et qui concernent trois aspects différents des problèmes d'acoustique dans le Cinéma»:

1) L'*Acoustique dans les studios de prise de vues* :

L'Auteur s'est attaché à étudier le traitement acoustique des studios de prise de vues en vue de répondre aux conditions particulières posées dans ce cas et notamment assurer une absorption constante à toutes les fréquences, réaliser une diffusion parfaite de l'énergie sonore et permettre la variation de la qualité acoustique de l'ambiance. Le rapport est accompagné d'une table fournissant les valeurs des coefficients d'absorption d'une vingtaine de matériaux essayés par l'Auteur.

2) *Emploi des cylindres pour l'absorption et la diffusion de l'énergie sonore:*

Ce rapport présente l'étude théorique de l'absorption du son avec les éléments cylindriques et

compare les résultats obtenus en Aniérique avec ceux du Laboratoire du Centre Expérimental de Rome. L'Auteur conclut à l'intérêt de l'utilisation des cylindres dans le traitement acoustique des studios et des salles de doublage.

3) *Relations entre Vabsorption du son par les personnes et Vévolution du costume:*

Dans cette étude, l'Auteur a recherché l'influeijce de l'évolution dvi costume sur la valeur du coefficient d'absorption présenté par les personnes. Son étude fournit ainsi les diagrammes relatifs aux costumes de l'époque romaine, de'la Renaissance, du XVIII[6] siècle et de l'époque contemporaine. Ces résultats sont d'autant plns intéressants que l'on connaît l'importance de la présence du public sur la qualité acoustique d'une salle.

TESTI ORIGINALI DELLE RELAZIONI

The Cine-Theatre to-day & to-morrow

by Dr. WELLS COATES,
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(London)

Amongst the many experts contributing to this conference, the architect occupies an unusual position: his work is not so much directed at the improvement of one particular aspect of the cinema, but rather at the sensible relationship of all artistic, technical, managerial and financial requirements, their accommodation and protection.

Complex as this work — taken by itself — maybe, it can be performed by an able administrator and teehnician. The outcome, however, will not be architecture. For architecture can only result when the expression of the specialist's inventiveness is balanced by the requirements of society. Unfortunately, the demands made on the architect to-day, though strong from the specialist within, are weak from society without. I would therefore address you, not only as producers of the goods we have to offer, but also as their consumers. l would like to discuss, not only how diverse components operate within a structure, but also how such structure operates within its physical and cultural environments.

Our civilisation has produced a number of technical developments which set their own pace whether or not we are conscious of their roots, their function» or their purpose. The cinema is one of them. Its roots are entangled and obscure. They may be traced to the theatre, religious drama and primitive rituals; to nineteenth century painting and earliest cave drawings; to photography and the first means of optical rccording; to the newspaper, the illustrated story book and the church window; to fair grounds and market booths; no doubt also to the requirements of the masses which in warm climates have

produced the arenas for bull and cock fighting and, earlier, the Roman circus.

Equally varied and numerous are our attempts to define the function of the film. It may be industry, art form, propaganda, education or pure entertainment. It has also been judged morally as a vicious intoxicant, as a destroyer of active imagination and, the cinema, as a breeding place for criminals.

The question : « Whom does the cinema serve? » produces a straightforward answer: « The public », which is, however, too generai to be in anyway conclusive.

There is, of course, a great temptation to conclude, precisely from the generality of all these answers, that the film is a mere means of communication, that it is unique in as much as it is essentially visual, transcending therefore all barriers of language or learning, nations or classes, that we, as technicians, are concerned only with improving such means for the benefit of all, and that the cinema architect's job is to provide an efficient and pleasing shell to the technicians' developments.

But conclusions of this kind are suspect to-day. For all of us, because they parallel too closely the dangers inherent in the means of exploiting atomic energy, robot factories and the latest biological discoveries. For the architect in particular, they are not only suspect but unacceptable: his training and tradition have taught him indeed to provide shells for all human activities; but shells which are conditioned by man's specific and positive attitude towards contemporary life.

