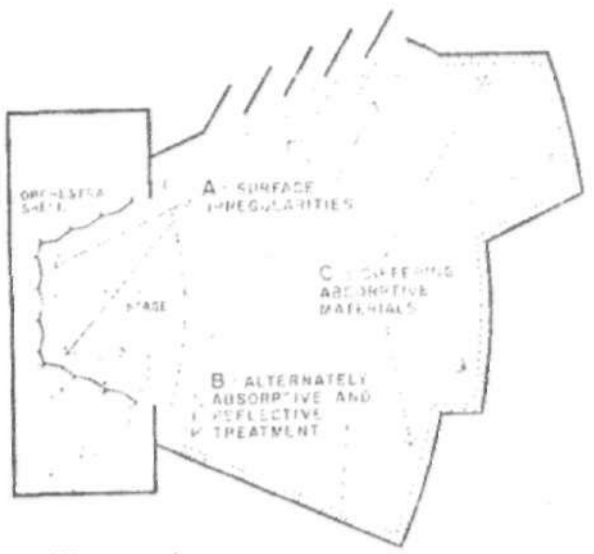
The sound field cannot be considered as diffused in rooms:

1. which have acoustical treatments concentrated in single area or in very few areas.
2. which have enclosures creating reflected sound concentrations originating from highly reflective domes, curved and acoustically untreated walls, etc.
3. which have one dimension disproportionately different from the other two.

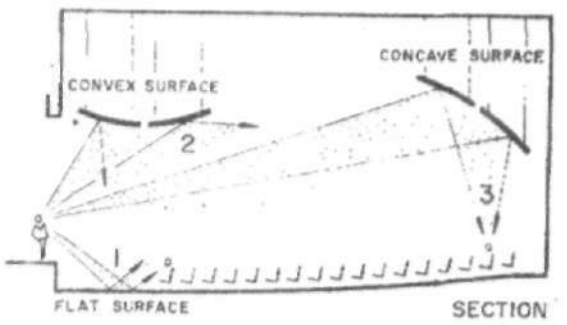
7-2 SOUND ABSORBING MATERIALS & CONSTRUCTION

Under special conditions many of the sound-absorptive constructions. Sound absorption should not be confused with sound insulation.

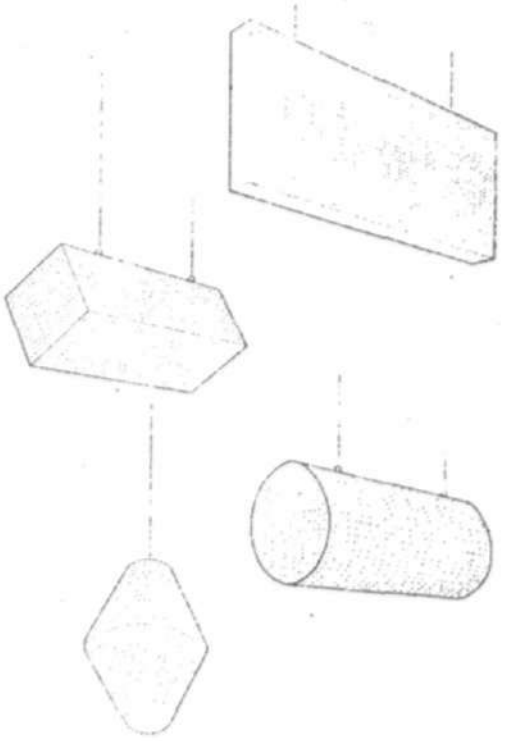
On striking any surface, sound is either reflected or absorbed. The sound energy is either reflected or absorbed. The sound energy absorbed by an absorbing layer is partially converted into heat but is mostly transmitted to the other side of the layer, unless such transmission is restrained by a backing of an impervious heavy barrier. In other words, a good sound absorber is an efficient sound transmitter, and consequently an inefficient sound insulator. An effective sound-insulating of sound from one side to other. (fig.....)



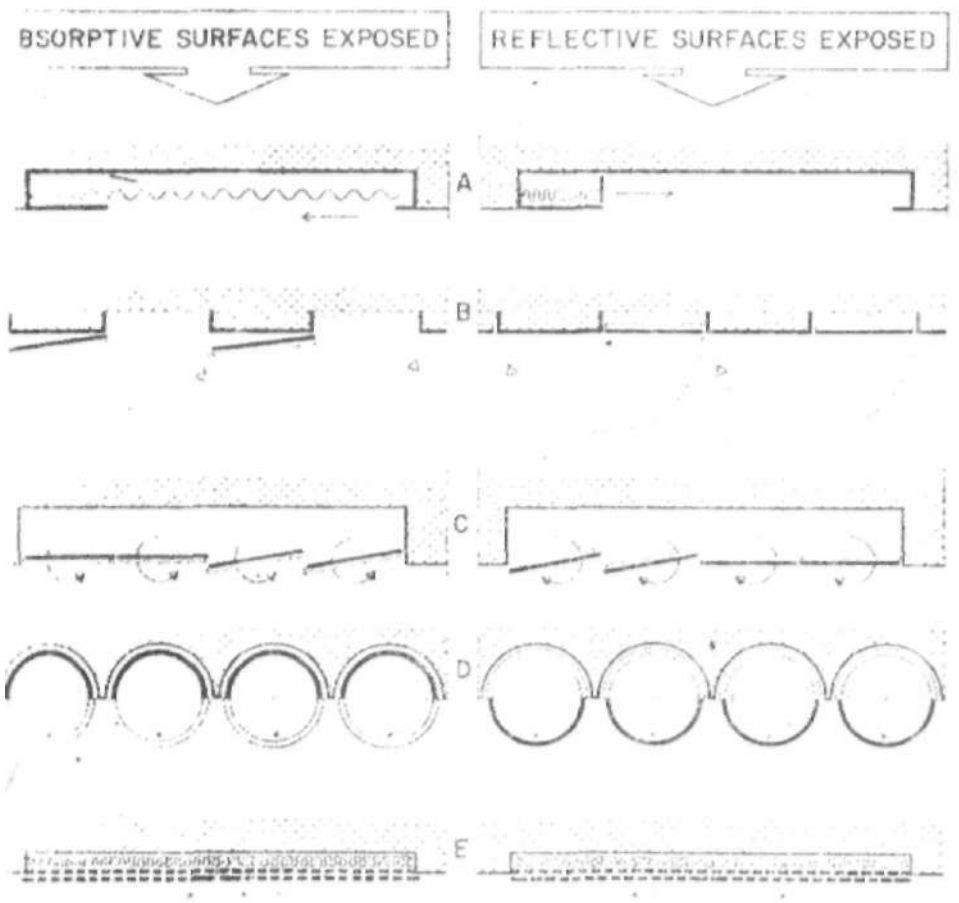
Sound diffusion (dispersion), or the uniform distribution of sound energy in auditoriums, can be achieved by the use of (A) surface irregularities, (B) alternately applied sound-absorptive and sound-reflective treatment, or (C) acoustical treatments of differing sound absorption.



Sound reflection from differently shaped surfaces: (1) uniform reflection; (2) sound dispersion; (3) sound concentration.



Space absorbers can be suspended as individual units from the ceiling. They are used when the area of the room surfaces is not adequate for conventional acoustical treatment.



Schematic illustration of variable absorbers which provide means for altering the absorption and thus the RT: (A) retractable curtain; (B) hinged panels; (C) rotatable panels; (D) rotatable cylinders; (E) sliding perforated panels; (F) rotatable triangular elements.

Sound-absorbing materials and constructions used in the acoustical design of acoustic spaces or for the sound control of noisy rooms can be classified as:

i. POROUS MATERIALS

ii. PANEL or MEMBRANE ABSORBERS

iii. CAVITY (or HELMHOLTZ) RESONATORS

Acoustical materials of any of these groups and a combination of these materials can be mounted on the room enclosures or suspended in the air as space absorbers. The method of mounting has a considerable effect on the sound absorption of most materials.

POROUS MATERIALS

The basic acoustical characteristics of all porous materials, such as fibre-boards, soft plasters, mineral wools, and isolation blankets, is a cellular network of interlocking pores. Incident sound energy is coverted into heat energy within these pores. Cellular materials with closed and noninterlocking cells, such as foamed resins, cellular rubbers, and foam glass, are poor sound absorbents.

Commercial porous materials can be divided into three categories:

a. prefabricated acoustical units

b. acoustical plasters and sprayed - on materials

and c. acoustical (isolation blankets).

Prefabricated acoustical units

Various types of perforated, unperforated, fissured, or textured cellulose and mineral-fibre tiles, lay-in panels, and perforated metal pans with absorbent pads constitute typical units in this group.

They are mounted in several ways, according to manufacturer's instructions, for example;

- cemented to a solid backing
- nailed or screwed to a wood framing

or - laid in a ceiling suspension system.

Using prefabricated acoustical units offers several advantages:

i. They are reliable, factory-guaranteed absorption

ii. Installation and maintenance are relatively easy and economical.

iii. Some can be redecorated without seriously affecting their absorption.

iv. Their use in ceiling systems can be integradted functionally and visually with requirements of lighting, heating, or air conditioning; they assist in noise reduction and offer flexibility in partitioning.

v. If suitably mounted, their absorption can be beneficially increased.

Their application, on the other hand, presents a few problems:

1. It is difficult to conceal the joints between adjacent units.
2. They generally have a soft structure, which would be subjected to mechanical damage if installed at lower levels of the walls.
3. Their aesthetic integration into an individualistic acoustic space project poses a formidable task.
4. The use of paint for redecoration purposes may harmfully alter the absorption of most prefabricated acoustical units unless manufacturer's instructions are followed.

Acoustical Plasters and Sprayed-on Materials

These are mostly for noise-reduction purposes and sometimes in acoustic spaces where any other acoustic treatment would be impractical because of the curved or irregular shape of the surface. They are applied in a semiplastic consistency, either by a spray gun or by hand trowelling.

The maintenance of acoustical plasters and sprayed-on finishes (sprayed mineral fibre) certainly offers some difficulties. Redecoration may create serious deterioration of their acoustical properties unless manufacturer's instructions are strictly followed.

Acoustical (Isolation) Blankets

These are manufactured from:

- rockwool
- glass fibres
- wood fibres
- hair felt, etc.

They are generally installed on a wood or metal framing system, these blankets are used for acoustical purposes in varying thicknesses between 25 and 125mm. Their absorption increases with thickness, particularly at low frequencies.

Since acoustical blankets do not constitute an aesthetically satisfactory finish, they are normally covered with a suitable type of perforated board, wood slats, fly screening, etc, placed over them and fastened to the framing system.

Carpets and Fabrics

In addition to their traditional role as floor covering, carpets are also used as versatile acoustical materials because they absorb airbone sounds and noises within the room,

they reduce and in some cases almost completely eliminate impact noises from above, and they eliminate surface noises (shuffling feet, clicking of heels, moving of furniture). Carpets are used for floor and wall covering alike.

PANEL (or MEMBRANE) ABSORBERS

The nonperforated panel, or membrane, absorbers represent another group of sound absorbers. The concept of their operation is this:

> "Any impervious material installed on a solid backing but separated from it by an air space will act as a panel absorber and will vibrate when struck by sound waves. The flexural vibration of the sound panel will then absorb a certain amount of incident sound energy by converting it into heat energy".

The following panel absorbers contribute to low-frequency absorption - wood and hardboard panels,
- gypsum boards,
- suspended plaster ceilings,
- furred-out plasters,
- rigid plastic boards,
- windows glazing, doors,
- wood floors and platforms

and - metal plates (serving as radiators).

CAVITY RESONATORS

The cavity or (Helm holtz) resonators, consist of an enclosed body of air confined within rigid walls and connected by a narrow opening to the surrounding spaces, in which the sound waves travel.

CHOICE OF SOUND ABSORBING MATERIALS

The following details should be examined in the selection of sound-absorbing finishes or constructions

1. Sound absorption coefficients at representative frequencies of the audio-frequency range.
2. Appearance (size, edges, joints, colour texture)
3. Fire endurance and resistance to flame spread
4. Installation cost
5. Ease of installation
6. Durability
7. Light reflectance.
8. Maintenance, cleaning, effect of redecoration upon sound absorption, and maintenance cost,
9. Job conditions (temperature, humidity during installation, and readiness of backings)
10. Integration of room elements (doors, windows, lighting fixtures, grilles, etc) into acoustic finish.
11. Thickness and weight
12. Moisture and condensation resistance once the room is in use.
13. Access to suspended ceilings or furred spaces
14. Thermal insulation value.
15. Attraction for vermin, dry rot, fungus.
16. Removability (sometimes a temporary requirement to make possible adjustments of isolation blankets.
17. Simultaneous requirement for adequate sound insulation (in the case of suspended ceilings and exteriors enclosures).

7-3 ACOUSTIC DESIGN OF STUDIOS

INTRODUCTION

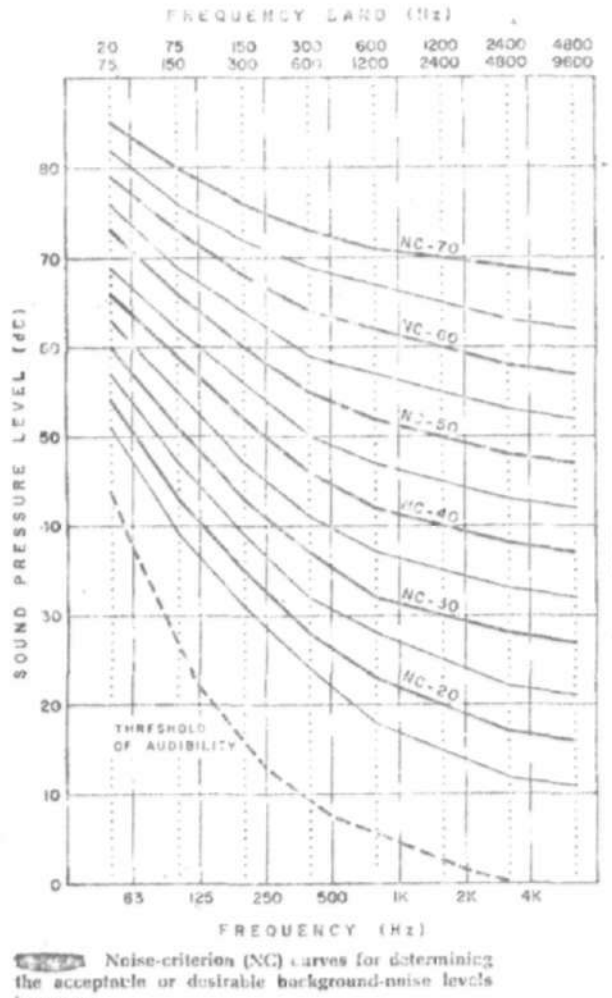
The design of spaces used primarily for microphone pick-up is such a special subject governed by highly technical requirements that it is very unlikely that the architect in charge of such a project would also assume responsibility for its acoustical design. It is highy necessary that studio acoustics be met with greater precision, and a particularly high degree of isolation must be provided against extraneous noise and vibration. Necessary acoustical calculations are applied to a wider frequency range than in normal cases, i.e. from 63Hz usually up to 8000Hz.

