MODERN STAGE LIGHTING

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MODERN STAGE LIGHTING

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THE ART AND SCIENCE OF STAGE LIGHTING.

INTRODUCTION.

The presentation before an audience of a play or spectacle in which movement, the expression of emotion, and a suggestion of natural effects are three of the principal characteristics, was for centuries regarded as a matter chiefly for the actors, scenery being of the crudest description, and illumination merely a row of footlights. Modern science, and the development of electrical methods of lighting, have made of stage-management an art which has at its disposal the most elaborate colour-effects, the means of vivid and accurate mimicry of nature in all her moods from calm to storm, and possibilities of brilliance compared with which the finest triumphs of the scene-painter become tame and dull.

Recent years have brought a greatly increased vogue for stage-spectacles with exceptional scenic appeal, and the response of the public to the efforts of the producer has been immediate. The modern revue, for example, relies for its success to a very considerable extent upon gorgeous costumes, the general glow of colour, and specially designed scenery ; and in the more serious type of production, including the opera, the same tendency is apparent. The source of all this splendour, given the competence of scenic artist and costumier, rests, as it always has done, in the skill devoted to the lighting. No stage play or spectacle will give its proper effect unless it is correctly illuminated, nor will it please the spectators unless suitable illumination is available in ample measure.

Let us consider for a moment a necessity which often arises in the craft of the theatre—the representation of realistic and natural atmospheric effects.

LIMITATIONS OF THE OLD METHODS.

An outdoor scene, we may assume, would have a back-cloth showing a blue sky with clouds. However well it might be painted, it was obviously artificial ; the clouds remained motionless, and the sky of canvas exhibited unpleasing folds and wrinkles which caught the dust. But there was another serious drawback. Any change, such as the approach and breaking of a thunderstorm, could not be made without the addition of complicated arrangements in order to secure the effect desired. This procedure is not only relatively clumsy, but the general result is not thoroughly convincing in its efforts to simulate such an atmospheric phenomenon. The audience is compelled to notice the artificiality of the methods employed ; and the final impression tends to destroy rather than build up that illusion which is part of the charm of the theatre.

Any means, therefore, which could be devised to ensure the representation of a series of natural effects on a single background, thus eliminating changes of scenery, would prove an immense stride in the art of the theatre. And those means have been devised, as we shall describe.

THE NEW METHOD.

The problem outlined in the foregoing—our chosen example being only one out of very many difficulties confronting the conscientious producer—has been seriously studied on the Continent during the last few years, and has been solved successfully, a most ingenious combination of electrical and optical effects being employed, in conjunction with an apparatus termed the Artificial Horizon which occupies the whole background of the stage. With this it becomes possible to reproduce within four walls almost every imaginable change in the aspect of nature. For instance, in a very short interval of time a brilliantly starlit sky may give place to a rosy dawn, the dawn growing to a bright summer day with blue sky and fleecy, sailing clouds. A transition to stormy weather is accomplished with equal ease, the sunshine gradually fading to a dull grey, and the sky meanwhile becoming overcast by masses of threatening cloud until the whole horizon is a sullen confusion of gathering tempest.

These wonderful effects are produced on the Artificial Horizon, without any change in material scenery, by means of a special mechanism known as the Cloud Apparatus, working in conjunction with a battery of special lights called Horizon Lamps.

THE FIRST INSTALLATION IN ENGLAND.