Indifference to current trends which, for lack of human understanding, is conveniently couched in terms of « unbiassed service to the community » — a service paid by all, to an abstract idea of the community — such attitude is not conducive to architecture. For all

architecture is creative only as it transforms; it materialises and crystallises ideas and it benefits mankind by referling the spirit and aspirations of the age in visual and tangible form.

The raw materials for this transformation, in the form of answers to questions, can normally be expected by an arehitect from his clients. But we have no client outside ourselves. We are responsible for creating both supply and demand. Should there stili be any doubt about this responsibility, I would recall, for instance, how reluctantly society accepted the film in its early days except as entertainment for the least educated classes, a prejudice which has not yet been entirely overcome. Or, later, how the introduction of sound was opposed by leading film artists whose art was defined by the very limits which we, the technicians, extended regardless.

Accepting then, as we must that with regard to cinema the neither the public nor artists are our clients; that we as a group have a dual function to perform: to exploit a technique and become eonscious of its application; that there are questions which need to be formulated and answered by ourselves; and that we do not yet possess the comprehensive understanding which alone can produce architecture in the true sense of the word, accepting these things, how do we proceed? How can we relate and unify diverse factors without criteria or clearly formulated aims?

The only answer at the moment seems to be to act empirically rather than theoretically. That is to reverse the procedure and study what has been done rather than what should have been done. The past generations have acted, if not very consciously, nevertheless decisively. 80,000 cinemas have been built all over the world. Their common history and analysis is instructive.

Unlike the film, the cinema building has one definite prototype: the theatre. Another, the converted shop, proved unsuccessful and is of interest only in as

much as it confirms the strength of that film antécédent which was rooted in the fairground; a characteristic retained, as we shall see, to the present day.

In order to understand the reasons for adopting the theatre as a prototype, one must recali, briefly, its historical position at the turn of the century, shortly before permanent buildings were required to display the rapidly advancing film technique to simultaneòusly growing audiences.

The typical theatre building of the day reflected accurately its development and function.' It consisted of two main parts: front of house and back-stage. They were separated by a strongly pronounced proscenium and unified by one major axis accentuating the symmetry of both. Their relative volumes within any one theatre were indicative of the importance attached to the social and the artistic function of the building.

The front of house was designed, not only with a view to observe the spectacle on the stage, but also to allow society to display itself. It is well to remember in this connection that the pit, or stalls, originated from the open court of preceding theatre types, from the galleried Renaissance ballroom or, earlier, from the orchestra, the main acting area in front of the Greek stage. Its origin, therefore, always served active purposes; and it stili did in the nineteenth century theatre where the stately dressed gathering of the aristocracy viewed the glittering crowd below from individual loges, arranged, in horse-shoe shaped tiers, around the pit.

The diversity of the whole scene was unified by the ceiling whose lavish ornaments, coffers and illumination defined and emphasized the centre of the auditorium: the focal point of grand foyers, reception rooms and sweeping staircases, the heart in fact of the whole building.

Unity within the auditorium was further achieved by its proportions. Although it would be untrue to say that all auditoria showed rigid similarities, they did as a generai rule observe relationships between height, width and length which ensured that the volume contained between pit, proscenium, galleries and ceiling could be perceived as one architectural composition. No dimensions appeared arbitrary. Particularly, in Europe opera houses (at Milan, Paris, Berlin) the design of auditoria has been deterniined by mathematical proportions (6:8:5) which are as pleasing visually as they are acoustically harmonious. It is important to bear in mind this architectural unity of the auditorium: it was a unity expressive of society», its stratification, culture, wit and aspirations, in short, it was expressive of the audience.

Almost subordinated to the public parts, the front of house, stood the stage block. Admittedly, it had gained in importance throughout the nineteenth century. The emphasis of the theatre function had shifted from social occasion to spectacle. The active part formerly played by the audience had become a mainly passive one. Theatre as an art form was taken more seriously; its spectators, not quite so brilliantly

dressed, sat in greater silence with higher expectations from the producer. Producers, in turn, realized their new responsibility. They knew that if the industrial revolution had robbed town life of its brilliant sparkle, sbstitufing grey smoke, masses of ill-fed workers and their monotonous by-law housing, so it had also brought the means to create any amount of brilliance and sparkle on the stage.