This meticulous approach to studio acoustics is necessary because the human (binural) listener in the studio is replaced by the microphone, a most sensitive electronic instrument which picks up sounds very much as a person would with monoaural hearing. The microphone will indicate it clearly:

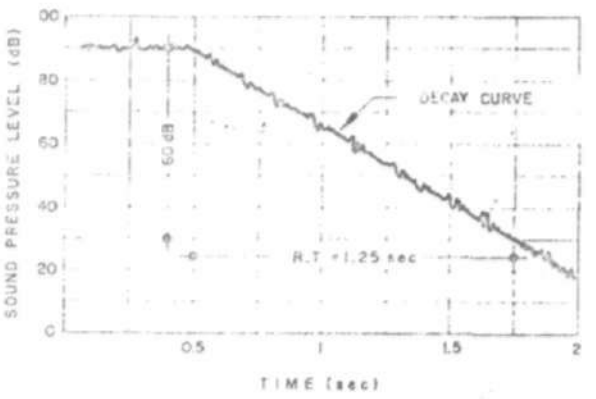
a. when reverberation characteristics are not optimum over a wide frequency range.
b. when diffusion is not high enough
c. when any acoustical defect such as echo or sound concentration is not noticeable
d. when the faintest noise or vibration exists in the studio

ACOUSTICAL REQUIREMENTS OF STUDIOS

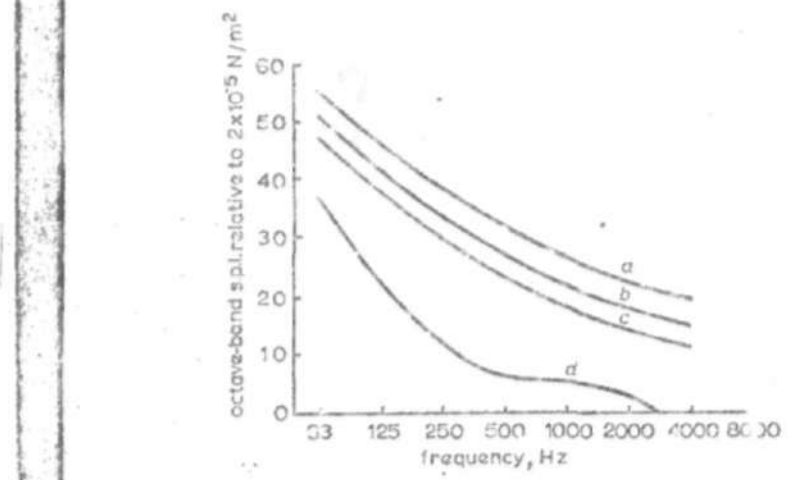
As a consequence of the fact that the studio forms an important link between the sound source and the microphone, particular attention must be given to the following requirements



Noise-criterion (NC) curves for determining the acceptable or desirable background-noise levels in rooms.

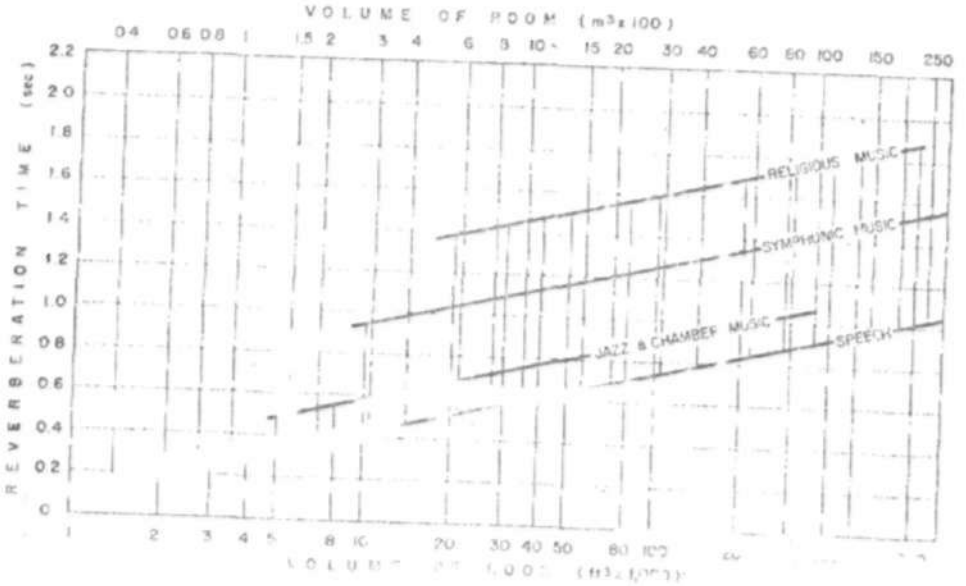


The reverberation time (RT) of a room is defined as the time required for a sound suddenly cut off to decrease by 60 dB.



Permissible background-noise levels in studios from all sources

a Radio studios for light entertainment
b All television studios; all sound studios except those covered by *a* or *c*
c Studios for radio drama
d Threshold of hearing for continuous spectrum noise (Robinson and Whittle, 1954)



Optimum RT's for studi... mid-frequency (500- to 1000-Hz) ro...

in their design:

1. An optimum size and shape for the studio must be established.
2. A high degree of diffusion must be secured
3. Ideal reverberation characteristics must be provided.
4. Acoustical defects must be totally prevented.
5. Noises and vibrations must be completely eliminated.

The size of a studio is determined by the physical space required for its occupants, equipments and furniture, by the function for which it is to be used, and by the acoustical requirements.

In establishing the necessary floor area for a large film shooting studio, there is no rigid rule governing this safe for the fact that a large hall uninterrupted by columns or supports, acoustically designed should be available. This should be sufficiently large to accommodate large and complex studio sets and the various activities of film shooting coupled with the accompanying instruments and equipment.

For a music studio, a single instrumentatlist occupies about 0.55 - 0.95m^2 of floor area, although it is found in practice that about 1.4 - 1.85m^2 of floor space is required for each musician in a small music studio and about 1.85 - 3.7m^2 in a large one. The extra space is taken up by circulation, music stands, and microphone spacing.

An average floor area of 0.37 - 0.55m^2 is required for singers depending on whether they are standing or seated.

ESTABLISHING THE FLOOR AREA OF STUDIOS*

	TYPE	AREA (approx.)
1.	SHOOTING STUDIOS	a ranging bet. $300m^2$-$3000m^2$
2.	MUSIC STUDIOS (SMALL)	1.4 to $1.85m^2$/INSTRUMENTALIST
3.	MUSIC STUDIOS (LARGE)	1.85 to $3.7m^2$/INSTRUMENTALIST
4.	AREA/MUSICIAN	0.37 to $0.55m^2$/SINGER

There are no room proportions that are universally or unanimously recommended as optimum. For rectangular studios the ratios for room proportions shown below are generally advocated.

RECOMMENDED PROPORTIONS FOR RECTANGULAR STUDIOS

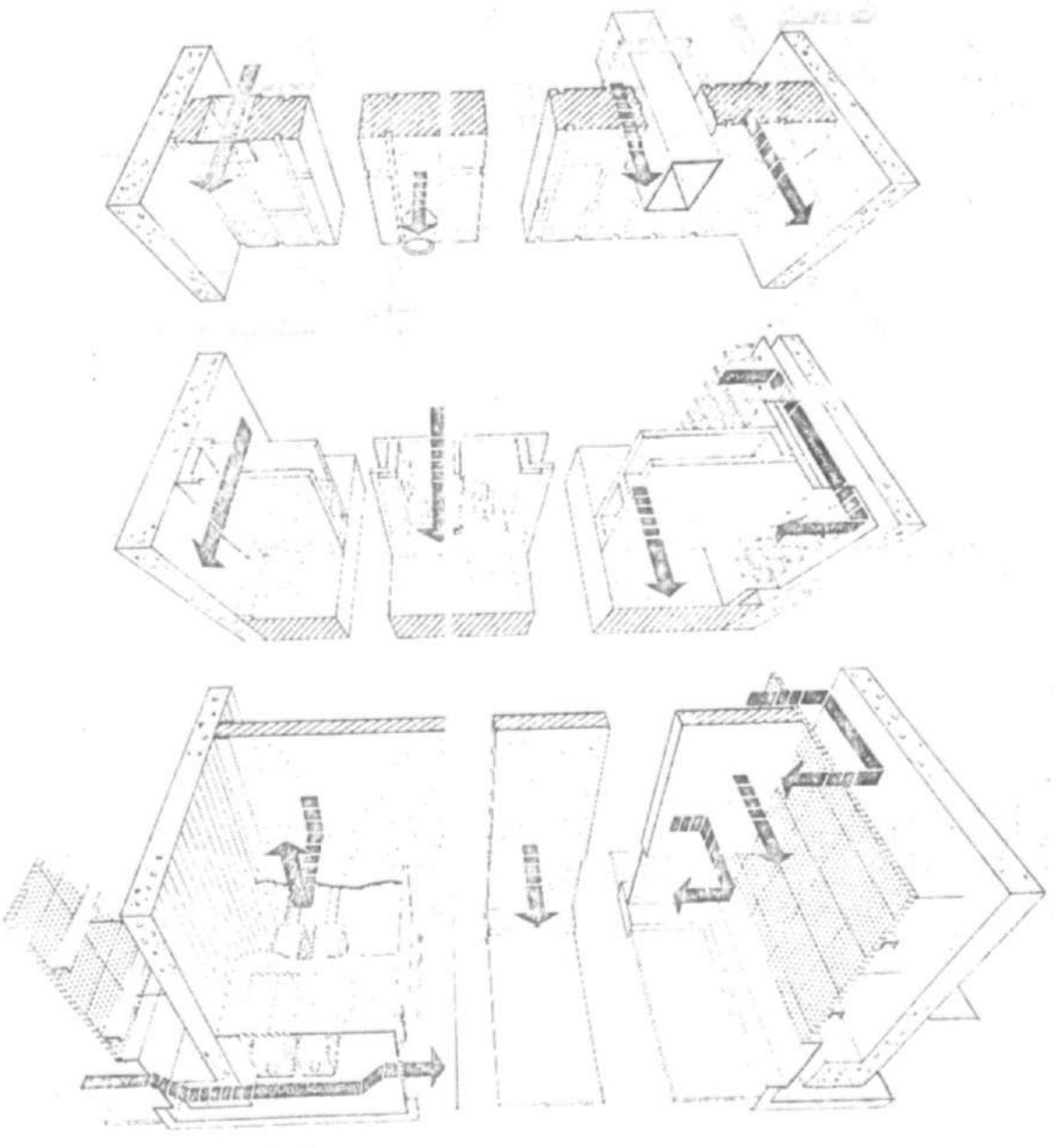
STUDIO TYPE	HEIGHT	WIDTH	LENGTH
SMALL	1	1.25	1.60
MEDIUM	1	1.50	2.50
WITH RELATIVELY LOW CEILING	1	2.50	3.20
WITH UNUSUAL LENGTH RELATIVE TO WIDTH.	1	1.25	3.20

It must however be stressed that the significance of room proportions in studio acoustics diminishes when

i. the studio has a non-rectangular floor,

ii. ideal reverberation characteristics have been achieved

iii. acoustical finishes particularly those with efficient low-frequency absorption, are generously used and evenly distributed



iv. a high degree of diffusion has been provided

v. the volume of the studio is above 710m^2 Provision for a high degree of diffusion is of vital importance in studio acoustics. With ideal diffusion the number of positions at which noticeable sound-pressure variation occur is considerably reduced, so that the microphones can be placed safely in almost any convenient position.

Broadcasting, speech, and recording studios must frequently be used for programmes differing widely in type, scale, or complexity. The necessary variable reverberation conditions can be achieved by the following means:

a. Variable absorbers on wall or ceiling surfaces, such as, hunged or sliding panels, rotatable cylinders, adjustable drapery, etc

b. Portable acoustic-screens (flats)

c. A reverberation chamber

d. A special mechanism to control the RT electronically, which is operated from the control room.

Boundary surfaces must be carefully checked for echoes, flutter echoes, and sound concentrations. Parrallel surfaces must be eliminated (particularly in medium and large studios) or treated with acoustical materials highly absorptive throughout the frequency range between 63 and 8000Hz.

SOUND RECORDING STUDIOS

Recording studios with a dead acoustical environment, are usually connected with a control room and other ancilliary room.

The floor area and shape depends on the furniture and technical equipment to be accommodated. Since as a rule, the public is not admitted into recording studios, priority can be given to acoustical rather than aesthetic requirements.

CONTROL ROOM

A recording studio is linked with one or more control rooms, where the control desk, that is, the nerve centre of the recording session, is located. All sound sources are controlled and mixed here, before the signal finally leaves the transmitter.

Visual contact between the studio and control room is provided by a wide control window with an unobstructed view of the floor. As long as the studio floor area does not exceed about .75 to 110m^2, both control room and studio can be on the same floor level. Control rooms linked with studios of larger size must be elevated.

The size and shape of the control room depend on how many people and how much equipment it must accommodate, for example:-

- audio console
- monitoring and talk-back facilities
- tape and desk reproducers
- tape recorder
- clock
- reverberation control unit
- video monitor
- intercom key panel

and - seats for the control personnel.

In control romms, an RT of about 0.4 sec. is recommended at the mid-frequency range.

FILM STUDIOS

Motion picture studios are usually built as large halls with highly absorbent enclosures so that the sets can contribute their own acoustical characteristics.as required.

Provision for the required short Reverberation Time and for a high degree of noise and vibration isolation within these studios is the main acoustical objective.

7-4 SOUND-INSULATING CONSTRUCTION

The sound insulating construction for the various acoustic rooms of the FILM STUDIO protection against.

1. AIRBORNE SOUND

and 2. STRUCTURE-BORNE or IMPACT NOISE.

CONSTRUCTION METHODS

The selection of a particular wall or floor construction is guided by three parametric functions. These are:

a. The existing or predictable noise level on the source side or in the source room

b. The acceptable (or desirable) background-noise level in the receiving room

c. The ability of the selected enclosure to reduce the exterior noise to an acceptable level.

ACCEPTABLE BACKGROUND NOISE LEVEL

The acceptable (or desirable) background-noise level can be expreesed in terms of noise criterion (NC) level, specified in terms of NOISE CRITERION CURVES fig.....

The basic objective is that the transmitted portion of the exterior noise be reduced on the receiving side just below background-noise level, provided that the background noise is within the perm_ssible or acceptable range.

An example of this is in fig....., if an exterior noise of 70dB must be reduced by using a partition below a background noise level of 20dB to about 15dB, the partition must have an acoustic rating (STC value) of 70 - 15 = 55dB. The figure ..., also shows that if the background-noise level can be raised to 35dB instead of 2[illegible]B, provided that it is still within the acceptable range, a more economical 40-dB (instead of 55dB0 partition will render the transmitted noise inaudible.

Background noise is a mixture of various noises in the unoccupied room created by the

i. mechanical and electrical services of the building
ii. exterior vehicular traffic
iii. general office activities in spaces adjacent to the receiving room, etc.

It is generally agreed that a reasonable amount of background noise or masking noise, when properly controlled (or artificially produced by electronic devices) will beneficially mask other disturbing noises, provided that the masking noise is:

i. continuous
ii. not too loud
iii. unobstrusive
iv. carrying no information, such as intelligible speech or identifiable music.

An excessive masking noise will impair audibility or intelligibility by drawning out faint speech, soft music, or other very low - intensity sounds one might want to hear.

RECOMMENDED BACKGROUND-NOISE CRITERIA FOR ROOMS

TYPE OF ROOM	NOISE CRITERIA NUMBER
CONCERT HALL	15-20
*RADIO OR RECORDING STUDIO	15-20
OPERA HOUSE	20
LEGITIMATE THEATRE	20-25
*MUSIC ROOM	20-25
TELEVISION STUDIO	20-25
EXECUTIVE OFFICE	20-30
CLASSROOM OR LECTURE HALL	25
*MOTION-PICTURE STUDIO	25
CONFERENCE ROOM	25-30
CHURCH OR SYNAGOGUE	25-30
COURTROOM	25-30
ASSEMBLY HALL OR SCHOOL AUDITORIUM	25-35
HOME (SLEEPING AREAS)	25-35
HOTEL OR MOTEL	25-35
MOTION PICTURE THEATRE	30
HOSPITAL	30
SEMI-PRIVATE OFFICE	30-35
LIBRARY	30-35
BUSINESS OFFICE	35-45
RESTAURANT	35-50
DRAFTING ROOM	40-45
GYMNASIUM	45-50
TYPING OR ACCOUNTING OFFICE	45-60
COLISEUM	50

SOURCE: Enironmental Acoustics by Leslie Doelle (Page 186).

WALL CONSTRUCTION

The insulating performance of an acoustic . Wall reaches the optimum if:

a. it has a reasonable and uniformly distributed mass over its entire area.

b. It is constructed both horizontally and vertically as an uninterrupted, complete barrier.

c. It is effectively sealed around its periphery, between its elements, and around openings made for outlets, switches, etc.

d. It is built from structural slab to structural slab, or when attached to a suspended ceiling only, adequate measures have been taken for the acoustic restoration of its missing portion above the suspended ceiling.