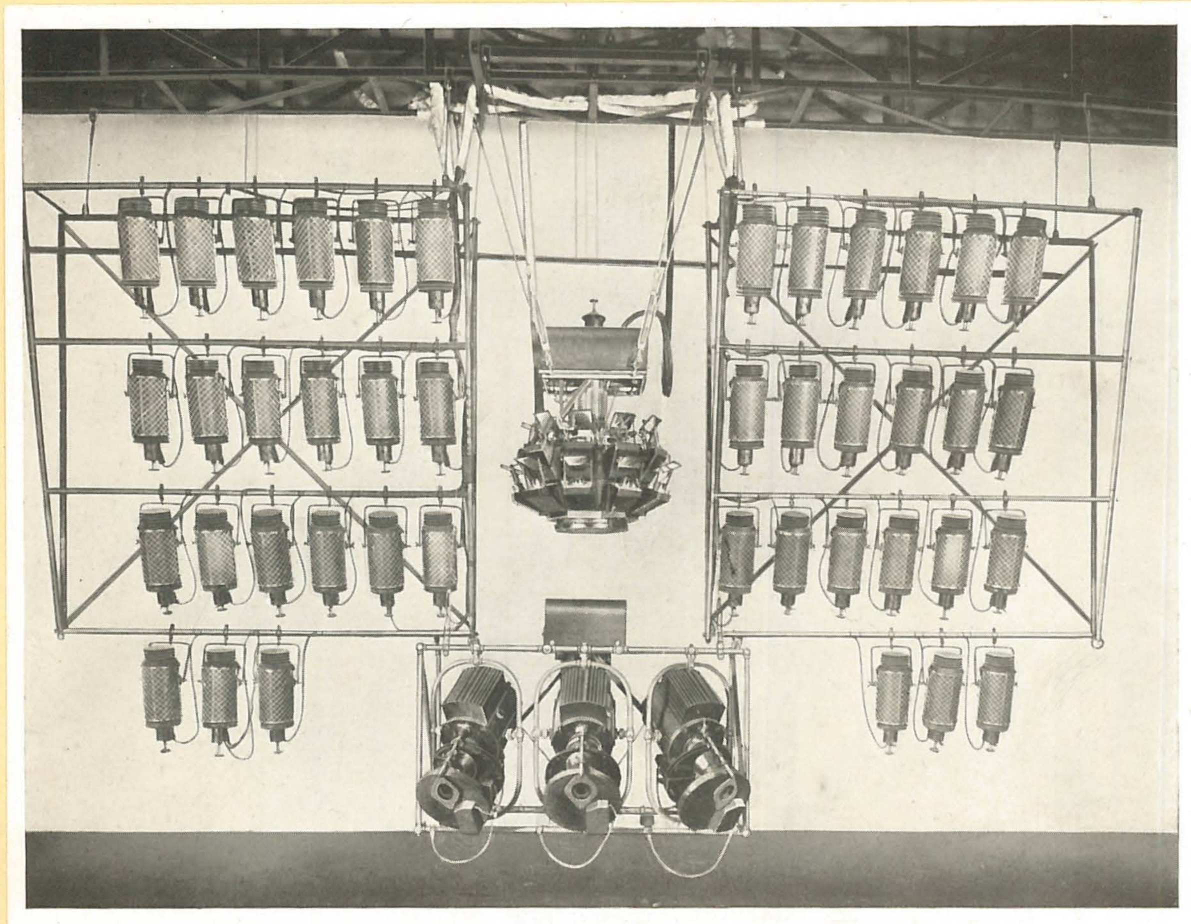
The success of this new method of scientific stage lighting, known as The Schwabe-Hasait system has already been amply proved on the Continent where it is now firmly established, and is being extensively adopted not only in new play houses, but also in existing first-class Theatres.

The General Electric Co. Ltd. has acquired the sole rights of this system for the United Kingdom and Colonies. This is now installed in some of the most popular theatres in London, as for example the Plaza and Carlton Theatres, where it has proved eminently successful.

A new Showroom has been opened at Magnet House, Kingsway, W.C. 2, which is at the disposal of architects, consulting engineers and others interested in stage lighting. Here stage lighting apparatus may be selected or demonstration witnessed of apparatus designed for every phase of stage lighting, while qualified engineers, who are always in attendance, may be consulted on projected or existing schemes of any magnitude.

MODERN STAGE LIGHTING.

It is the principal aim of the engineer in charge of stage lighting to illuminate all scenery as naturally as possible, in a manner suitable to the particular performance. We have already noted the defects of the ordinary methods, whereby few changes could be made without actual scene-shifting. It is now recognised that by scientific lighting much of this labour can be avoided, and many heavy pieces of scenery formerly regarded as essential are replaced by what we may term their "illuminating impression"; it is sufficient to suggest the outlines of a scene— a landscape, town, or building, a realistic result being obtained simply by the aid of light, correctly projected and modified.



Schwabe Apparatus at The St. Martin's Theatre,
Showing Horizon Lamps, Cloud Apparatus and Panorama Apparatus.