Since early in the seventeenth century, when Sabbatini published his instructions describing how, for instance, one can produce water spouting dolphins or other sea monsters, how to show the sea rising, swelling, getting rough and changing colour, how to simulate paradise and other desirable phenomena, little progress had been made in stage mechanics.

But at the time we are investigating producers had at their disposai traps, curtains, complicated flying apparatus, grids that allowed the complete disappearance of back-drops, as well as revolving stages, sliding stages, wagons and lifts for quick changes in scenery, the magie lantern for projected effects, and the cyclorama adding depth to the stage. Correspondingly equipped were the many workshops that formed part of the backstage block. All these various mechanisms required of course considerable floor-space. In addition, large Storage areas had to be made available for scenery as well as materials.

To-day we know that these applications of new mechanical inventions and increased engineering productivity were largely misdirected. They added considerably to initial as well as maintanance costs, but little to the artistic requirements of the day. The theatregoer demanded photographic reality from the stage set and designers aimed at satisfying this demand, without fully accepting, let alone exploiting, the limitations which did in fact stili exist. Except in the ablest hands, the results in many provincial theatres were grotesque when they should have been real and dramatic. The audiences, which were no longer groups of invited guests but very much the generai public, could not he catered for by a comparatively small number of expensively equipped theatres and a smaller number of capable producers.

Then the film was born. Its advantages were obvious. Competition was keen. Cinema buildings were required quickly. Any large room would do, provided screem and projector could be accommodated. The cores of the large theatres lent themselves admirably to the purpose. Theatre managers were glad to let their buildings without incurring heavy expenditure on actors, stage hands and scenery.

No wonder, therefore, that as a new building type had to be created for the cinema, the theatre auditorium was chosen as a prototype. If at the time, any other, say, the Greek theatre plan had been in vogue, it could not so readily have been converted. Cinema architects might have been forced to start from first principles. As it was, their problem, whether in new buildings or

conversions, was always one of adaption.

Three major principles determined this process: speed, economy, efficiency. Speed and economy were tantamount to the sanie thing: quickly available sites for new buildings were therfore chosen amongst built-up areas of towns, in closest vicinity to population centres. Such sites were rarely island-sites, but rather situated between, behind, or under other buildings. Their development was economical because it reduced the areas of external wall facing and sound proofing, it minimised road charges and was, nevertheless, welcomed by locai authorities as a revenue of high rates.

Sites wich .were so available, however, were often long and narrow, sometimes irregular, always retaining the outlines of the domestic or commerciai buildings which they supported previously. The cinema architects ingenuity showed itself in the degree in wich he could utilise the characteristics of the land, accommodating screen and projector and as large an audience as possible in between. At the sanie time, perhaps not always consciously, he would try to organise his spaces to conform to the tradition established by his prototype, the theatre.

He could, obviously, omit workshops, rehearsal rooms, dressingrooms and almost the entire stage house, as well as extravagant — now hopelessly needless — foyers, bars and all but the smallest ante-rooms. Faithfulness to his prototype was, in fact, only required in the auditorium itself which constituted perhaps 90% of the new cinema, as compared with about 25 %, or less, of the nineteenth century theatre. And even here, faithfulness was found to be less important than efficiency.

The many galleries and almost ' flat stalls of the theatre auditorium produced unsatisfactory sight-lines and had to be modified. A reduction in the number of galleries was also necessitated, directly or indirectly, by new safety regulations, formulated as a result of tragic theatre fires in Europe and America.

In addition to improving sight-lines, the prototype was further amended by shifting its centre of interest: the auditorium was no longer the nucleus of the structure, it was the structure. Though without nucleus, it had a focal point, the screen. Ceiling, galleries. decoration and lighting were therefore designed to accentuate this point alone, an adaptation which served the psychological, as much as the visual and acoustic requirements of the cinema.