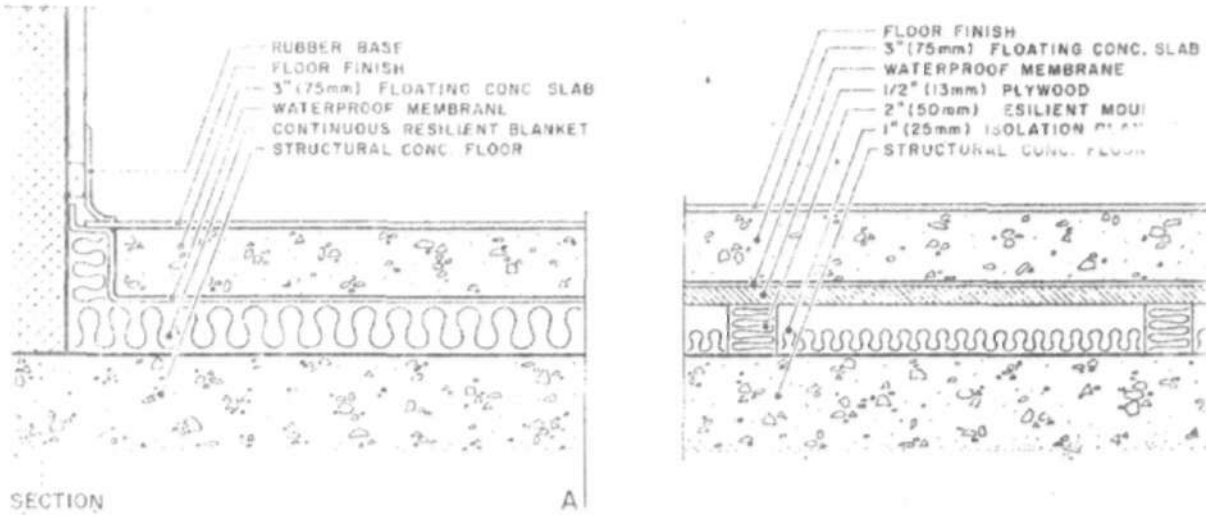
The sealant should be nonsetting, nonskinning, and nonhardening caulking compound; gasketing alone is not as effective as caulking.

ACOUSTIC FLOOR CONSTRUCTION

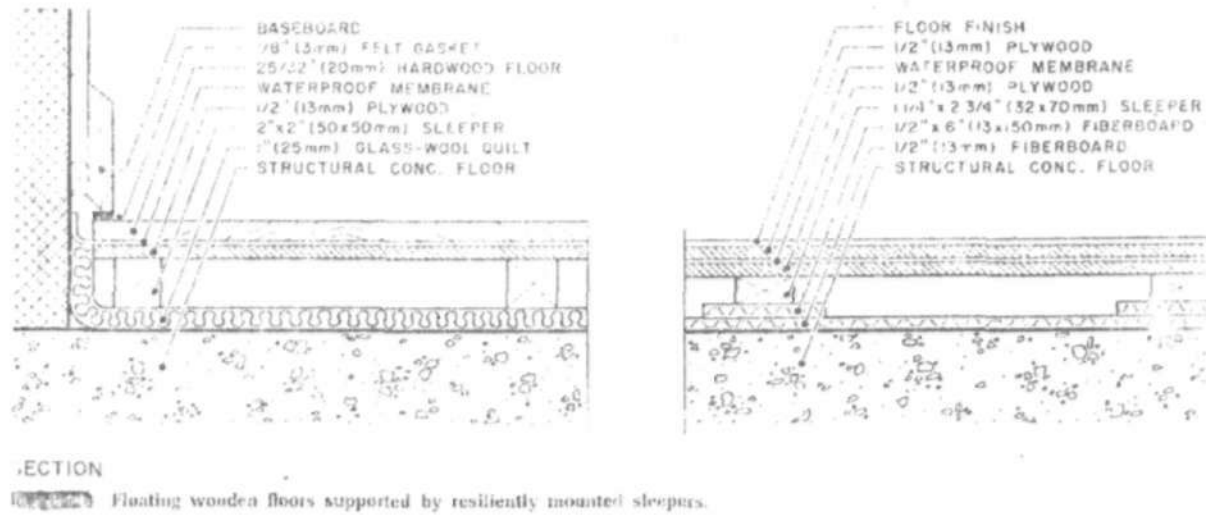
Studios in which sound is recorded require special acoustic properties and their design constitutes a highly complex subject. The combined knowledge and experience of an architect, a structural engineer, an electrical engineer and an acoustic expert are all needed to satisfactorily solve the problems involved.

The sound insulation of floors can be improved in the following ways:

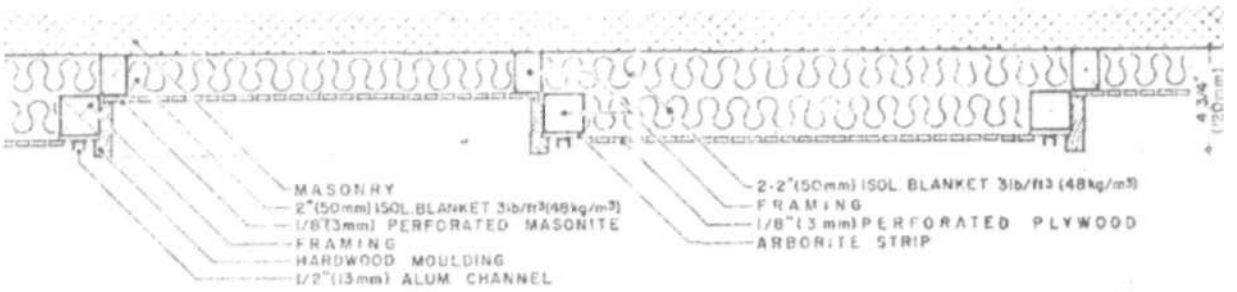
1. A soft RESILIENT SURFACE, such as carpeting, corktile, rubber, or vinyl tile, greatly improves the impact-noise insulation of the floor but provides only negligible insulation against airborne noise.



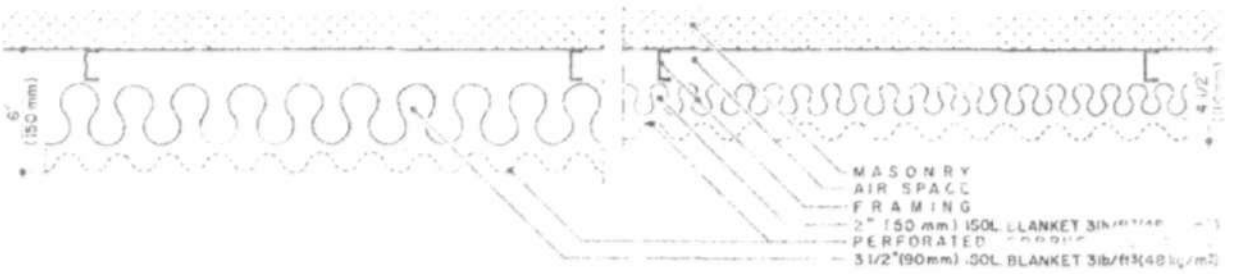
Floating concrete floors supported by (A) a continuous layer of resilient blanket and (B) distributed resilient mounts.



Floating wooden floors supported by resiliently mounted sleepers.



LITTLE THEATER, ACADEMIE DE QUEBEC, AMYOT VAU, ARCHITECTS



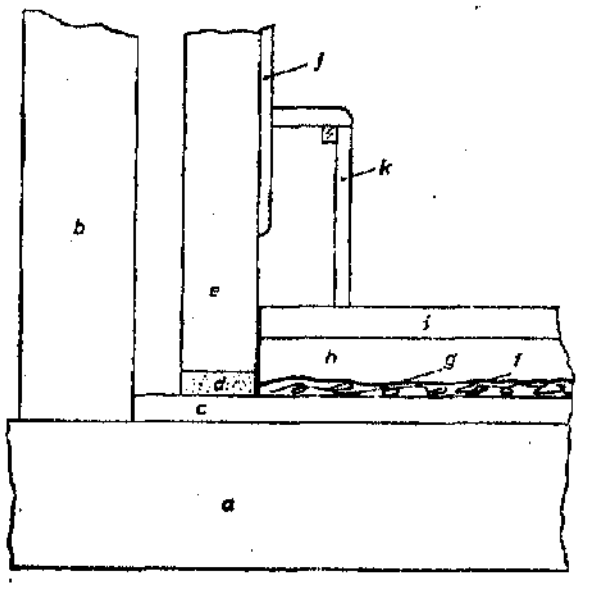
2. A FLOATING FLOOR considerably improves the sound insulation against both airborne and impact noises.
3. A solid SUSPENDED CEILING improves the insulation against both airborne and impact noises, the extent depending on the weight of the suspended ceiling and the degree of resiliency with which the ceiling is attached to the structural floor.

Hard, rigid finishes over a concrete floor, such as wood, linoleum, vinyl-asbestos tile, asphalt tile, etc; do not improve the impact-noise insulation of the floor. Whenever possible, laying a carpet is unquestionably the most sensible measure for eliminating impact (footstep noises).

FLOATING FLOORS

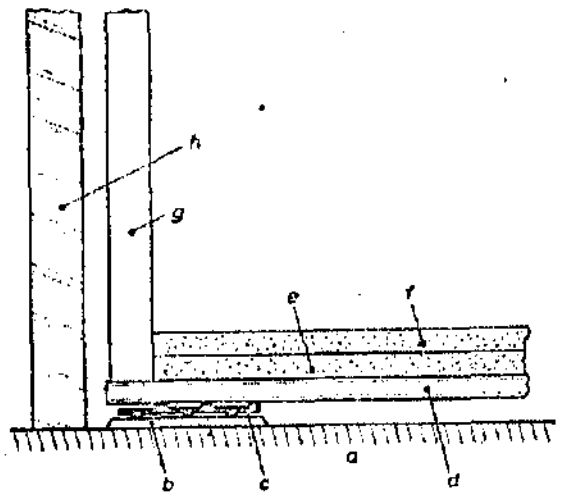
These can be supported by a continuous layer of resilient blanket, resilient mounts, or sleepers, which rest on a resilient blanket or are carried in resilient chairs. In all cases, the FLOATING FLOOR assembly rests on structural slab. Floating wood floors should be carefully nailed to the supporting sleepers only. A floating concrete slab has been recommended to be at least 75mm thick on top of an adequately resilient blanket. Floating concrete floors have been found out to be more effective than floating wood floors.

In order to obtain maximum efficiency it is essential not only to provide a consistent and uninterrupted acoustical separation between floating floor and structural slab, but also to avoid any rigid contact between floating floor and the surrounding walls.



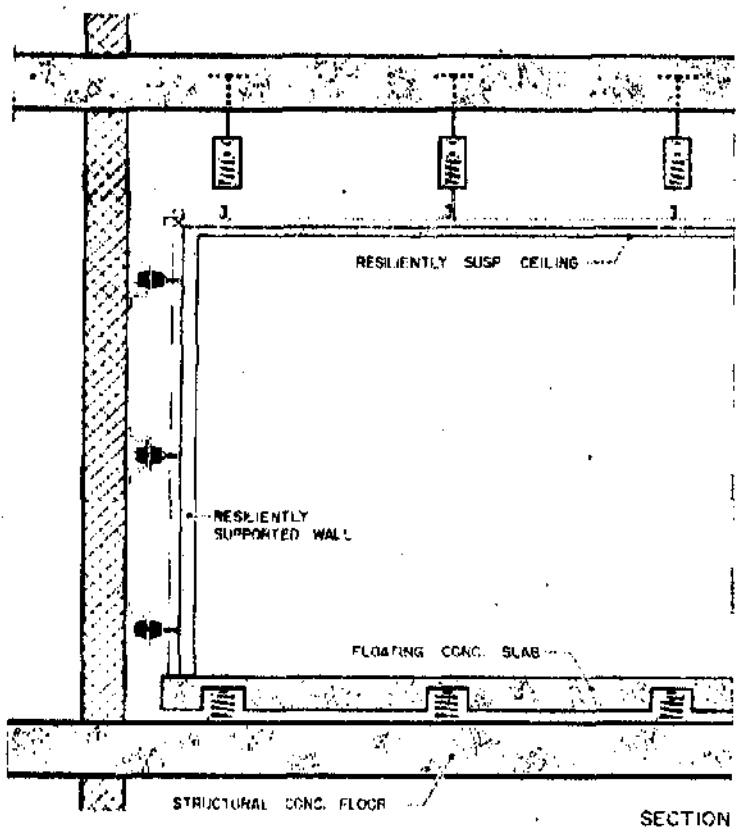
Studio floor laid on mineral wool

a Structural floor slab
b 125mm brickwork
c Lightweight concrete screed
d Cork
e 75mm breeze block
f Mineral-wool blanket
g Waterproof paper
h Lightweight concrete
i Finishing screed
j Plaster
k Microphone skirting



Suspension of studio on rubber pads

a Structural floor
b Concrete plinth
c Rubber pad
d Prestressed-concrete planks
e Concrete
f Screed of asphalt concrete
g Inner wall
h Outer wall



SECTION

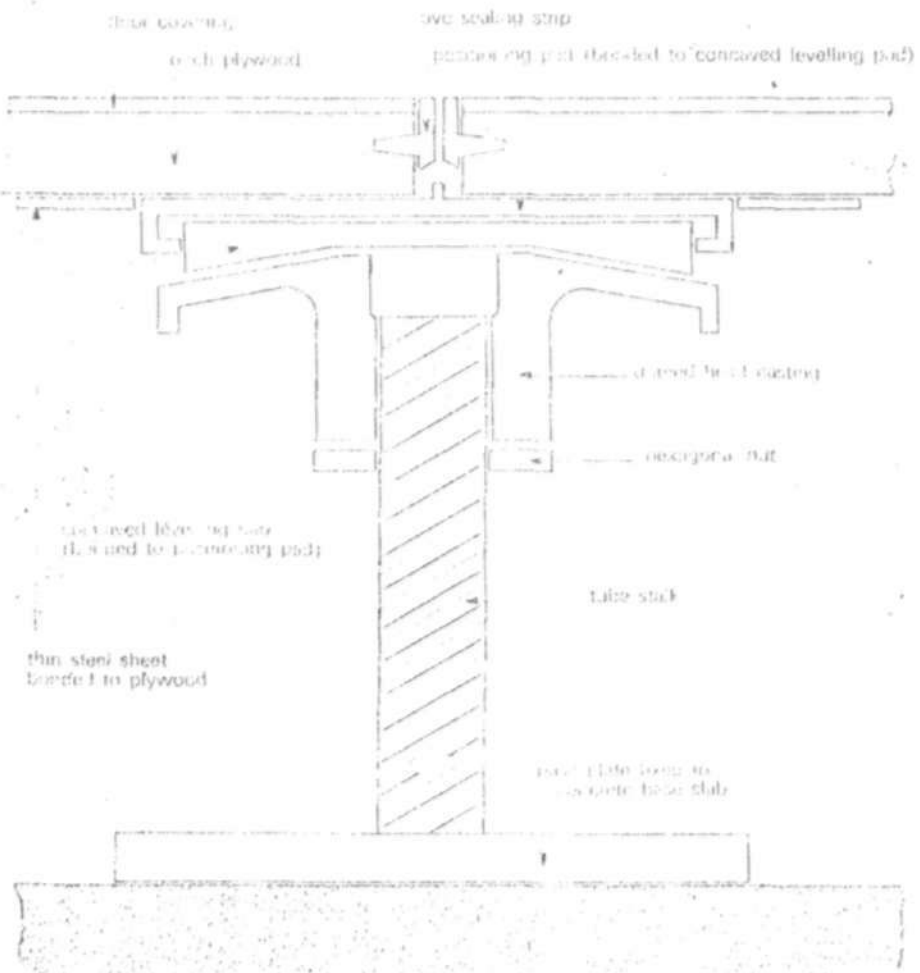
Discontinuous construction with floating floor, isolated wall, and resiliently suspended ceiling.

The resilient blanket beneath the floating slab must be adequately protected by a waterproof membrane (roofing felt or polyethylene) against moisture originating from the pouring of the floating slab. Protection of the waterproof membrane (by plywood) may also be necessary against such potential dmages as rupture during reinforcement and concrete pouring. Once the area of the floating concrete slab exceeds 12 to 14 square metres suitably spaced expansion joints and reinforcing bars should be provided. All pipes, ducts, conduits, etc, which penetrate through floating floors should be isolated all around to avoid "short-circuiting between structural floor and floating slab".