MODERN STAGE LIGHTING

Modern stage lighting, with its ease of control and its endless variety of effects, only became practicable by the aid of electricity. The advent of gas marked one improvement upon the candles of Restoration days ; but the first great advance was made when arc lamps took the place of gas. Obviously, here was a more brilliant source of light ; but stage lighting with arc lamps presented many difficulties, and the carbon filament lamp on account of its low candle-power was found unsuitable for the representation of full daylight. The arrival of the metal filament lamp was welcome ; but still further progress was made when, within the last few years, the gasfilled lamp was developed, and was found to be an excellent substitute for the arc lamp. It then became possible for one man to control the full range of illumination, with all its changes, from any given point. Quite recently another step forward has been taken by the manufacture of a specially shaped filament which enables these lamps to be adapted for practically all purposes.

GENERAL LIGHTING.

There are two principal considerations in general stage lighting :—

(a) The illumination of the acting area, on which the actors move and on which the scenery is erected ; and

(b) The illumination of the artificial horizon, and the reproduction upon it of varied natural effects.

THE ACTING AREA.

The methods employed until comparatively recently for illuminating this part of the stage consisted in the use of " floats " or footlights—(so termed because originally rows of wicks floating in oil provided the necessary light)—battens, and chandeliers lowered from the ceiling. The latest methods, while still retaining the use of footlights and battens where required, rely to a great extent upon the use of specially designed flood-lights, projectors and spot-lights.

The most suitable type of flood-light contains a gasfilled lamp of 1500 watts with a set of reflectors specially placed to enhance the effect. The upper mirror reflects the rays which reach it from beneath, the lower one utilises the lateral rays. Two ventilating rings are provided for cooling purposes. These projectors may be suspended above the stage, and coloured discs are employed to vary the effect. Should vertical illumination be undesirable they may be supported in such a manner that the light is sent in any direction required.

Spot-lights are needed when certain sections of the acting area are to be sharply defined. In these the light is concentrated by means of a lens, which can be focussed telescopically and directed towards the centre of interest. By the addition of a second lens and an objective, this apparatus can be used for projection purposes—that is, the throwing of a definite picture on a plane surface.

It will be seen that with these three forms of illumination a great range of effects is at the disposal of the producer. The function of the flood-light is to illuminate a comparatively wide area—open-air scenes, pageants, or other displays where quantity of light is important rather than quality. The spot-light is employed when a small area has to be intensely illuminated, leaving the surrounding portion by contrast unaffected. The projection apparatus gives special effects ; the diameter of the lighted zone can be accurately regulated, and an illuminated picture can be formed and varied by using shutters of different shapes having circular, elliptical or rectangular apertures. With this it is possible to throw light on a head, a costume, or any particular object without illuminating the surrounding region ; and by the use of painted slides instead of shutters, any number of different impressions may be created, such as sunlight through foliage, sunlight shining through a church window, and other fascinating representations.

FOOTLIGHTS.

At various times the use of footlights has been condemned ; they are necessary, however, to the modern theatre because lighting from below is generally regarded as essential. As with other modes of illumination, the footlights have been greatly improved, and those in use to-day are considerably in advance of the older types. " The glare of the footlights " has become a familiar phrase ; but it no longer applies. Indirect lighting has recently been adopted ; the actors are protected from the dazzling effect by so placing the footlights that they are almost hidden in the stage floor. Tubular lamps are used, fitted with suitable mirrors and reflectors which throw the light upward.

Colour effects are an important feature in theatre-craft, and in this direction also, many improvements have been made. The dipped lamp was unsatisfactory on account of the short life of the colouring layer, and another method is to use special lamps which are impregnated with colouring matter during manufacture, with the result that a permanent colour is obtained. As an alternative, uniformly tinted glasses, called colour filters, may be placed in front of the lamps. The footlights are arranged in sections with suitable electrical control, so that all or any sections may be switched on at will.

CONTROL OF LIGHT.