The cumulative effect of extracting, adapting and ammending left, of course, little of the originai theatre plan — (it confused, by the way, to no small extent, the theatre arehitect) — but what it left was a skeleton idea on which present cinema designis based.

I would now like to examine, in the light of our architectural experience, whether this idea has proved itself and. if not, whether there are, at our disposai, any alternatives which merit investigation.

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The architect of cinema, to-day, follows a fairly straight-forward routine. No longer does he think in terms of adapted theatre auditoria. Apart from site dimensions, two pairs of factors alone determine the geometry of his design. Both of these are rigid and, in routine work, must be accepted. The first pair is positive, in as much as it defines conditions. It consists of (a) projection method and (b) promoters interest. The projection method describes the relationship between projector, screen and field of vision. The promoters, interest describes the desirable utilisation of the field of vision, that is, the relationship between quality and quantity of seats. The second pair of factors is negative, in as much as it limits the conditions defined by the first pair. It consists of (a) sight-lines and (b) safety regulations; as both of these are designed to protect the health and comfort of the public, minimum standards are normally laid down by local government authorities. Within a given site there is usually only one optimum solution that will balance the requirements of these two pairs of factors.

The architect's task is therefore reduced, initially, to solving a mathematical spatial problem and, subsequently, to ensue, somehow, the provision of all other architectural requirements within the rigid geometry determined by this problems solution. These other requirements are: site utilisation, visual expression, acoustics, mechanical services, construction, maintainance and growth.

As all of them are subordinated to a fixed geometry, the question arises whether they should not contribute to its form. In reply, one may well argue that, to-day, the cinema is not the only structure which rigorously subordinates a number of its functions to one predominant. Another, perhaps the most outstanding that comes to mind, is the aeroplane, designed primarily to fly. This purpose determines its form. Within this form, the serverai accompanying fliers must be provided for.

In assessing the validity of this analogy, the first criterion available to an architect is to compare the visual results: the form, dimensions and material of the aeroplane are known and convincing. But what is the form of the cinema? What are its dimensions and materials? What is the visual expression of the rigid geometry that takes precedent over many important architectural factors? Any answer we attempt to formulate would have to be prefixed by the words « It depends ». And there the analogy breaks down: for either the predominant conditions alone determine form (as in the aeroplane), or it depends also on other factors which, as suggested, should be visually expressed.

Lack of expression, in this case, of course, is only symptomatic, and, to verify the criticism made, it must be substantiated. The mairi short comings of present practice, as I see them, are the following:

Firstly, that the cinema structure has not yet developed its own character.

This statement is a corollary of facts previously discussed: we cannot expect genuine characteristics in a building whose function in society is obscure. Present practice attempts to embellish the structure in one of two ways. Either by elinging to the remnants of the theatre tradition, planting a proscenium around a scene revealed by heavy tableau curtains, with symbolic ornementation disguising loud speaker and airgrills; or by a conscious effort to do « something else ». « Something else » invariably reflects the tastes of designer and promoter (or there interpretation of public taste): it may employ moving stars crossing the firmament as stuck to the ceiling, or large photomurals covering auditorium walls; but whether tasteless and sentimental, or attractive and novel; so far, nothing has been developed which is characteristic, not of individuals, but of the cinema.

As it took several thousand years to establish the theatrical tradition, we need not, in this respect, be too self critical, after only half a century of cinema designing; but, the architect in particular, must remain conscious of this fundamental problem.

Secondly, in my list of shortcomings, I would discuss dimensions.

With regard to dimensions in relation to the individuai, that is with regard to scale, the cinema shows a quality wich is distinctly medieval. There is no other building type to-day that reflects such lack of sensitiveness on the part of man to Iris surroundings.

From the fourteenth century Hall, in which all families of a household lived under one roof, we have developed the block comprising flats, appropriate in size to family life.

From the school hall of the industriai revolution, in which often a hundred children of all age groups tried to absorb knowledge, we have developed the modern educational building with classes, appropriate in size to teaching and to learning.