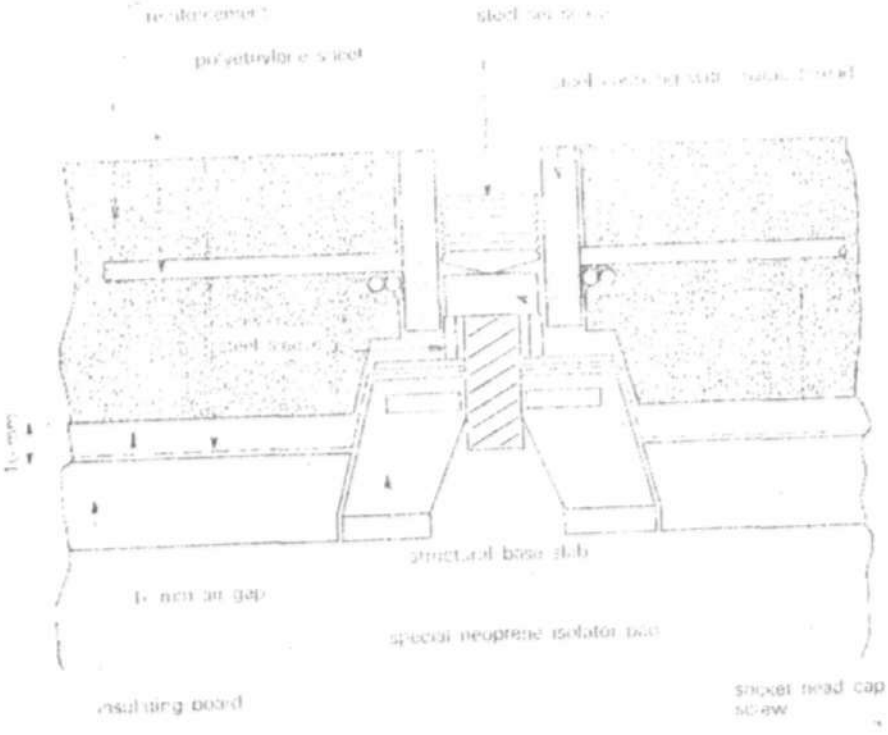
There are various methods of construction which can be used. One of these techniques is that employed in the construction of a recording studio in London.

Essentially, the arrangement consists of a double concrete slab, with an air space between, the upper slab being supported on patent Neoprene insulator pads. The method of construction is as follows:

> "The structural base slab (i.e. the lower of the two), is designed and constructed in the usual way as a suspended reinforced concrete floor. After the curing period is over, the special patented Neoprene insulator pads are fixed at predetermined centres over the whole slab, then the whole slab is covered with a special insulating board 25mm thick, which has holes cut in it to fit around the Neoprene pads. As soon as this insulation board is in position, a 500-gauge polyethylene sheet is laid on top to cover the whole area, with holes cut in the centre of each insulator to allow the steel coupling (which have inside threads) to be placed in position on the insulation pads.



[redacted] *Detail of stalk for cavity floor. (Courtesy: H. H. Robertson (UK) Ltd.)*



[redacted] *Diagram of 'floating' r.c. floor slab after raising by 10 mm.*

The purpose of this membrane is to ensure complete separation between the insulating board and the upper concrete slab which is cast on top .....

When the polythene membrane is in position, the steel couplings are placed centrally on the Neoprene insulators and the steel cap screws are inserted down the inside of the couplings and screwed into the Neoprene pad. This holds the couplings steady during the casting of the top slab.

The reinforcement for the top slab is then placed in position and is welded to the steel couplings. Additional reinforcing bars are provided adjacent to the couplings.

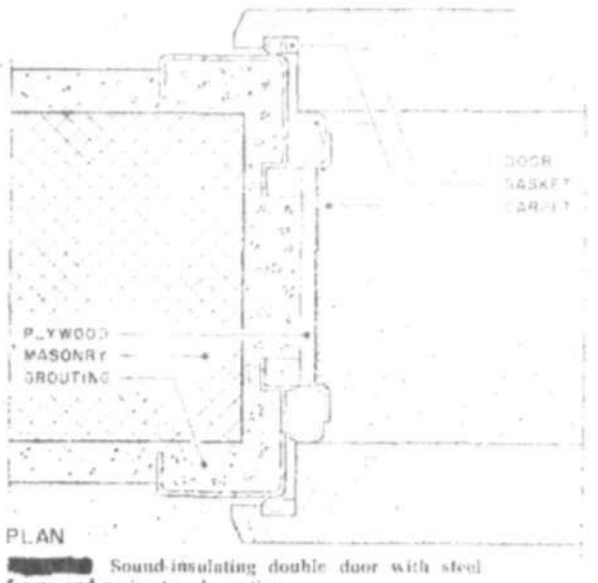
The concrete for the upper slab is then placed, compacted and cured in the usual way. When the concrete reaches a compressive strength of 25N/mm^2 the steel cap screws are removed and replaced by the socket head cap screws which are screwed down into the Neoprene pads. Then steel socket set screws with oval points are screwed down into the couplings (which, as previously stated have threads), until they engage on the tops of the socket head cap screws.

When the set screws are rotated further, this raises the upper slab because the couplings are welded to the reinforcement encased in the concrete of the slab.

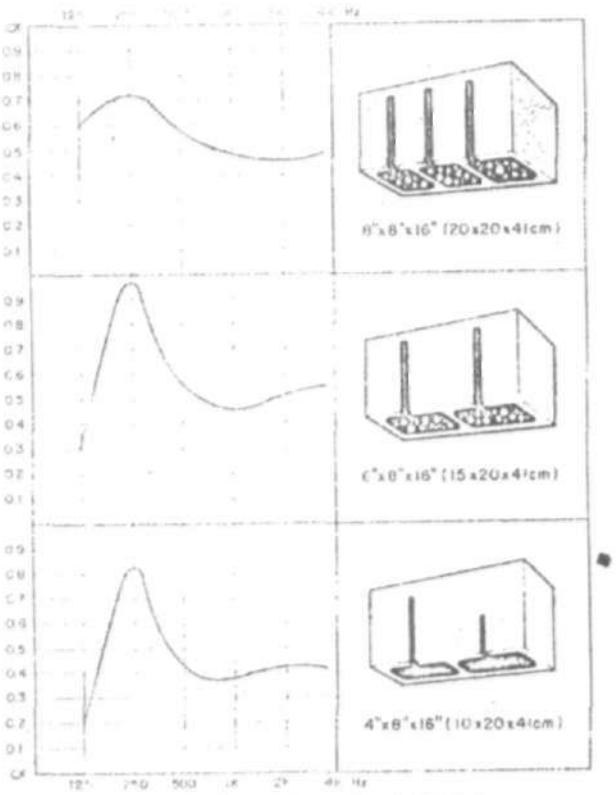
It is essential that during the raising operation, all the set screws are rotated simultaneously by an equal amount, ... A continuous check must be kept on the level of the top slab as it is slowly raised".

FLOORS:

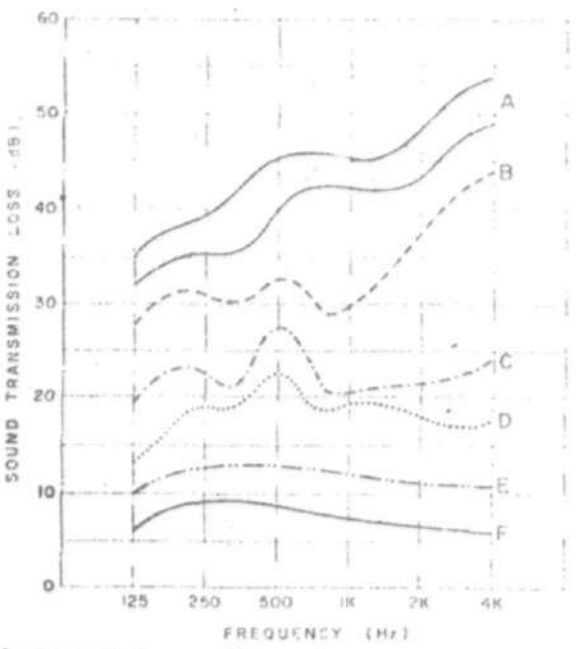
"Construction and fishes by P. H. Perkins (Pages 108 - 109)"



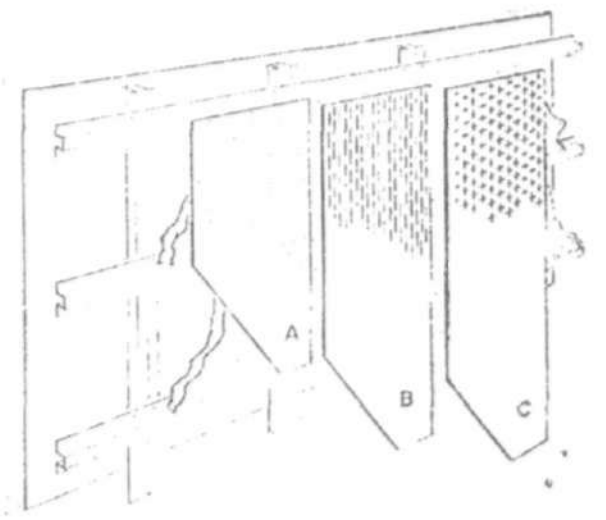
Sound-insulating double door with steel frame and perimeter absorption.



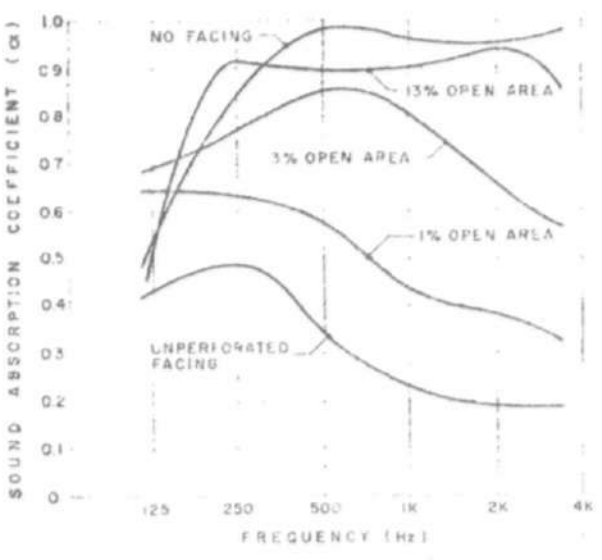
Typical Soundblox units used as individual cavity resonators.



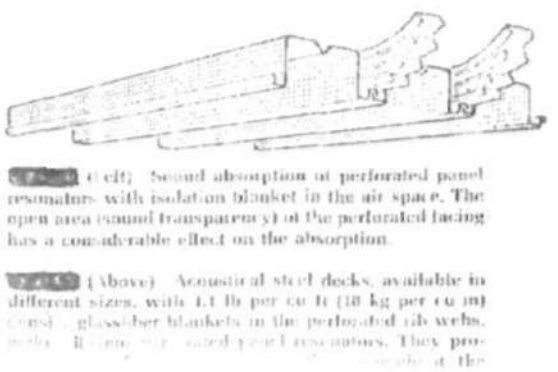
TL diagrams of different door constructions: (A) soundproof door (spread of TL values); (B) solid-core door gasketed; (C) hollow-core door gasketed; (D) ungasketed hollow-core door; (E) louvered door (25 percent open); (F) open door.



Typical installation of a perforated panel resonator using various types of perforated facings and with an isolation blanket in the air space. (A) perforated board, (B) slotted hardboard, (C) perforated metal or plastic.



(Left) Sound absorption of perforated panel resonators with isolation blanket in the air space. The open area (sound transparency) of the perforated facing has a considerable effect on the absorption.



(Above) Acoustical steel decks, available in different sizes, with 1.1 lb per cu ft (18 kg per cu m) [illegible] glass-fiber blankets in the perforated rib webs, [illegible]

STUDIO DOORS

Doors constitue acoustically weak elements of walls because:

a. their surface weight is normally less than that of the wall into which they are built.

b. the gaps around their edges, unless sealed, offer an easy passage for the transmission of noise.

c. they are considerably smaller than an average partition, consequently their "low-frequency resonances occur at a more critical range of the audio-frequency spectrum".

Sound insulating doors should essentially be of solid-core and heavy (rather than hollow-core and light) construction, with all edges well sealed. Light-weight, hollow-core wooden doors are dimensionally unstable and can warp, destorying the seal along the perimeter of the door.

The use of automatic door closers is recommended in order to avoid the annoying sound of doors slamming in the studios.

ACOUSTIC WINDOWS

Observation windows in the walls separating studios from cubicles or recording rooms generally require two or three leaves of glass, which should not be all of the same thickness. Variation of the thickness prevents all the leaves having the same critical frequencies. Typical thicknesses are in the range of 6 - 12mm. The reveals should be treated with packing felt or some similar sound-absorbing material to damp cavity modes and arrangements should be made for opening the outer leaves for cleaning or removal of condensation, should this occur.

They may be inclined, so that they do not cause disturbing reflections from the lights in the rooms. Such windows, however well designed, tend to be the weakest links in the wall, and their design and construction should be supervised with care to ensure that they provides as little sound transmission as possible.

7-5 VENTILATION OF STUDIOS

INTRODUCTION

Because of the acoustic requirements of the various types of studios, it is a necessity that direct openings to the exterior should be avoided. This therefore creates a great problem for the flow of air for ventilation. It is therefore necessary to use some mechanical means of ventilating the studio spaces. The installation of mechanical ventilation system with its accompanying noise and vibrational tendencies therefore obviously poses a big problem for the studio architect if normal studio (which should be as quite and still as possible) activities will not be disturbed.

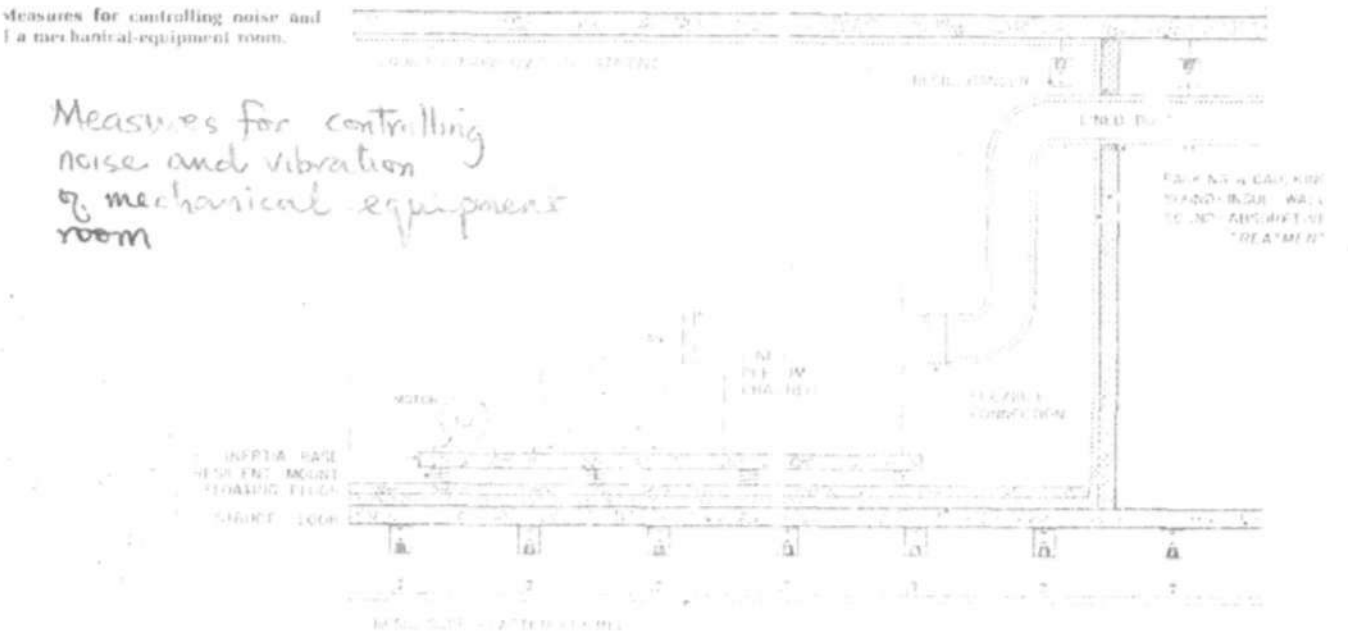
VENTILATION SYSTEMS

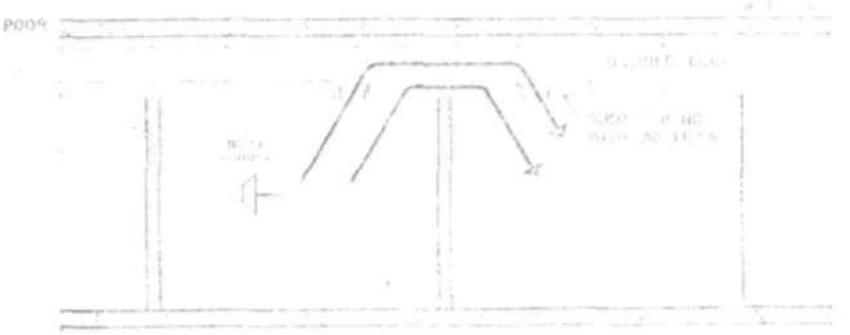
If the ingress of external noise is assumed to have been satisfactorily reduced by effective sound insulation and by isolation from structure-borne sound, the major source of background noise is usually the ventilation system.