It is very necessary that the illumination of the stage should be instantly and easily controlled, so that all possible graduations of light may be attained. The cold grey light of dawn is often desired, or the warm red glow of sunset. Some scenes may demand sudden variations in strength of lighting, or slow, almost imperceptible changes from the softest to the most brilliant effects. Partial lighting, transitions of colour—all must be capable of production at will. To deal successfully with this problem a regulating apparatus is necessary which will enable the Illuminating Engineer to control his light-waves in much the same way as an organist controls his sound-waves. In fact, the modern stage-lighting control may very fairly be compared to the control of an organ, its function being to regulate the quantity and intensity of light, just as the volume and quality of sound in an organ is modified by keyboard, stops and pedals.

The various types of illuminating apparatus which have been described, and others even more striking which we shall mention later, all require careful handling. By ingenious electrical and mechanical devices it is possible to centralise all control so that the complete range of effects is at the command of a single operator. At the same time each lighting unit, having its own electric circuit, can be operated independently when necessary, so that a very complete and precise regulation is obtainable.

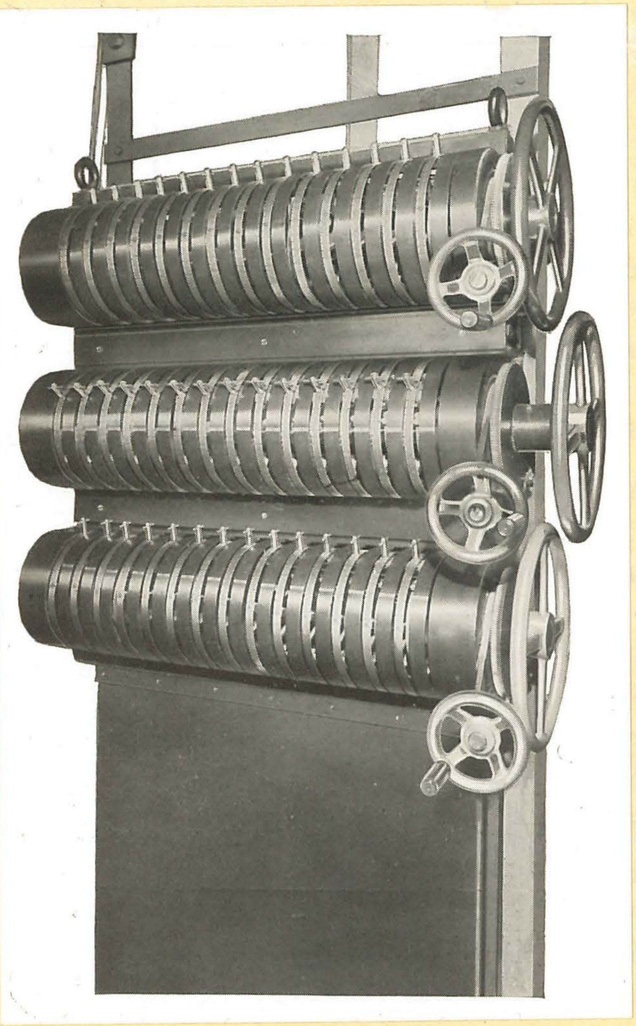
The regulator which secures the desired changes, from darkness to fullest brilliance, may be termed the brain of the lighting installation. It is a purely mechanical device, consisting essentially of a series of levers arranged in rows placed one above the other and connected by steel wires running over pulleys to a number of movable contacts sliding over resistance steps.

By operating the levers, resistance may be either inserted or cut out of the various lighting circuits, thus dimming or raising the lights as required.

Each lever is arranged to move over a scale, divided into a number of parts, the scale divisions corresponding to definite positions of the resistance contact controlled by the lever. Regulation can therefore be made extremely accurate, and definite variations in the intensity of light may be repeated as often as desired.

The effects required having been worked out experimentally at rehearsals, the operator is able to note the positions of his controls ; he therefore has only to reset them at the points recorded in order to obtain the known results.

It is occasionally necessary that a number of levers should act in unison ; for example, if an actor carrying a lamp



Master
Control
Apparatus

appears, the whole stage may have to be suddenly illuminated. A device for this purpose enables each lever to be mechanically coupled to a spindle capable of operating all the levers in a tier simultaneously.