From the hospices, where crowds in need of care could scarcely be overlooked, we have developed the modern hospital with wards, appropriate in size to healing and recuperating.

Similarly in our vast population centres we have discovered the necessity for avoiding prawl and are now planning towns comprising neighbourhood units, appropriate in size to our present way of life.

But, in the cinema, the auditorium remains large and undifferentiated, accommodating either hundreds or thousands, with no cellular structure, between projector and screen. Nor can we claim that it is expressive of unity as experienced in communal buildings such as theatres or churches. For the cinema is not a communal building in the true sense of the word, because no conscious communion joins its users.

This lack of a norm in the auditorium is surprising for the following reasons: the cinema may be seen as a cell belonging to the vast organism, the film industry; its structure, differs fundamentally from that of the theatre where each performance is unique: it would be naturai to assemble as large

an audience as possible to see a play shown by one author, one producer and one company at just one time and piace. But the cinema cells perform identical functions. Not only are films shown in all auditoria, but copies of the sanie film are projected simultaneously. Screens, that are already multiplied in haphazard fashion, could be multiplied to suit the dictates of optimum conditions for comfort, vision and acoustics.

To state this aim may sound like a platitude, so obvious are its advantages. It is however important to bear in mind that, in the past, we have been prepared — perhaps too readily prepared — to let site conditions and promoter's intereste, that is locai influences utilised the flexibility of current projection methods and that, in spite of such flexibility, we have deviated from the ideal; at the sanie time, we have lost the opportunity of achieving architectural form wlrich could result from adherence to the discipline imposed by the above mentioned aims.

Closely linked to the problem of eslablishing a norm is the third factor which I think needs to be reconsidered, that is construction.

To describe present practice would be almost impossible, for each cinema is built according to site, capacity, funds and availability of materials. Yet, in this age of standardisation there are few building types whose components perform such clearly defined functions as those employed in the cinema. We know exactly what we expect from walls, floor, seats and ceiling, from screen and from projector. Their requirements will, undoubtedly, be discussed in other lectures of this conference. Further, we know exactly the desirable relationship between these components.

In other building types which have been standardized, the danger has been experienced that architectural forms may be stereotyped at the expense of individual requirements; that arbitrary relationships are determined without the option of flexible arrangements. For instance, in the standardization of dwellings, the greatest single problem is to find a System that will allow the interchange of parts to suit requirements of different families and site orientations.

In the cinema, the characteristics of this problem do not exist. No individuai likes and dislikes influence the fundamentals of the plans; there is no orientation other than that to the screen. No matter where the geographical location, the principles of projection are international, so is the distribution of the film. There is no valid reason why cinema construction, too, should not be rationalised, if there were closer co-operation between the film industry and cinema architects.

We have seen that, in the initial flourish of the industry, speed was a prime consideration. This is still the case. But now, particularly in the development of the new towns all over the world, where sites may be allocated to suit our requirements, rather

than vice versa, greater speed, economy and efficiency would result from a planned cinema building programme than from impromptu decisions made locally in each case.

In addition, to the development of standard building units such programme, or rather the research preceding it, would have to investigate means of catering for the time-use of the cinema: by that I mean that existing auditoria are designed only for performances to a full house.

In fact, if we study the use of the building in the dimension of time, we find that (a) each day, during many of the early performances, the building is only partially used; (b) periodically the interior needs to be redecorated as speedily as may be possible; (c) at a future date, it may be found desirable to increase the seating capacity of the building.

Point (a) the under occupied auditorium has, as far as I know only been studied by the heating and ventilating engineer; point (b) has been accepted as an unavoidable fact: provision is made for speedy redecorating. As regards point (e) growth, the only feasible enlargement possible in the average cinema is by moving the screen away from the projector and adding seats to the floor space so gained; a procedure, apart from acustic, visual and architectural difficulties that is relatively expensive.

Lastly, in this brief criticai revue I would discuss site utilisation.