A large studio may be equiped with lights consumming up to about a third of a megawatt of power, and this power is almost entirely converted into heat, which raises the temperature of the air.

Measures for controlling noise and
l a mechanical-equipment room.

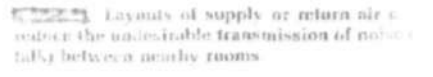
Measures for controlling
noise and vibration
of mechanical equipment
room











Layouts of supply or return air s
reduce the undesirable transmission of noise
tally between nearby rooms

If the ventilation fails in a studio such as this, work becomes impossible within about 15minutes if the normal production is carried on.

If we assume that a rise in temperature of $15^{o}C$ is permissibl in the studio as the ventilating air flows from inlet to exhaust ducts through the studio, the mass of air to be moved per second is given by:

$$\frac{300,000}{15\ Cp} \text{ Kilogrammes,}$$

where Cp is the Specific Heat of air at constant pressure.
This represents a volume of

$$\frac{3x10^{5}}{15\ Cp} \text{ Cubic metres,}$$

giving approximately

$$6x10^{4} \text{ litres or } 60m^{3}/\text{second}$$

This is clearly a very large flow rate demanding large ducts and a high velocity within them.

The fig..... shows a typical ventilation installation for a large studio. Air is drawn from the outside of the building through filters by a large centrifugal fan and discharged into a mixing chamber from which ducts lead to the upper part of the studio.

The fan is isolated from the floor by antivibration mountings, or by a simple slab of cork serving the same purpose and is connec to the mixing chamber by a short section of flexible trunking. A second fan draws air from exhaust ducts in the studio, and discharges it into the mixing chamber by way of a refrigerati plant. Automatic controls maintain the proportion of recirculated air, and thus keep the air supply to the studio at a desired temperature. The air is conveyed from this mixing chamber to distribution ducts in the upper part of the studio. These ducts are branched off a main duct running along one side or across the middle of the studio, thus distributing the air evenly all over the area.

Alternatively, the air can be ducted to the perimeter of the ceiling, from where it sinks towards the floor, taking the place of that being drawn out of the studio by the exhaust ducts near ground lvel.

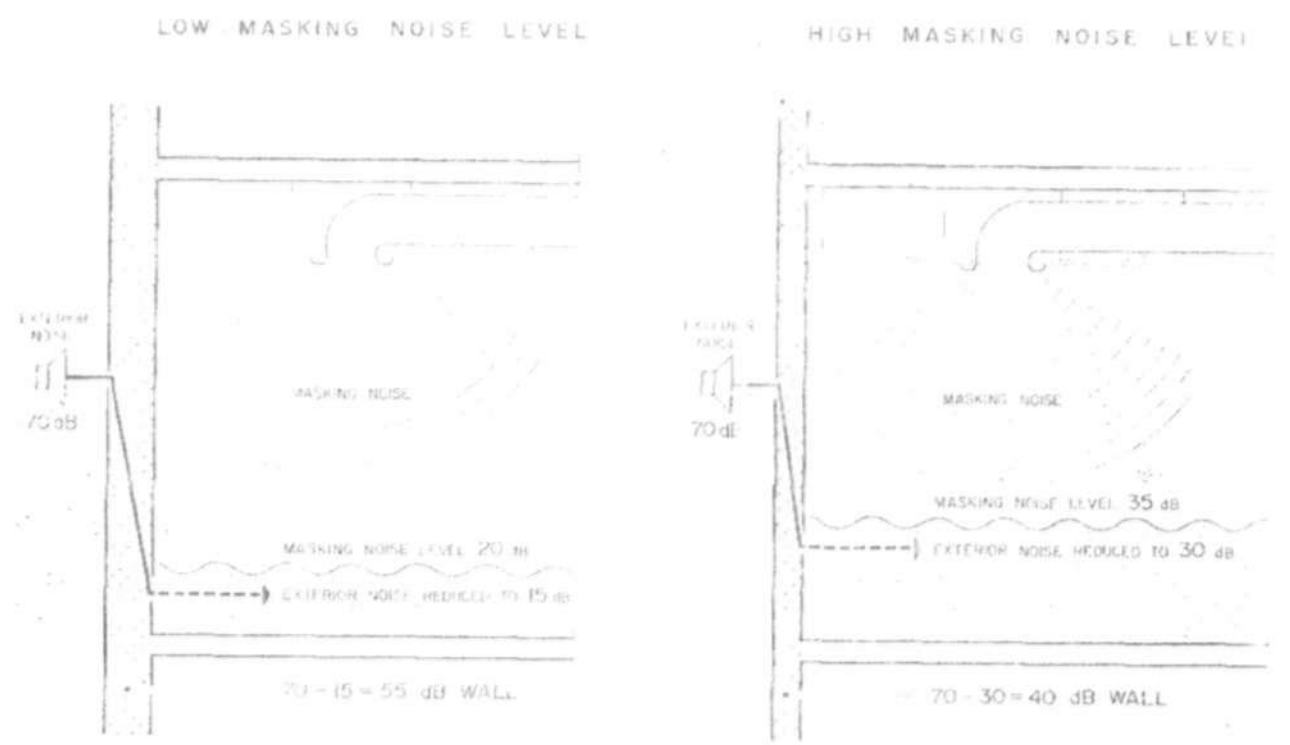
The inside of the mixing chamber and the larger - section parts of the ducting are lined with a porous, sound-absorbing material, which reduces the transmission of sound from the fans along the ducts to the studio. The arrangement of the inlet ducting is designed as far as possible, to cause the least disturbance or localised flow in the neighbourhood of microphones; this is most important in film studios in which distant microphones are commonly used.

To move the air at a sufficient rate, it may be necessary to use fairly high velocities of flow, and there will be some regeneration of noise in the ducts themselves from turbulence, particularly at changes of cross-section or direction. A single attenuator, usually a heavily lined section of duct of increased, cross-section, is normally sufficient to reduce this regenerated noise to a satisfactory level. The attenuator may contain lined splitters (metal sheets dividing the duct into several parallel channels), or it may be in the form of a labyrinth.

Calculating Noise Output

Methods of calculating the noise output of a ventilation system have been worked out by several people,

The basis of these methods is to compute the total production of sound energy in the fan by means of an empirical formula that includes the norninal power of the driving motor and the static pressure produced or the volume flow of air through the system.



With a relatively high but acceptable background-noise level in a room, the reduction of exterior noises can be achieved at a lower cost.

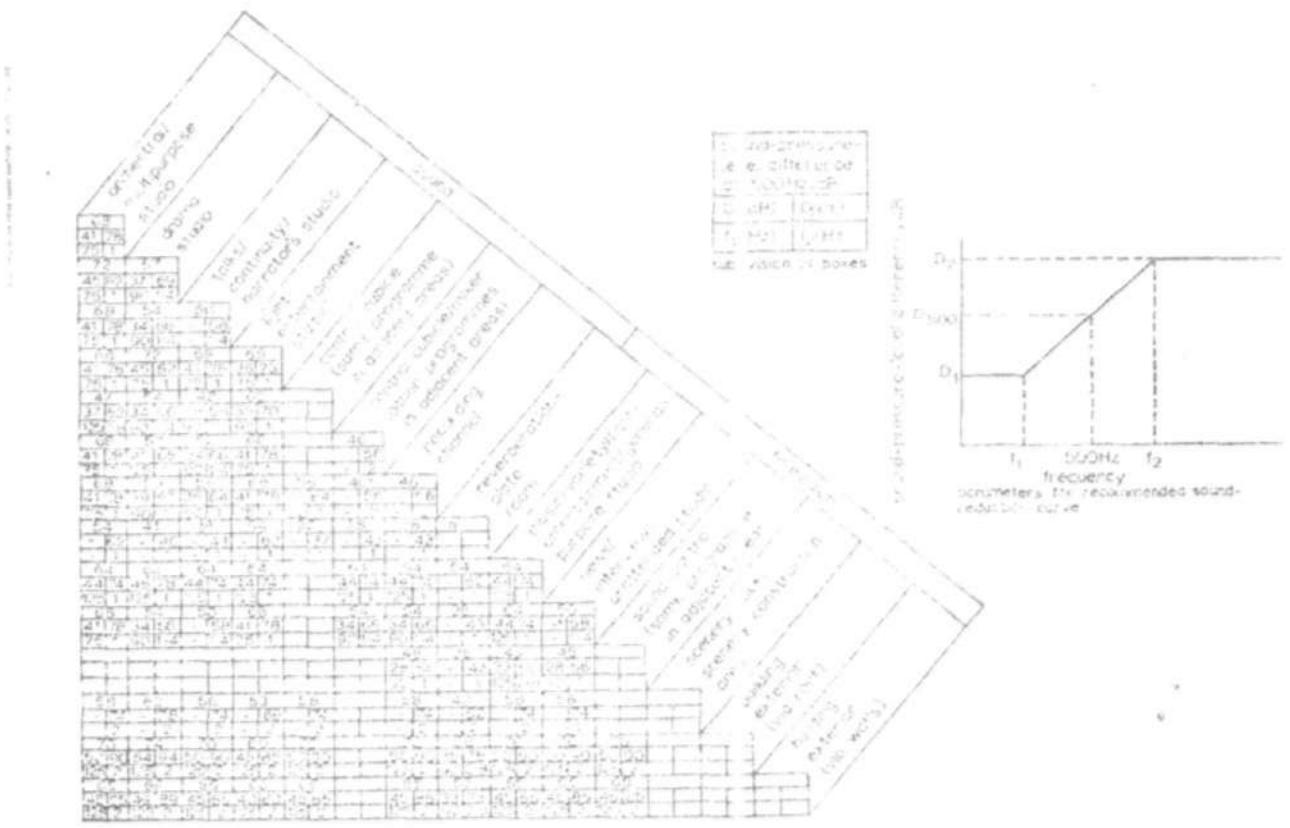


Chart showing sound-reduction parameters for partitions between areas in studio centres (Smith and Gilford, 1968)

* Studios intended for pop-music groups with amplified equipment require partitions giving 10dB higher sound reduction for protection of neighbouring areas.

This total power is then fitted to one of a series of spectra for the types of fan that are available (fig.....). Centrifugal fans produce relatively more low-frequency noise than axial blowers. These are less frequently used for large ventilation systems, but are feasible for systems using high velocities and small ducts.

The reduction or regeneration of sound power as the air is conveyed through the ducting to the studio is then examined in detail, taking into account the effect of bends, duct linings, changes of section and use of attenuators. Finally, the sound pressure level (S.P.L.) at the nearest point of the studio to each outlet at which an operational microphone is likely to be situated is calculated using some standard equations.

A point of importance in the design of such a system is the effect of the grilles that are often fixed over the ends of ducts where they terminate at the studio walls. These are used:

i. toregulate or modify the direction of airflow

ii. to prevent papers or cigarette ends from being drawn into exhaust ducts

iii. for purely decorative purposes.

Unfortunately, however, if not well designed, these can be the source of considerable regeneration of noise, either by turbulence or by the production of clearly pitched "aeolian tones" originating from a regular series of vortexes that are shed by the vains or bars of the grilles and travelling downstream. Generally speaking, such grilles serve very little purpose in studios, and are best avoided if not fulfilling a definite function.

7-6 LIGHTING

Working under studio conditions, it is possible to assume that no natural lighting exists, what is in front of a camera is invisible. It emerges out of darkness only as it is lighted at the command of the cameraman and the chief electrician, or gaffer.

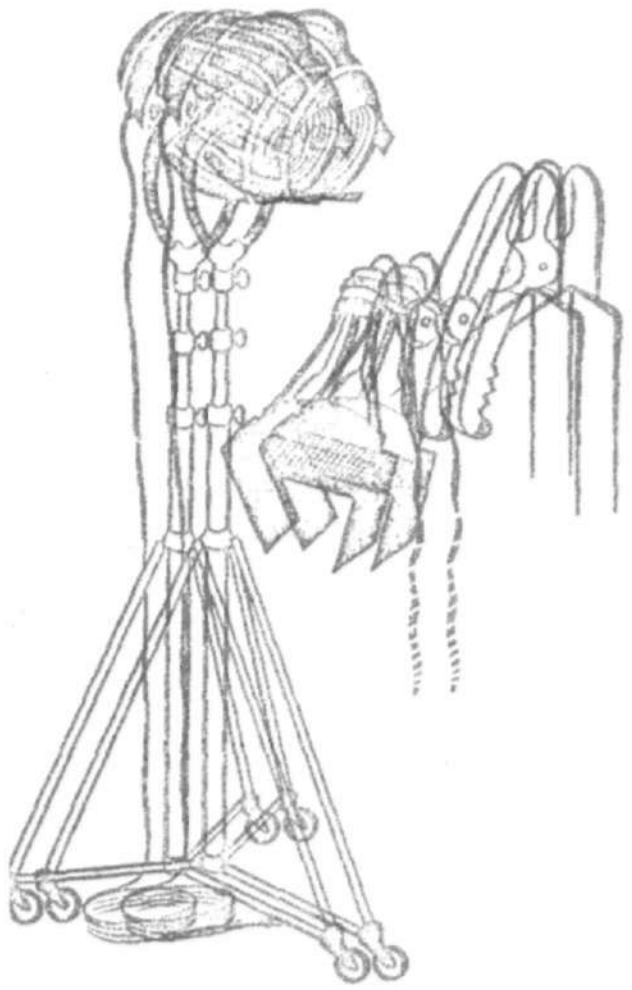
Three types of lighting can be conveniently distinguished:

1. FRONTLIGHTING
2. CROSSLIGHTING
3. HIGHLIGHTING

FRONTLIGHTING consists of general illumination of the subject from the side toward the camera. It provides basic light intensity required for proper exposure within the latitude range of the negative emulsion.

CROSSLIGHTING provides the basic modelling which determines the general balance of light details in the subject and gives them added prominence.

BACKLIGHTING, important as it is as a technique, is not really a distinct type of lighting. If only the reverse side of an object were illuminated, the camera would notice no difference in its appearance, and the light would thus be thrown away. Actually of course, backlight becomes diffused and spread out so that it illuminates the sides of objects, throwing them into high relief. It is thus a kind of sidelighting. TOPLIGHTING is also as a rule as combination of frontlighting and crosslighting.



[redacted]ight[illegible]ight[illegible]ight[illegible]ing[illegible]nit. The[illegible]
[illegible]ent[illegible]ustrates[illegible]ard[illegible]
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SOURCES OF LIGHT

Light from a bulb is usually directed by a reflector into the limited area where it is needed. Two kinds of surfaces are used as reflectors: DIFFUSE and SPECULAR. DIFFUSE REFLECTION takes place when the reflecting particles in a material throw the light equally in all directions. SPECULAR REFLECTION takes place when they throw it all in one direction. The same terms apply to substances which transmit light. Specular transmission goes with transparent substances; Diffuse transmissio with transluscent substances which spread the light evenly over a wide field of view.

Today focusable spot lamps are used. The two most common shapes of reflector - the SPHERE and the PARABOLA - are both used.

Most studio light sources today combine the lens and spherical mirror to produce a beam which can be made almost parallel or caused to converge or deverge over a smaller or larger angle, while still keeping the illumination uniform.

Light sources used in movie shooting today are almost exclusively of two kinds:

a. INCANDESCENT

and b. CARBON ARC.

The popular fluorescent lamp has so far proved of little value in the motion picture studio.

INCANDESCENT LIGHTING

This is the lighting produced by raising of a metallic filame to a high temperature.