The change from daylight to dusk, or from night to daylight, necessitates the simultaneous alteration of the resistances in several circuits—an operation which must be carried out slowly. For this purpose the levers are again coupled to the shaft, which in this case is controlled by a special slow motion gear which allows the required changes in the intensity of the light to be effected without the slightest difficulty.

A full description of this regulator is somewhat technical, and it is therefore not proposed to enlarge on its details in this publication. It should be pointed out, however, that the design is such that an intelligent operator should not experience any difficulty whatever in operating it under working conditions. In order to obtain the best results it is advisable that the regulator should be so situated that the operator can command a view of the whole stage.

The resistance-chamber should be a separate room or compartment, in reasonable proximity to the stage, and should be properly ventilated in order that the heat given off when the resistances are in operation may be carried away.

PROSCENIUM LIGHTING.

Until within the last few years the footlights formed a barrier between actors and audience, not to be crossed ; stage and auditorium were two distinct and entirely separate parts of the theatre. Recently, however, the vogue of the "revue" and similar theatrical productions have brought the actors from the principal stage into the part hitherto reserved for the public, certain effective situations otherwise unattainable being thus rendered possible.

Fresh problems in lighting arise from this popular change, as the lights of the acting area can no longer be used, the proscenium wall not being available. The footlights are, of course, useless ; vertical lighting and side lighting are impracticable.

Various attempts were made to use flood lights or spot-lights to illuminate this forward area, and it was finally found that the only quarter where lighting apparatus could be employed satisfactorily without interfering with the vision of the audience was the ceiling of the auditorium. If the rays fall almost vertically from there, they are hardly noticeable ; the effect is all the more striking, since it achieves the ideal of the illuminating engineer—that light should be visible only when it falls upon the required spot.

THE ARTIFICIAL HORIZON.

We now come to one of the most notable advances in stage-craft made in recent years—a step forward as revolutionary in its results upon scenic effects as was the change from old-fashioned footlights to electric lamps. No conception of the astonishing qualities of light itself entered into the preparations of the scene-builder of former days. His "sky" was a blue canvas backcloth, showing, too frequently, ridges and hollows lined with dust ; and his endeavours at reproducing the wonderful phenomena of nature were accepted by the public only because they knew of nothing better.

In modern stage lighting this canvas gives place to an arrangement known as the Artificial Horizon, visible only as a reflector of light, unobtrusive, and producing an extraordinary illusion of depth and atmosphere. It may have the shape of a cupola, or of the surface of a cylinder, and is brilliant white, in order that all rays falling upon it shall be reflected equally and with the smallest possible amount of absorption. From any point of the auditorium the effect is wonderfully good, the sense of depth and distance which it is the object of all landscape backgrounds to produce being enhanced to a remarkable degree.

Apart from the results obtained from a spectacular point of view, which we shall describe in detail, there is a great deal to be said in favour of the Artificial Horizon from the standpoint of economy. It is possible, for example, to do away with a large proportion of the flats and side scenery—and therefore, of course, with a corresponding amount of labour in scene-shifting. A few stage "props," standing out sharply defined against the horizon, can be substituted for the customary pieces which occupy so much space and necessitate continual alterations in setting.

The Artificial Horizon can be erected as a permanent structure by covering a suitable framework with a layer of polished plaster of paris ; this method, however, has certain disadvantages in its unavoidable obstruction of the general movement, and the liability to damage of the polished surface. These drawbacks have been overcome by the invention of a movable artificial sky, consisting of large sheets of canvas sewn together and perfectly stretched in a manner that leaves not the slightest fold or crease visible. The smooth screen thus formed runs on a semi-circular rail fixed across the back of the stage, and is operated by an electric motor which rolls or unrolls it in a few seconds. Thus for the setting of a scene representing an interior it can be quickly rolled up out of the way.

THE LIGHTING OF THE ARTIFICIAL HORIZON.

For the correct illumination of the Artificial Horizon very strong light, variable at will both in colour and intensity, is required, and the ideal source is the gasfilled lamp, without which, indeed, many of the marvellous effects produced could not be obtained. A number of high candle-power lamps contained in special housings are used, the number depending upon the size of the horizon, which in turn is governed by the dimensions of the stage itself. These are shown in the illustration on page 7.