I shall, as far as possible, restrict my remarks to purely architectural considerations although this subject needs to be discussed also from the financial and town planning point of view. Referring again to the theatre, the cinemas prototype, we have seen how its nucleus, the auditorium alone was developed, and how ante-rooms and cloakrooms were reduced lo a minimum. This change though brought about by reasons of economy in expenditure and site area, has proved successful also inasmuch as the average cinemagoer does not require lavish foyers or even cloakrooms: he rarely leaves his hat and coat, but prefers to enter the darkness of the auditorium as directly as possible from the Street. He must, however, leave bis car, though we know from American open-air cinemas, that hie would drive straight into a viewing position, if that were universally practicable. As it is not, parking facilities must be provided.

So far this was done only where the site could not be fully exploited to accommodate a maximum numer of seats, and even where provision for parking was made, it bore little relation to either the capacity or the location of the auditorium. In future, such haphazard relationship will not suffice and, as long as we cannot develop a cinema from first principles, we could no worse than to relate our car parks within the cinema site as consciously as the theatre architect disposed the cloakrooms which we found redundant. Far less essential is the rigid relationship between auditorium and, for instance, refresh-

ment rooms where these are provided. For car parking, to increasing numbers, is part of the process of going to the cinema. Eating and drinking is a separate process. The relation to the auditorium of ancillary site uses such as cafes, shops, ballrooms, etc, should therefore be as free, as that between car park and auditorium should be studied.

From an architectural point of view, the question of site utilisation is important, because it links the interests of manager, financier, and the generai public. Our best examples of existing cinema architecture show that this importance has been realised.

I should, therefore, like to use the development of this particular subject, site utilisation as a first basis for discussing possible future trends in design. This discussion will assume that present advantages will be crystalised and accentuated. Later, I would like to develop ideas based, not on the current characteristics, but on the assumption that it will pay us to retrace our steps a little in order to rectify present shortcomings.

The two projects illustrating these fundamentally differing methods of approach have been designed and are being developed, within my organisation, by Mr. Lucas Mellinger.

The first fully accepts developments as they are at the raoment. It attempts to plan consciously for characteristics which have resulted spontaneously during the past fifty years. The auditorium is, therefore, conceived as a shell completely surrounded by accommodation for every day activities: shops, offices, their storage areas, pubs, restaurants, etc... The lower ground floor is envisaged as catering entirely for car parking and the motorist generally. Direct access by stairs, escalators, lifts and goods lifts links this level with others above. The upper floors are, of course, only for pedestrian use, but corridors, giving access on one side to individual premises and to the cinema on the other, are designed as internal streets, or shopping arcades, connected to the main traffic network of the town at upper ground floor level. No attempt is made to express the form of the volume containing the auditorium, but rather to hide it by posters, showcases and illuminated advertisements facing shops.

As yet, such a proposai would not pass safety regulations of most authorities. But, we are studying trends and they are in this direction. In New York, for instance, Building Codes only allow since 1938 the construction of income producing property above and below auditorium and foyers. Previous to that date, such occupancy was limited to the floors above the foyer only. With the further improvement of non-flam film stock and fire proofing of generai building materials, I can see no reason why this trend should not continue, provided adequate escapes are planned. The additional costs of lifts and escalators would appear to be particularly justified if their maximum use

can be assured throughout the day. This is the case in the proposed scheme where it may be assumed that shoppers and office staff within the building will decrease as cinema attendance rises.

In this scheme, therefore, the auditorium has again become a core, though not a focal point. It is not set amongst rooms designed for social activities, but rather in the heart of a commercial environment.

Physically, it occupies a volume undesirable for other development, having neither daylight nor a view of life in the Street. It benefits, on the other hand, from the sound buffer around. Its maximum use is at night, whereas other floor space in the building is mainly used during the day. The two, cinema and its surroundings, may therefore, be said to te truly complementary.

From a financial point of view, the building contains a maximum of income producing volume; structurally, il is economical; from a town planning point of view, it relieves congestion within the centrai area, without reducing the active character appropriate to this part of the town. Only from a visual point of view it is, of course, negative, the structure being enveloped rather than expressed. But, how do we know that this quality is not inherent in the cinema?