It has today been developed to such an efficiency that it will suffice for all small and medium - size sets, and will cover most of the interiors commonly met with on location shooting. Tungsten is almost universally used as a filament material since it has the highest melting point of any conductor (about 3,650°K)

Something must be said about the type of focusing lamps in which these light sources are most often used. These fit into the general category of SPOT LAMPS or SPOTS, that is lamps which can give either a very narrow or comparatively wide beam, ranging usually from about 10 degrees to 45 degrees and having a good degree of uniformity.

ARCH LIGHTING

This is a type of lighting produced by a bridge of incandescent vapour which carries an electric current from one electrode to another. This current sustains the luminous bridge so long as the distance between the electrodes does not exceed critical limit.

At present carbon arcs are the only type of arc widely used in studios.

ACCESS TO LIGHTING POSITIONS OVER THE STUDIO

All lighting positions have to be reached so that individual units can be directed, focused, colour filters changed and the fittings maintained. It is most convenient if the electricians can reach the lanterns from permanent walk ways or platforms with room to walk without stooping, but this is not always possible over the stage where hanging space is in great demand.

Lighting over the studio is usually suspended from bars attached to counterweight sets or winches. It should be known however that the ability to raise or lower these bars does not make it possible to adjust the angle or focus of a spotlight before hauting the bar into place. Such adjustments can only be made when it is in its final position. There is a limited range of lanterns which can be directed from below by means of a pole, but this is at best unwidely and adjusting from a step ladder is usually a surer method. Step ladders are, however, dangerous and inconvenient.

Access to the lantern from bridge and slots should be easy and safe. It may be necessary to knee down to make some adjustement to the extremities of the lanterns but this is no reason to expect technicians to reach lighting positions by crawling on all fours. There should be proper headroom of 2 metres over all access routes so that people can walk naturally without having to crouch.

Platforms and walkways should be finished in a material which is quiet to walk on and reasonably comfortable to kneel on. Wood or linoleum are suitable and have another advantage in their electrical insulation which reduces the risks if a technician touches a faulty lantern. Kicking plates must be provided at the edges of walkways to prevent small items being knocked off.

All the bars mentioned for suspending studio lighting equipment should be 50mm outside diameter tube which has a recommended span of 1950mm. A span of 240mm should not be exceeded. This is the usual scaffold tube and other sizes or square section tube will not take the standard hook damp used for attaching lanterns and are therefore, unsuitable.

STORAGE

Storage space and racking for spare lamps, equipment, colours and cables should be available on or adjacent to bridges and slots. The amount of space required is difficult to determine precisely, but it is reasonable to provide 20% spare lanterns, coils of cable, spare colour frames, tools and accessories.

REFLECTING SURFACES

There is inevitably some light spill from lanterns and to avoid distracting reflections, all those studio surfaces near bridges and slots should be of low reflectances. In particular, polished surfaces which give specular reflections should be avoided.

THE LIGHTING CONTROL ROOM

The best position for the operator of the lighting-control board is in a control room in the studio with an observation window allowing him an unristricted and undistorted view of the sets, wing to wing and floor to borders.

The control room houses the lighting console and the operator and needs space for writing the lighting plot, storage and maintenance activity. A space 3m wide and 2.4m deep should be allowed initially, but this may have to be revised depending upon the equipment installed.

The normall access to the control room should be outside the studio and preferably separate from public areas, but a door direct into the studio is desirable for rehearsal. There should be an easy connection from the control room to the stage and dimmer room and any associated data stores, without having to go through the studio.

The entrance door must be light-trapped to avoid light spill into the studio through the observation window and also to avoid disturbing the operator's dark adaptation.

The Observation Window

The size of the window should be governed by the sight lines from the operator to the stage and lighting equipment which he should be able to see. A typical size would be 1200mm x 600mm high. Reflections of the illuminated part of the control board in the window man distract the operator and on the studio side reflections of studio lighting can be a nuisance to performers. This can be eliminated by angling the glass. Tinted or one-way glass which affects the true colour or intensity of the operator's studio lighting picture is totally unacceptable.

FINISHES

The floors, walls and ceiling of the control room should be dark and non-reflective. A soft finish, such as carpet, on the floor both absorbs sound and muffles it at source. The walls should also be lined with sound-absorbing materials.

7-7 WASTE DISPOSAL

As a consequence of the multi-disciplinary nature of the Film Industry, the volume of wastes accruing from it is enormous. The categories of waste from the proposed film industry fall into two groups.

A. SOLID WASTES

B. LIQUID WASTES

These groups need special methods of handling if normal life within the environment will not be hampered. A careful analysis of these wastes will help in providing methods of dealing with the

A. SOLID WASTES

These are the wastes which come from stationery, timber bits, saw dust and shavings, Textile wastes, Broken Ceramic elements, and wasted food from Restaurant.

B. LIQUID WASTES

These are those accruing from the urinal wastes, surface water from rain, wastes from taps and showers chemicals from the film laboratories and wastes from the Water Closets (W.C.)

DISPOSAL

The solid wastes should be collected at a point and carried to a distant place where they could be burnt or buried while those from the WC and the liquid wastes can go to a central seqage treatment plant.

Wastes from the laboratory especially the used sodium throsulphate (hypo) from which, through a process called Silver recovery, the silver in the hypo is electrolytically plated or chemically precipitated. The pure silver thus recovered can be sold while the liquid is allowed to wash down the drain.

PART EIGHT

THE DESIGN

- THE ARCHITECTURE OF THE FILM STUDIOS
- THE BRIEF
- THE SITE
- THE DESIGN, CONCEPT AND PROCESS

THE DESIGN

8-1 ARCHITECTURE OF FILM STUDIOS

For the uninitiated, the popular conception of a film industry should be a place of multi-environmental and architectural possibilities which can absorb or allow the shooting of all films ranging from war films to love epics to neck-breaking feats to the gentle procession for participants in the convocation of a University.

Much as this may be allowed to be true to some extent, it cannot be taken as the whole truth for the complete production and processing of a film does not necessarily imply a complete recording or shooting of actualities but also an intricate and highly tecnical assemblage of the synthesis of the completed scenes.

In view of this therefore, the major preoccupation of a film studio architect is to master the technical realities of the various aspects of film making so as to provide a conducive environment for the production and processing of the film. It is the solution of the technical realities of ACOUSTICS and LIGHTING that should dominate all other parameters since these constitute the basic prerequisites for a successful film production and processing; all other factors are of course supplementary.

CREATION OF AN AFRICAN IMPACT

Because of the cultural role of the FILM in a society, the outcome of an established Film Industry should bear an indelible imprint of the society's cultural impact not only in the scenes or type of films produced but in the type of structure of the buildings where these films are made.

I, know that there is a universality in the techniques of film production and because of the nature of the technical aspects of the industry an architectural solution in America or Britain for example may also be adequate in Africa. However, in an age when African architects are trying to evolve an AFRICAN ARCHITECTURE, this universality should not be the end of the road.

Africa has a few architectural elements like THE DOME, ARCH, and TRIANGULAR HUT which all symbolize an African's conception of life. These could be included in the design of the Film Industry so as to create an African Impact.

8-2 THE BRIEF

The ultimate aim of this THESIS is to design an environment for the production of about 50 FILM a year with a capacity for future expansion.

The following have therefore been proposed as the necessary infrastructures for a successful take off of the Nigerian Film Industry.

(a) ADMINISTRATIVE COMPLEX

(b) PREPARATORY WORKSHOPS

(c) FILM SHOOTING STUDIOS

(d) LABORATORIES & RECORDING STUDIOS

(e) MAINTENANCE SECTION

(f) RESTAURANT & RECREATIONAL FACILITIES.

The details of the brief is as follows:

ADMINISTRATIVE COMPLEX

No.	Description of Spaces	Area/ Unit	Total - Area
1.	Reception Hall		
4.	Clerical Offices	15m Sq.m.	60Sq.m.
1.	Messenger's Office	20Sq.m.	20 " "
1.	Chief Administrative Officer	25" "	25 " "
4.	Executive Officers	20" "	80
1.	Chief Personnel Officer	20 " "	20Sq.m
7.	Scriptwriters Offices	20Sq. m.	140Sq.m.
3.	Film Producers	25Sq. m.	75Sq.m.
1.	Principal Film Director	20 Sq.m.	20Sq.m.
9.	Film Directors	20Sq. m.	180Sq.m.
7.	Cameramen's Offices	15Sq. m.	105Sq.m.

	DESCRIPTION OF SPACES	AREA/UNIT	TOTAL AREA
1	Ordering Office	20Sq.m.	20Sq.m.
	Stores		
1.	Conference Room	180	180m
1.	Film Distribution Office		
1.	Sales Officer's Office		
1.	Public Relation Officer's		
1.	Registration of Actors' Room		
1.	Central Information Unit		
1.	Cash Office		
1.	Paymaster's Office with Safe		
1.	Accounts Record's Registry		
1.	General Accounts Office		
2.	Senior Executive Accountants		
1.	Chief Accountant		
1.	Central Stationery Store		
1.	Store Keeper's Office		
1.	Machine Dup cating Room		
1.	Machine Store for Typists		
1.	Drivers Room		
	Toilet Facilities		

PREPARATORY WORKSHOPS

No.	DESCRIPTION OF SPACES	AREA/UNIT	TOTAL AREA
1.	Reception Hall		
1.	Changing Room (Male)		
1.	" " (Female)		
	Toilet Facilities		
	METAL WORKSHOP		
1.	Tools' Store		
1.	Main Workshop		
	TAILOR'S WORKSHOP		
1.	Cutting Room		
1.	Tailor's Workshop		
1.	Finished Product Store		
	SCULPTURE & CERAMIC WORKSHOPS		
1.	Chemical Store		
1.	Clay Preparation Room		
1.	Throwing Room		
1.	Finishing Room		
1.	Electric Firing Room		
1.	Clay Storage		
1.	Sculpturing Room		
1.	Sculpture Finishing Room		
1.	Storage of Finished Sculptures		
	WOOD WORKSHOP		
1.	Timber Yard		
1.	Carpenter's Office		
1.	Machine Workshop		
1.	Bench Room		
1.	Finishing Room		
1.	Display Room		

No.	DESCRIPTION OF SPACES	AREA/UNIT	TOTAL AREA
	Sound Dubbing & Preview Theatre		
	Music Library		
	Band Rehearsal Room		
	Offices of Music Directors		
	Sound Recording Control Room		
	Music Recording Studio		
	Prescoring and Playback Theatre		
	Film Cutting Rooms		
	Sound Effect Studios		
	Model Making Room		
	Trick Studios		
	Cine Animation Rooms		
	Storage of Trick Films		
	Photographic Darkroom		
	Optical Effects Room		
	Photographic Store		
	Design Studios		
	Special Effects Studios		
	FILM SHOOTING STUDIOS		
4.	Main Shooting Studios: Studio 1		
	" 2		
	" 3		
	" 4		
4.	Dressing Rooms for Star Actors		
4.	Large General Dressing Rooms		
	Sound Locks		
	Control Rooms for Each Studio		
	Offices for Studio Mangers		
	Storage of Studio Equipment		
	Stand-by Zone for Final Assembly of Materials for set Construction in Studio.		
	Lighting Brioge		
	Projection Room for Back Projection		

NO.	DESCRIPTION OF SPACES	AREA/UNIT	TOTAL AREA
	RESTAURANT & RECREATIONAL FACILITIES		
1.	Main Restaurant		
1.	Water Restaurant		
2.	Lawn Tennis Courts		
2.	Volley Ball "		
1.	Large Swimming Pool		

0 - 3 THE SITE

The proposed site for this scheme: THE NIGERIAN FILM STUDIOS is in ILORIN, KWARA STATE, NIGERIA. I have decided to choose this site because of the following reasons:

Ilorin's climatic condition appear to me to be a desirable compromise between the scorching heat with the dessicating harmattan of the north and the debilitating humidity coupled with the flood striking tendencies of the south.

The seeming centrality of Ilorin has given KWARA STATE a status of THE GATEWAY BETWEEN NORTH AND THE SOUTH.

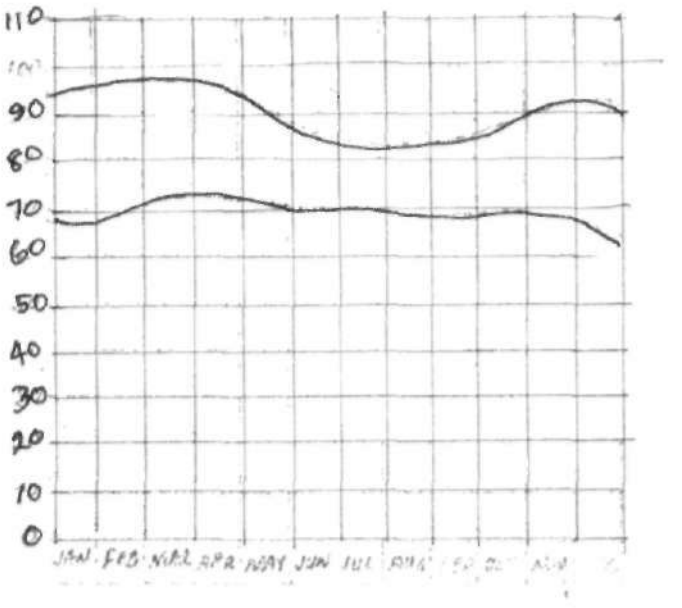
The ready availability of transport facilities like the International Airport, the Railway Line and the good roads linking several parts of the country will facilitate the easy movement of actors to the various parts of the country.

The availability of various Hotels low cost houses and guest houses will provide ready services to actors and staff of the Film Industry.

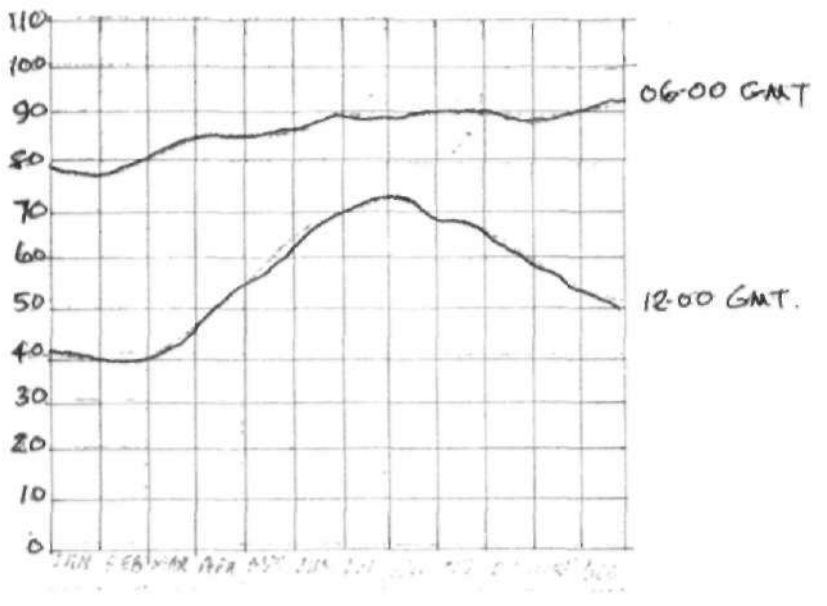
MAP OF NIGERIA SHOWING THE LOCATION OF ILORIN IN KWARA STATE



Climatic Studies



Mean Monthly Maximum and Minimum Temperatures °F



Percentage Mean Relative Humidity at 06.00 & 12.00 GMT

FIG

I do not want to claim however that Ilorin is the only suitable site for the development of THE NIGERIAN, FILM STUDIOS. There are of course a lot of ciramatic sites all over the country, Ilorin is just one of them. It is envisaged that as this proposal becomes fully developed, other film studios will eventually spring up India for example has over 60 studios with about 250 film producing companies. As the film business in Nigeria expands, studio centres will be spread all over the country.