The horizon lanterns, each containing a 1,000-watt tubular type gasfilled lamp fitted with an aluminium reflector and a coloured glass slide, are built up in three or four tiers, forming a homogeneous unit, and are supported in a rigid metal framework suspended from the roof.

The representation of natural effects—such as dawn, sunrise, the blue sky of broad day, sunset, twilight, etc.—is possible, with innumerable shades and intermediate gradations, by the use of the Artificial Horizon, and the scientific combinations of colour necessary for these charming sky-pictures have been studied exhaustively and worked out to a nicety. It is a well-known fact that the atmosphere absorbs the rays of the sun to a varying extent according to the angle at which those rays pass through it to the observer ; at sunrise and sunset, for example, the red rays are transmitted more freely, the light striking almost horizontally through thicker layers of air. At noon, we find the blue rays transmitted ; and at various times and seasons atmospheric changes will cause different and often very beautiful modifications of light and shade and colour. The reproduction of this range of natural effects within the four walls of a theatre may be regarded as one of the triumphs of modern stage lighting.

A natural shade of blue is given by the rays emitted from high-wattage lamps, used to illuminate the upper horizon and as each lamp has its intensity of illumination under perfect control, any variation in the depth or paleness of the blue sky can be obtained. The dimming of the lamps by the switching in of more resistance causes a red glow ; this could also be produced with the old type of carbon filament lamp, but the blue tints were beyond its capabilities. To obtain the various colour combinations required in the representation of sky effects, each horizon lamp is fitted with a colour slide, the colours used covering the whole range which has been found necessary in practice. By a suitable combination of various colours it will be seen that a very wide series of tones is available by which any natural sky phenomena may be produced. A dark blue group of lamps at full power, for instance, gives the spectator the impression of a summer noonday ; the same group when dimmed throws the deep velvety blue of a fine night sky on the Artificial Horizon. With the dark blue and green combined and dimmed, the appearance of moonlight is obtained. A mixture of certain groups gives an evening sky before sunset. The clear, rain-washed sky of spring days is produced by the paler green and blue groups. But there is no need to describe the complete range of effects ; the grey sky of stormy weather, the low red tones of dusk, the glare of noon, or the pure primrose dawn, and all the slow merging of one effect into another so continually observed in nature, can be imitated with astonishing accuracy in a way that has never before been possible.

CONTROL OF COLOURS, Etc.

Complete and flexible control of the lighting of the Artificial Horizon is obtained by a Master Control Apparatus which operates a series of resistances in circuit with the individual lamps. This is designed in such a way that dimming or raising the light takes place smoothly and easily, with none of the objectionable jerky effect which often spoils an otherwise pleasing scene.

As the source of light is at a high level, in order that it should not be perceptible to the audience, it follows that the lower part of the horizon does not receive from it the same intensity of illumination as the upper portion. To remedy this a certain number of lamps placed at the level of the stage, of the same power and type as those already described, are employed. These are contained in moveable trolleys, spaced round the bottom of the screen, and are supplied with colour slides and arranged so that they can be tilted at any angle.

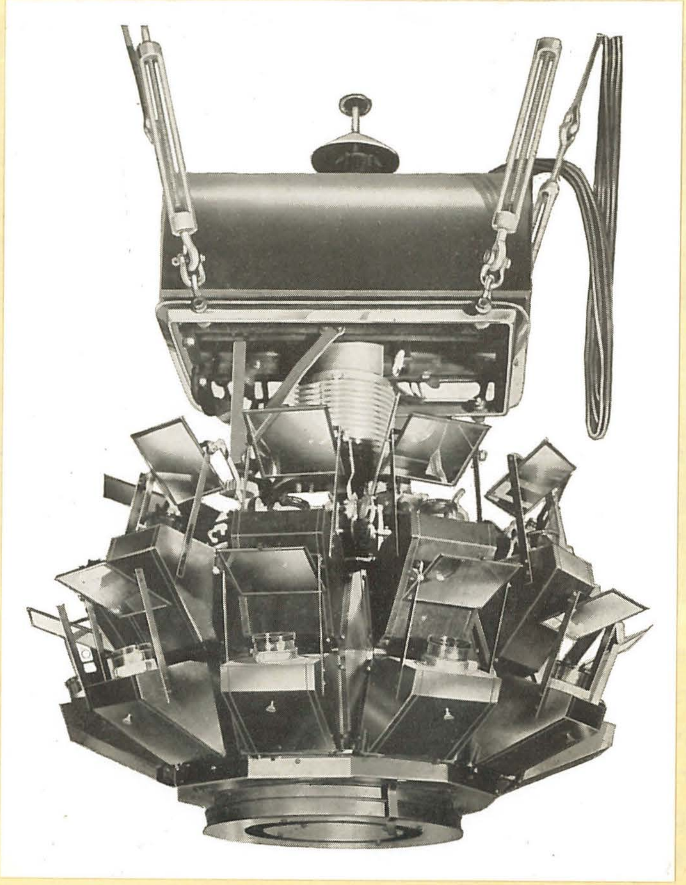
As the amount of heat generated by the installation is considerable, ample provision is made for the adequate ventilation of the lamps ; and in addition each lamp is protected by wire guards from accidental breakage.