To help us consider this question, I would now like to describe the second scheme based on the assumption that present developments need not be fully accepted. Rather than designing a cinema to suit current projection methods, it develops a form which satifies all architectural requirements and them puts the onus of completing the design on the film projection engineer.

The scheme invisages a central projection room. From this room images of one film copy are projected simultaneously to the back of six, or less, screens hexagonally arranged on plan. An equal number of separate wedge-shaped auditoria, designed on one floor, surround the projection room. The floor is not dished, but follows a Constant upward rake. Equality of sight lines is achieved by increasing the spacing between seats towards the rear. This system ensures simplicity in construction, as well as safety conditions appropriate to the varying widths of rows of seating within each wedge shaped unit. The whole auditorium is raised above car park and foyer at ground level. All services are accommodated within the centrai block.

The advantages claimed for this project may be summarised as follows:

The scheme lends itself for cinemas seating approx. 300, 600, 900, 1200, 1500 or 1800. It ensures full application even when the cinema is not used to capacity. It therefore avoids the undesirable psychological effect of large empty cinemas. The possibility of partial use effects economies in staff, cleaning, lighting, heating and ventilation. Redecorating may be carried out in sections wìthout interference in the normal showing of programmes. If desired, some sections may be furnished and decora-

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led for children. In warm climates, part of the seating may be left uncovered, in the open air. Back projection increases the « magic » of the performance and avoids the distraction of smoke filled light beams within the auditorium. The scheme lends itself to T. V. projection.

The components of the structure, as well as its engineering services, are easily standardized, fabricated and transported. Time of erection could be minimised, and performances, to limited audiences, could be shown whilst construction is still in progress. Only some of the six auditoria need be built initially. Additions can be made without interference in the normal showing of programmes. The small standard sized screen are more readily and economically replaced, if damaged.

The small sectional auditoria within the cinema have an optimum reverberation time of one second, as against an optimum time of one point five seconds which would be required if all the seating were accommodated in one large auditorium, as is customary. It is, therefore, possible to allow about 150 cubic feet (4.24 cub. m.) per person in the scheme shown, as against about 200 cubic feet (5.65 cub. m.) which would be necessary in the normal type of building. This saving in volume reflects itself, of course, also in the economy of heating and ventilating. In addition to allowing a 25 % reduction in volume, the sub-division of the sectional auditoria ensures that minor disturbances from coughing, talking, coming and going, etc., are localised.

Major disturbances, such as danger from fire, are equally limited. The design, in fact, resolves the serious problem of safeguarding 1800 lives, into separate problems of safe guarding smaller groups. Chaos and mass histeria, in the event of danger are therefore unlikely.

The form of the building is directly determined by the fundamental idea underlying the whole scheme: one central projection room as focal point to surrounding spectators. Its outline is easily conceived and recognised; it has direction, rhythm in the structure, and sufficient interest, I believe, to attract the attention the cinema needs and deserves.

Any discussion about the future of cinema design would be incomplete without consideration of the influence of television. Unlike film projection, television projection is not, as yet, flexible. The architect is given no alternatives: he must work for the rigid relationship demanded between T. V. projector and screen; their distance apart must not exceed a given maximum; a zero angle of projection is essential.

In one of the buildings I designed for the Festival of Britain South Bank Exhibition, the Telekinema, I have allowed this limitation to develop the whole scheme. The sequence of operations in designing the structure was therefore as follows:

A diagram was drawn showing the screen in section. At a distance of 45 f. t. (13.7 m.) from the screen, with a zero angle of throw the T. V. projector wa» located. The two film projectors were placed behind this location.

Sight lines were then allowed to determine the maximum distance between screen and the last row of seating in the stalls, under the projection areas. The remainder of the total accommodation required was then found to obtain equally adequate sight lines from the stepped balcony seating designed above the projection room.