8 - 5 THE DESIGN CONCEPT & PROCESS

The Design Process deals with three fundamental pattern of location in space and time:

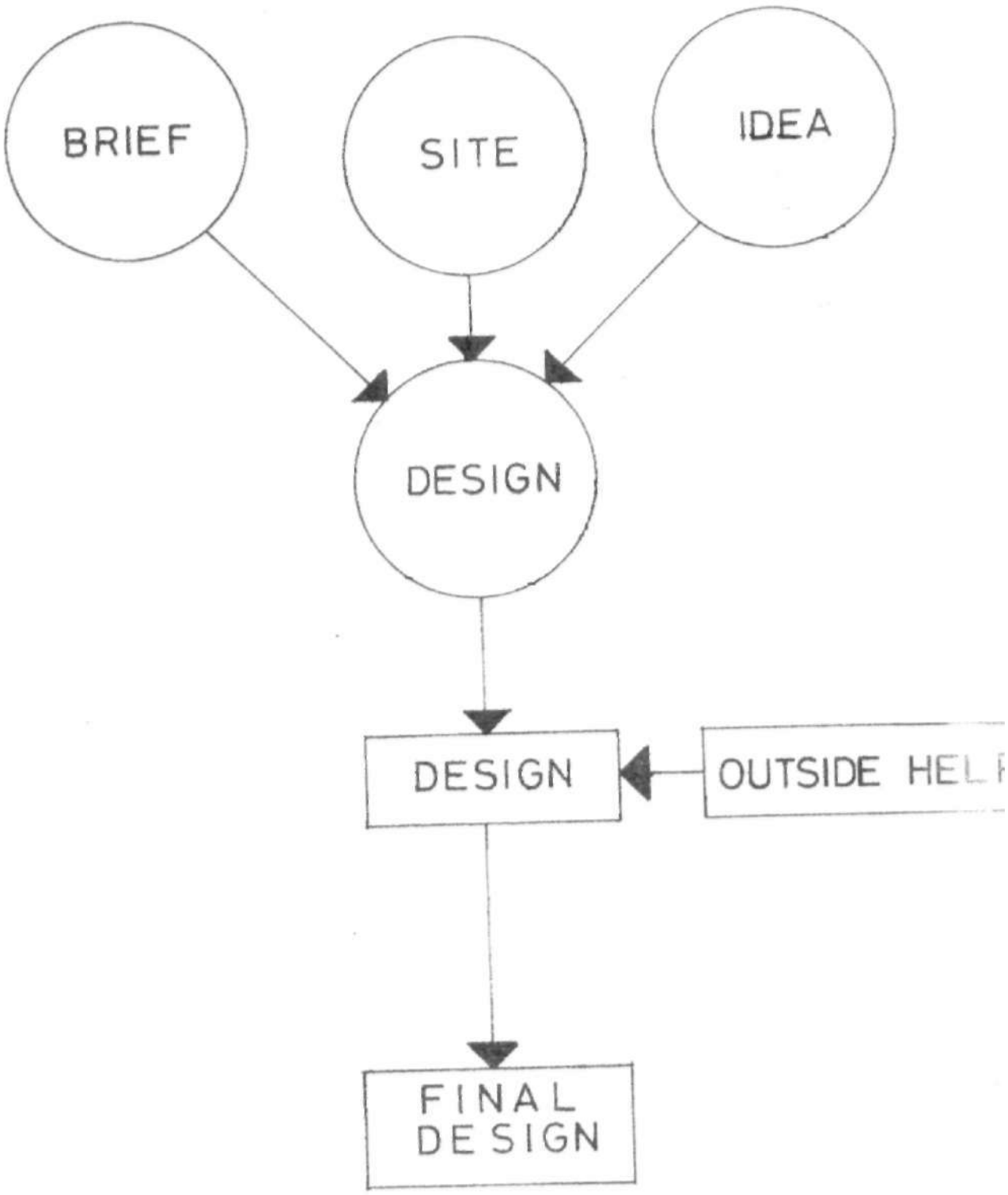
(1) THE PATTERN OF ACTIVITY

(2) THE PATTERN OF CIRCULATION

(3) THE PHYSICAL FORMS.

All these become the subject matter of the first sketches and remain dominant themes throughout the THESIS. A designer's stock-in-trade is his knowledge of a broad range of alternatives for these three patterns.

ARCHITECTURAL DESIGN PROCESS.



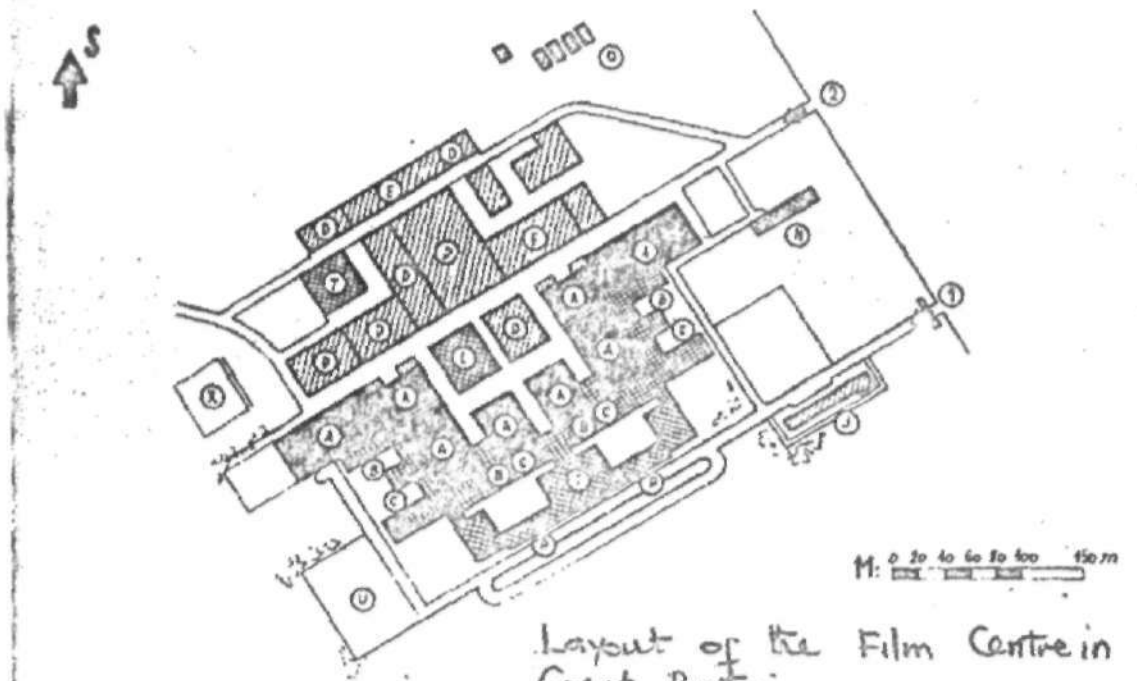


Schematic Layout of the Film Town in PARIS.
ARCHITECT: F. Bauer (1945)

M: 0 20 40 60 80 100 150m

b) Ideové schéma film. města u Paříže (arch. F. Bauer, technolog S. Feldman, 1945 – Francie). Koncepční námět řady různě velkých ateliérů pavilónového charakteru, propojených souvislým pásem tvůrčího příslušenství: A – ateliéry, D – dílny a sklady, H – sklady rekvizit, I – energetické zdroje, J – garáže, požární služba apod., L – zvuk. studia, M – laboratoře, N – střižny, P – správní budova, X – bazén.

c) Ideová schéma film. střediska (arch. H. Junge, Velká Británie, období druhé světové války). Námět vychází ze skladby film. výroben v Denhamu: převládají v něm koncepční monoblokové principy: A – ateliéry, B – šatny herců, C – šatny komparsu, D – dílny a sklady, E – sklad dřeva, F – sklad kulis (fundus), J – garáže, požární služba apod., L – zvuk. studio, N – střižny, O – sklady film. materiálu, P – správní a administrativní objekty, T – restaurace, kantina, klub, U – parkoviště vozidel, X – bazén, 1 – hlavní vstup, 2 – vrátnice pro přísun materiálu.

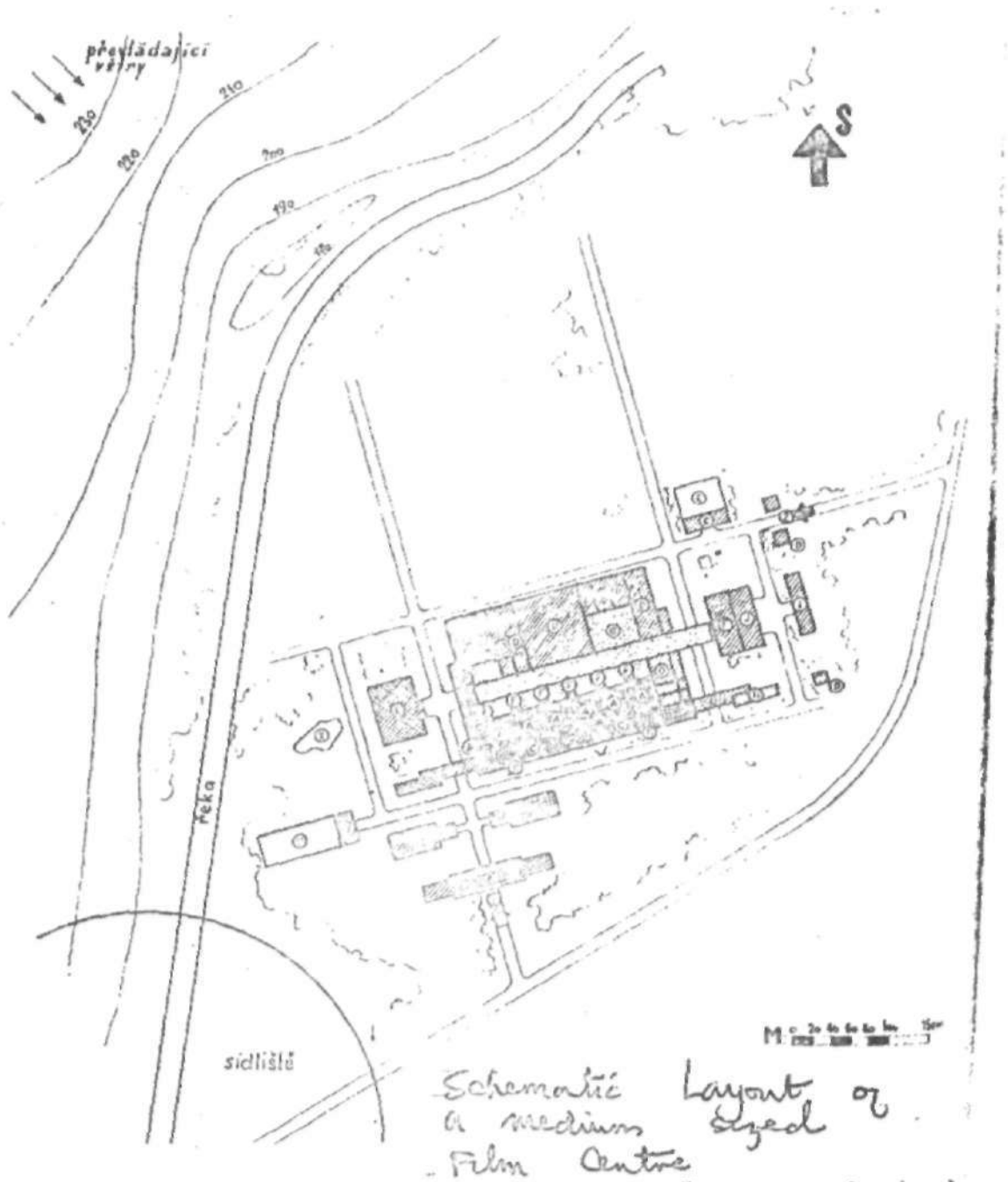


M: 0 20 40 60 80 100 150 m

Layout of the Film Centre in Great Britain
ARCHITECT: H. Junge.

A = STUDIOS
B = CHANGING ROOMS OF FILM STARS
C = " " " ORDINARY ACTORS
D = WORKSHOP & STORAGE FACILITIES
E = TIMBER STORAGE
F = STORAGE OF DECORATION
G = ASSEMBLYING OF SETS & DECORATION
H = STORAGE OF PERMANENT EQUIPMENTS
I = REHERSAL STUDIO
J = POWER HOUSE
L = GARAGES, FIRE SERVICE, etc
M = SHORT LENGTH FILMS
N = SOUND STUDIO
O = LABORATORIES

N = CUTTING ROOMS
O = STORAGE OF FILM MATERI
P = ADMINISTRATIVE BLOCK
Q = TECHNICAL RESEARCH
R = FILM INSTITUTE
S = FILM SCHOOLS
T = RESTAURANT, CANTEEN, C
U = PARKING SPACE
V = PLAYGROUND
W = ———————
X = POOL
Y = CHANGING ROOM
Z = PARKS & RECREATIO



Schematic Layout of a medium sized Film Centre
ARCHITECT: Jan Novák (1952)

d) **Ideové schéma film. střediska** střední velikosti (arch. Jan Novák, 1953): *A* – ateliéry, *B* – šatny herců, *C* – šatny komparsu, *D* – dílny a sklady, *E* – sklad dřeva, *F* – sklad kulis (fundus), *G* – montážní haly, *H* – sklad zakázek, *CH* – studio přípravy filmu (zkušební studio), *I* – energetická zdroje, *J* – garáže, požární služba apod., *L* – zvuk. studio, *M* – laboratoře *N*, – přílohy *O* – sklady film. materiálu, *P* – správní a administrativní objekty, *T* – restaurace, kantýna, klub, *V* – hřiště, *X* – bazén, *1* – hlavní reprezentační vstup, *2* – vrátnice pro příjem materiálu.

1 = MAIN ENTRANCE

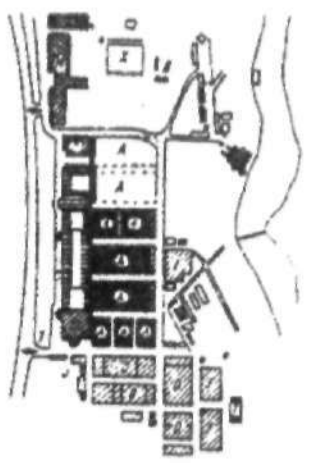
2 = SERVICE ENTRANCE

* The alphabets stand for the same things in all given examples.

Concept of the Italian Film Centre in Rome.

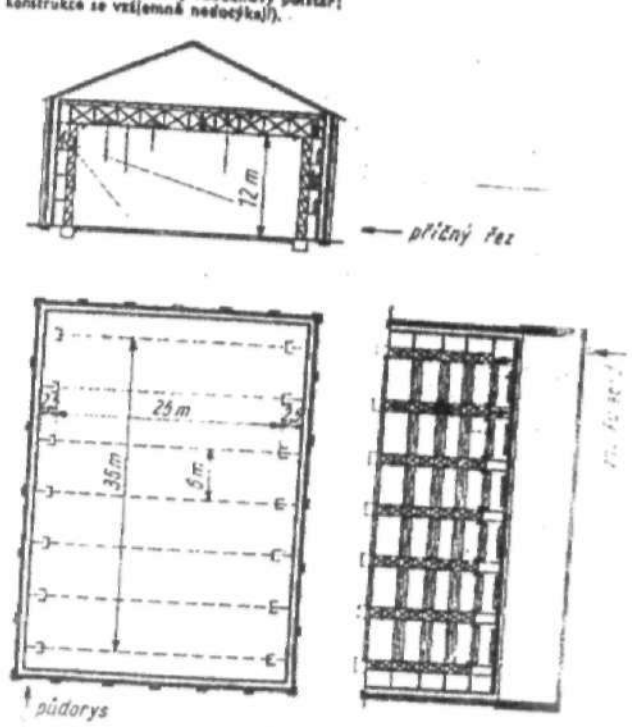


Koncepce italského film. střediska v Cinecittà u Říma: A – ateliéry, B – řazny herců, C – řazny komparsu, D – dílny a sklady, F – sklad kulis (fundus), H – sklady rekvizit, nábytku, kostýmů, I – energetické zdroje, J – garáže, požární služba apod., M – laboratoře, N – střižny, O – sklady film. materiálu, P – správní a administrativní objekty, T – restaurace, kantina, klub, V – hlavní reprezentační vstup, Z – vrátnice pro příjem materiálu.



Koncepční schéma film. střediska London Filmu v Denhamu (arch. M. Joseph): A – ateliéry, B – řazny herců, C – řazny komparsu, D – dílny a sklady, F – sklad kulis (fundus), G – montážní haly, I – energetické zdroje, J – garáže, požární služba apod., M – laboratoře, T – restaurace, kantina, klub, X – bazén, V – hlavní reprezentační vstup.