THE CLOUD APPARATUS.

So far, we have been dealing with the reproduction of clear sky effects and colour-changes ; but a far wider range even than these is possible by the use of the Cloud Apparatus in conjunction with the Artificial Horizon. Half the beauty of the sky consists in the movement and shape of its clouds, and the old method of painted canvas scenery gave no opportunity for simulating this beauty in the theatre. Nor was it free from absurdities, such as the painted clouds which remained stationary in a howling storm, or the cloud which gave no sign of motion during a whole scene —makeshifts which, as we noted, were accepted as legitimate only for lack of something better.

The Artificial Horizon, with its wonderful command of light and colour, offered an ideal setting for the reproduction of moving clouds, and the Cloud Apparatus, as its name implies, is a mechanism by which a series of cloud-pictures can be projected upon it.

The apparatus consists of two essential portions : one which is stationary carries the main driving motor, the collector rings, and a 3000-watt gasfilled lamp ; the other, which rotates round the first, carries the system of cloud-pictures, lenses and reflectors, also two small motors which drive two lines of shafting by means of suitable gears. These shafts give motion to a series of eccentrics



Cloud Apparatus.
(*Patent No.*163, 663/21).

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which cause a number of reflectors to rotate through a definite angle, thus causing the cloud-images to rise or fall as desired.

The moving system has its cloud slides arranged in two tiers. Immediately behind each slide a condenser transmits the rays from the lamp through the slide on to a fixed glass reflector ; this in turn transmits the picture through an objective lens on to a movable glass reflector actuated by one of the eccentrics, and this reflector throws the picture on the horizon screen.

The slow motion of clouds across the sky is simulated by the rotation of the two tiers, which are driven by the main motor through reducing gears ; this motor is reversible, so that the clouds can move from right to left or *vice versa*, and by combining the horizontal with the vertical movements diagonally travelling and thickening clouds may be produced. One particularly interesting effect obtainable by the combination of these movements is that of two separate banks of cloud travelling independently one above the other, a phenomenon frequently observed in nature. The rate of movement is variable through a range of speeds, the motors being equipped with speed-regulating devices.

Different effects are caused by dimming the light, the clouds appearing dense and heavy, or white and fleecy ; and by varying the voltage many impressive results can be secured. By lowering it gradually, for instance, a cloud may be made to appear slowly forming in a clear blue sky, growing and spreading until the whole heavens are obscured by heavy masses of cumulus indicating the approach of a storm. And as in all these effects the clouds are reproduced from actual photographs, they are absolutely true to nature.

Cumulus
Cloud formation
such as can be
faithfully reproduced
on the Artificial Horizon.

The success of the Cloud Apparatus is greatly influenced by the manipulation of the horizon lighting, which creates the illusion of the sky itself.

We can do no more than allude, in this necessarily brief description, to the years of research which have led up to such a remarkable triumph of stage-craft and brought it to its present state of perfection and reliability ; nor can our description give an adequate idea of the exquisite results obtained, which, in the hands of a skilful operator, reproduce at will, practically any atmospheric phenomena of nature. They must be seen to be believed.