Although the site was triangular in area, its dimensions did not allow a « fan-shape » plan; nor did the budget permit such a structure. It was, therefore, necessary to adopt a parallel-sided plan so that roof members could be standardized in dimensions. Behind the projection room, the access block was designed as a separate structure, insulated from the auditorium and acting as a noisebuffer to the adjoining railway line. As non-flam film stock was used, it was decided to make a show of the projectors and associated equipment: a large viewing window was designed to allow a free display of this equipment from the main entrance hall. This decision had the additional advantage that T. V. cameras could shoot, from within the projection room, activities in the entrance hall which was, accordingly, designed also a small studio.

The exterior shows the separate access block, including the main entrance, at a level giving equal access to balcony above and stalls below. The walls flanking the auditorium have been accentuated, not only for visual reasons, but mainly to satisfy the stringent sound insulating requirements of these areas. The quilted effect of the wall panels is due to the outermost skin of the wall being supported only at approx. equidistant points and containing air spaces in between.

Access block, auditorium and the screen chamber, accommodating six of the 24 separate loud speakers, are each appropriate in size and exhibit not a preconceived idea, but the geometry characteristic of this experimental, stereoscopic, stereophonic and dual-purpose cinema.

I have described this building, firstly, because it shows particularly well how form and dimensions grow out of function — though often such growth is suppressed, instead of furthered —. and secondly, it may help to indicate the impact television will have on cinema design and, in fact, the film industry generally. This impact will be direct inasmuch as it effects the lay out of auditoria in relation to projection room and screen; but more important is the indirect influence: for we know that the time is not very far ahead when the programmes shown in specially designed buildings may also "be seen in the comfort of the home.

The continued success, if not the survival of the cinema will, therefore, depend largely on the environment in which these programmes are seen.

Standards of comfort and vision will certainly have to be improved; but more vital is the necessity to offer in our cinema architecture the positive qualities of the film: qualities which provide a release from the humdrum, everyday, office, workshops and domestic atmosphere; qualities which activate the imagination, which add to the experience like a journey into an unknown country and help us to relate our limited outlook and knowledge to the ideas and happenings in the whole world.

I am confident that, jointly, we can produce what the occasion demands.

Décoration et illumination des théâtres cinématographiques modernes et futurs

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PREAMBULE

Quel est le rôle de l'architecte dans la création ou la transformation d'une salle de cinéma?

Comme pour toute autre conception, l'Architecte est avant tout le conseiller de son client. Mais ce rôle pose pour lui des problèmes très différents de toute autre élaboration, beaucoup plus complexes en tout cas. Quand il s'agit d'une maison, d'un immeuble, d'une usine, d'un magasin, il y a avant tout un problème de bon sens à résoudre: créer sur un certain nombre de mètres carrés de surface, des outils d'existence qui favorisent au maximum la vie de famille, le travail de l'employé, ou le commerce du marchand, sans oublier cet impondérable qui nait de jolies proportions et de l'utilisation agréable et judicieuse d'un lieu. Ces questions ont été étudiées, travaillées, enrichies par l'expérience des siècles, par les découvertes du confort, par les exigences de chaque époque.

La conception d'une salle de Cinéma est un *problème neuf d'un demi-siècle*. Nous avons toute latitude pour chercher et trouver des idées nouvelles. L'Architecte doit tenir compte de l'expérience des exploitants, de la technique moderne, des exigences de public, mais il doit aussi aller de l'avant et imaginer et prévoir ce qui peut aider à retenir le public, l'attirer au maximum.

Par cela l'Architecte doit, comme toujours, rester absolument libre, et, aujourd'hui plus que jamais, mettre au service de l'œuvre toutes ses idées et toute son imagination. Compte tenu de la technique et de l'expérience, chaque problème de création d'une salle doit être différent du problème précédent, les règles constantes étant conditionnées par la bonne visibilité, la bonne acoustique, la sécurité, etc.. Mais à côté de ces quelques constantes qui sont du ressort de la mathématique, *la plus grande liberté* — et l'on n'insistera jamais assez sur ce point — doit être laissée à l'Ar-