Conceptual layout of the London Film in Denham
Arch. M. Joseph



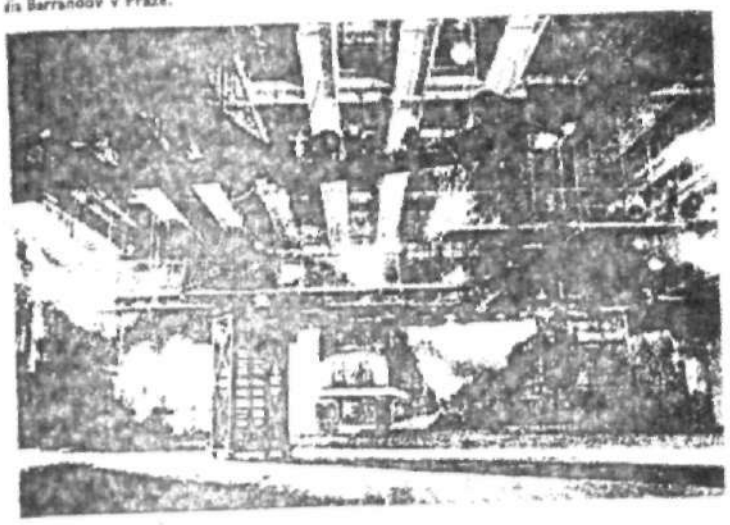
f) Schéma dvojité konstrukce film. ateliéru (vnější obalová a vnitřní ocelová konstrukce jsou uloženy na samostatných základech a opatřeny zvuk. izolací. Mezi oběma konstrukcemi vzniká nepřerušený vzduchový polštář; konstrukce se vzájemně nedotýkají).

Basic Schematic Concept
the Barandov Film Studios
Architect: (Jan Novák)

c) Základní schéma koncepce perspektivní výstavby film. střediska na Barrandově z r. 1950 (arch. Jan Novák). A – ateliéry, B – fasny herců, C – fasny komparsu, D – dílny a sklady, E – sklad dřeva, G – montážní haly, H – sklady rekvizit, nábytku, kostýmů, CH – studio přípravy filmu (zkušební studio), I – energetické zdroje, J – garáže, pofární služba atd., K – provozovny krátkometrážního úseku, L – zvuk. studio, M – laboratoře, N – střižny, O – sklady film. materiálu, P – správní a administrativní objekty, Q – tech. výzkum, R – film. ústav, S – film. školy, T – restaurace, kantina, klub, U – parkoviště vozidel, V – hřiště, X – bazén, Y – fasny hřišť, Z – sady a rekreační plochy, 1 – hlavní reprezentační vstup, 2 – vrátnice pro přísun materiálu.



d) Celkový letecký pohled na areál Film. studia Barrandov v Praze.



A P P E N D I X

SOME TYPICAL NOISE SOURCES

This table is divided into two parts, the first giving the sound-power levels of unified sources, generally those inside a studio centre, and the second giving the peak sound-pressure levels due to external or scattered sources where this method of specification is more appropriate . Although only those sources that have fairly characteristic levels and spectra are included, the figures must be taken as representative only, designs should preferably be based on direct measurements in the actual situation:

SOUND POWER LEVELS IN DECIBELS RELATIVE TO 10^{-12}W IN OCTAVE BANDS

Centre Frequency of Band, Hz	63	125	250	500	1000	2000	4000	8000
Male speech, Voice raised for clear enunciation only	66	73	78	80	77	71	65	65
Male speech declamatory	approx. 8 dB higher than above							
String quartet	80	84	88	90	90	88	86	80
Symphony orchestra	96	100	104	109	106	104	102	98
Pop group, amplified	110	125	125	125	120	115	110	100

SOUND ABSORPTION COEFFICIENTS OF BUILDING MATERIALS, ACOUSTICAL MATERIALS, AND ROOM CONTENTS

DESCRIPTION	FREQUENCY, Hz					
	125	250	500	1000	2000	4000
Acoustical plaster average	0.07	0.17	0.50	0.60	0.68	0.66
Acoustic steel deck 150mm ribs	0.58	0.64	0.71	0.63	0.47	0.40
Acoustone space tile, 8km OC, permit	0.22	0.81	1.88	2.28	2.16	1.83
Air per 28 cubic metre volume, relative humidity 50%				0.9	2.9	7.4
Audience, in upholstered seats, per unit floor area	0.39	0.57	0.80	0.94	0.92	0.87
Unoccupied, well-upholstered seating, per unit floor area	0.19	0.37	0.56	0.67	0.61	0.59
Musician, with seat and instrument per person	4.0	8.5	11.5	14.0	13.0	12.0
Carpet, heavy on concrete	0.02	0.06	0.14	0.37	0.60	0.65
Carpet, heavy on 1.35kg per sq.m. hair felt or foam rubber	0.08	0.24	0.57	0.69	0.71	0.73
Concrete block unpainted	0.36	0.44	0.31	0.29	0.39	0.25
Concrete block painted	0.10	0.05	0.06	0.07	0.09	0.08
Floors, concrete or terrazzo	0.01	0.01	0.15	0.02	0.02	0.02
Linoleum, vinyl, rubber, or cork tile on concrete	0.02	0.03	0.03	0.03	0.03	0.02
Geocoustic tile 81cm OC, permit	0.13	0.74	2.35	2.53	2.03	1.73
Gypsum board 13mm on 50x100mm stud, 41cm OC	0.29	0.10	0.05	0.04	0.07	0.09
Plywood 6mm over 75mm airspace, 25mm glass-fiber backing	0.60	0.30	0.40	0.09	0.09	0.09
Wood panel 10 to 13mm over 50x100mm airspace	0.30	0.25	0.20	0.17	0.15	0.10

SOUND PRESSURE LEVELS, IN OCTAVE BANDS, DECIBELS RELATIVE TO 2 x 10^{-5} N/M

Centre Frequency of band Hz	63	125	250	500	1000	2000	4000	8000
Jet airliner flying at 300m	95	100	100	100	100	97	95	90
Urban motorway, 40m from edge	82	82	81	78	75	71	71	70
City street traffic 10m from kerb.	92	92	92	87	86	86	86	84
Scenery-construction Workshop, at walls	77	80	83	85	85	85	85	80

NO OF PERSONS EMPLOYED IN MOVIE PRODUCTION IN AMERICA'S HOLLYWOOD

*Between 27 -33,000 persons

* About 13,000 wage earners a month

*In 1940 12,391 persons were engaged in movie production in California.

*30,405 persons were engaged in making movies in Los Angeles area in 1937

- 14,007 were salaried employees and officers of the Companies
- 16,398 were wage-earners

GLOSSARY OF TECHNICAL TERMS

Animation:

The technique of synthesizing apparent mobility of inanimate objects or drawings through the medium of cinematography. The term is also used for the sequence of drawings made to create the movement, and for the movement itself when seen on the screen.

Answer Print:

The first print (combining picture and sound, if a sound picture), in release form, offered by the laboratory to the producer for acceptance. It is usually studied carefully to determine whether changes are required prior to printing the balance of the order (UFPA).

Close-Up (CU):

A detail photographed from such a distance that only a small portion of the subject fills a frame of film.

Cut:

(1) The instantaneous change from one scene to another. Successive frames contain the last frame of one scene and the first frame of the following scene. (2) To stop operation of camera, action, and/or sound recording equipment. (3) To sever or splice film in the editing process.

Dailies:

(Rushes) - Usually a one-light print, made without regard to color balance, from which the action is checked and the best takes selected.

Director:

The individual who interprets the script in terms of cinematic technique, supervises all phases of the work involved in achieving a coherent, unified film presentation, and assumes responsibility for what appears on the screen. (UFPA).

Dissolve:

An optical or camera effect in which one scene gradually fades out at the same time that a second scene fades in. There is an apparent double exposure during the center portion of a dissolve sequence where the two scenes overlap.

Dolly:

(1) A truck built to carry camera and camera operator to facilitate movement of the camera during the shooting of scenes. (2) To move the camera toward or away from the subject while shooting a scene. (UFPA)

Dubbing:

The addition of sound (either music or dialogue) to a visual presentation via a rerecording process, which prepares a complete sound track (usually magnetic) that can be transferred to, and synchronized with, the visual presentation.

Editing:

The process of assembling, arranging, and trimming the desired shots and sound tracks to best advantage for the purpose at hand. (UFPA)

Editor:

The individual who decides what scenes and takes are to be used, how, where, in what sequence, and at what length they will appear. (UFPA)

Fade:

Exposure of motion picture film either in the camera or during subsequent operations, so that, for a fade-in, starting with maximum density and extending for a predetermined number of frames, each successive frame receives a systematically greater exposure than the frame preceding it, until full normal exposure for the

scene has been attained. From this frame on, successive frames receive identical exposure for the remainder of the take. The procedure is reversed in the case of fade-outs. (UFPA)

Frame:

(1) One individual picture on a piece of motion picture film. (2) To bring the limits of an individual picture on a piece of motion picture film into coincidence with the limits of the projector aperture in projection. (3) To compose a shot. (UFPA)

Gobo:

Panel of opaque material used to confine the area a light illuminates, or to keep light from shining directly into the camera lens.

Laboratory:

An establishment organized and equipped to provide services such as processing motion picture film, produce prerelease duplicating internegatives, master positives, duplicate negatives, and workprints, as well as completed release prints for distribution. (UFPA)

Lip Synchronization:

The relationship of sound and picture that exists when the movements of speech are perceived to coincide with the sounds of speech. (UFPA)

Long Shot (LS):

The photographing of a scene or action from a distance or a wide angle of view so that a large area of the setting appears in a frame of film, and the scene or objects appear quite small.

Magnetic Track:

Audio material recorded on a film or tape that has been coated with a magnetic recording medium.

Master:

The final negative-reversal positive or intermediate film from which subsequent prints are made.

Master Shot:

Usually a long shot in which all action in a scene takes place. Action is repeated for the MS and CU which may be cut into the scene.

Medium Shot (MS):

A scene that is photographed from a medium distance so that the full figure of the subject fills an entire frame.

Negative:

The term "negative" is used to designate any of the following (in either black-and-white or color): (1) The raw stock specifically designed for negative images. (2) The negative image. (3) Negative raw stock that has been exposed but has not been processed. (4) Processed film bearing a negative image. (UFPA)

Negative Image:

A photographic image in which the values of light and shade of the original photographed subject are represented in inverse order, Note: In a negative image, light objects of the original subject are represented by high densities and dark objects are represented by low densities. In a color negative, colors are represented by their complementary color. (UFPA)

Optical Effects:

The alteration of a motion picture scene, commonly introduced in duplication, including fades, dissolves, and wipes, as well as well as many more spectacular effects. (UFPA)

Original:

An initial photographic image, or sound recording-whether photographic or magnetic-as opposed to some stage of duplication thereof. (UFPA)

Positive Image:

A photographic replica in which the values or light and shade of the original photographed subject are represented in their natural order. The light objects of the original subject are represented by low densities and the dark objects are represented by high densities. (UFPA)

Postsynchronization:

The recording of the sound track after the picture has been completed.

Presynchronization:

The recording of the sound track before any production has begun, so that action can be synchronized when the film is exposed with the prerecorded sound.

Production:

The general term used to describe the processes involved in making all the original material that is the basis for the finished motion picture. Loosely, the completed film. (UFPA)

Projection:

The process of presenting a film by optical means and transmitted light for either visual or aural review, or both. (UFPA)

Raw Stock:

Motion picture film that has not been exposed or processed. (UFPA)

Reduction Printing:

The process of producing and recording photographically a smaller image-usually on a smaller film format-from a larger image. Film thus made is referred to as a reduction negative or a reduction print. (UFPA)

Release Print:

A composite print made for general distribution and exhibiti n after the final answer or sample print has been approved. (UFPA)

Reversal Film:

A film which, after exposure, is processed to produce a positive image on the same film rather than a customary negative image. (UFPA)

Rough Cut:

A preliminary, trial stage in the process of editing a film. Shots, scenes, and sequences are laid out in approximate relationship, without detailed attention to the individual cutting points.

Rushes:

See "Dailies".

Scene:

A continuous unit of action in a film.

Sequence:

A series of shots characterized by inherent unity of theme and purpose. (UFPA)

Shot:

(1) A single run of the camera. (2) The piece of film resulting from such a run. (UFPA)

Sound Track:

The portion of a length of film reserved for the sound record, or any recording so located. Also, any length of film bearing sound only. (UFPA)

Special Effects:

Any shot unobtainable by straightforward motion picture shooting techniques. In this category are shots requiring multiple-image montages, split screens, vignetting, models, etc. (UFPA)

Synchronization:

The positioning of a sound track so that it is in harmony with, and timed to, the picture portion of the film.

Synchronizer:

A mechanism employing a common rotary shaft that has sprockets which, by engaging perforations in the film, pass corresponding lengths of picture and sound films simultaneously, thus effectively keeping the two (or more) films in synchronism during the editing process. (UFPA)

Take:

A term used to indicate the number of times a given shot has been made. Takes are usually numbered sequentially and are identified in the picture by slate and in the track by voice. (UFPA)

Wild:

Picture or sound shot without synchronous relationship to the other.

Wipe:

An optical effect used as a transition from one scene to another. In a common form, scene "A" appears to be "wiped" off the screen by the progressive revelation of scene "B" as a vertical dividing line separating the two advances across the screen from left to right.

Workprint:

Any picture or sound track print, usually a positive, intended for use in the editing process to establish through a series of trial cuttings the finished version of a film. The purpose is to preserve the original intact (and undamaged) until the cutting points have been established. (UFPA)

Zoom-In:

A continuous changing of the camera lens focal length, which gradually narrows down the area of the picture being photographed, giving the effect of continuously enlarging the subject.

Zoom Lens:

A lens whose focal length is variable within specified limits, and is capable of simulating the effect of camera movement toward or away from a subject.

Zoom-Out:

A continuous changing of the camera lens focal length, which gradually enlarges the area being photographed, giving the effect of a continuously diminishing subject.

B I B L I O G R A P H Y

1. Basic Motion Picture Technology
   by Bernard I. Happe. Hastings House, Publishers;

2. Education Films: Writing, Directing, and Producing for Classroom, Television and Industry by Lewis Helmar Herman. Crown Publishers.

3. Film-Makers' Art.
   by Haig P. Manoogan. Basic Books Publishers

4. Focal Envyclopedia of Film and Television: Techniques:
   by Raymond Spottiswoode, General Editor.

5. Guide to Filmmaking:
   by Edward Pincus. Signet Book

6. Hand-Book of Basic Motion Picture Techniques
   by Emil E. Brodbeck.

7. How to Shoot A Movie Story
   by Arthur L. Gaskill.

8. Principles of Cinematography:
   by Leslie J. Wheeler.

9. Sound Recording for Motion Pictures
   by A. S. Barnes & Co.,

10. Technique of Documentary Film Production
    by W. Hugh Baddeley.

11. Technique of Film Animation
    by John Halles and Roger Manvell.

12. Technique of Film Music:
    by Roger Manvell and John Huntley.

13. The Technique of Special Effects Cinematography:
    by Raymond Fielding

14. Technique of the Film Cutting Room:
    by Ernest Walter.

15. The Technique of Sound Studio:
by Alec Nisbett.

16. The Technique of Lighting for Television and Motion Pictures
by Gerald Millerson

17. Film and its Techniques:
by Raymond Spottiswoode.

10. Holly-Wood:
by Leo C. Rosten.

19. Acoustics for Radio and Television Studios:
by

20. A Concise History of the Cinema: Edited
by Peter Cowie Volume 1; before 1940.

21. Making A Film:
by Anderson, Lindsay.

22. The Film Business, a History of the British Cinema 1096 - 1972
by Ernest Betts.

23. To Encourage the Art of the Film. The story of the Britist Film Institute by Ivan Butler.

24. The Film Till Now: a suney of World Cinema By Paul Rotha and Richard Griffith.

25. Evironmental Acoustics:
by Leslie L. Doelle.

26. Theatre Planning: Edited
by Roderick Ham.

28. Recreation Areas: by George D. Butler.

29. Floors: Construction and Fimsher by P. H. Perkins.

30. Film: a filmova technika S. Kolektivem Autoru Zpracovali.

31. Professional Darkroom Design: a Kodak Publication.

32. Acoustics for Radio and Television Studios by Christopher Gilford: Peter Peregrinus Ltd.