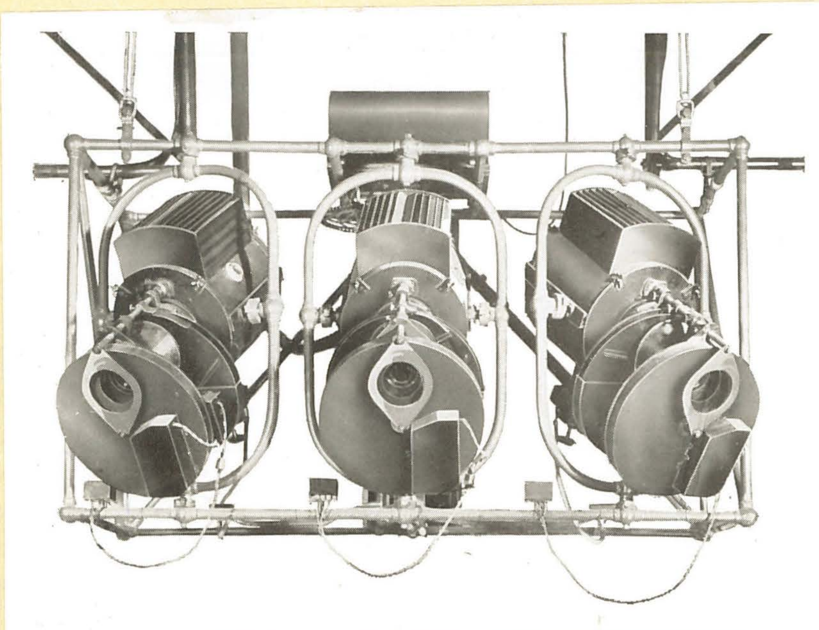
PANORAMA PROJECTION APPARATUS.

The effect of the Cloud Apparatus may be intensified by the addition of the Panorama Projection Apparatus, which projects a series of cloud pictures or landscapes on the Artificial Horizon.

It may be used independently also with excellent results. It consists essentially of three projectors mounted on a tubular steel frame, capable of being tilted in an upward or downward direction, and with each lamp mounted in such a manner that it can swing on its horizontal axis and be locked in the desired position by a set-screw.

The raising and lowering movement is obtained by a small motor driving a screwed spindle, the rotation of which operates wires attached to the projectors.

Each projector, in addition to its 3000-watt gasfilled lamp, adjustable by means of a handwheel operated from the exterior,



Panorama
Projection Apparatus.

is equipped with an adjustable reflector which enables the focus of the beam of light to be readily corrected.

Two discs are fitted to each lamp, one being a colour-screen, the other containing several dia-positives, so that it is possible (to take one illustration) to obtain three entirely different panoramas without the necessity of changing slides. In front of the projector lens a circular motor-driven colour-screen is fitted by which the operator can control various special colour-effects.

With this apparatus the only limits may be said to be set by the imagination of the Producer. When used for cloud effects in co-operation with the Cloud Apparatus the most marvellous cloud-scapes are formed with the greatest ease, the operator then having at his command two different sets of cloud-pictures, a moving and a fixed series, with which he can produce almost any conceivable combination on the Artificial Horizon.

SPECIAL EFFECTS: STORMS, LIGHTNING, Etc.

In modern stage lighting provision is made for many special and spectacular effects which may add to the popularity of the play or piece, in practically all of which electricity is employed. The imitation of a storm, to take one example, was always, and probably always will be, a favourite sensation ; but we have progressed greatly since the barn-storming days when a violently shaken sheet of tin was considered a good imitation of thunder. The crash of thunder is now finely imitated by a clever mechanical device, part of which consists

Panorama with Clouds of Alto-Cumulus order.

of a drum rotated by an electric motor, the intensity of the sound being electrically controlled.

Lightning, on the modern stage, may be termed "real" rather than imitation, since it is produced by an electrical discharge. Special arc lamps with impregnated flame-carbons are used. As soon as the current is switched on an arc is struck, only to be broken immediately by the rapid raising of the upper carbon by means of a coil ; the sudden flash is projected through a shutter having a suitable aperture, thus giving a vivid momentary glare. The carbon is retained in its raised position until the switch is opened. Several discharges in succession may be obtained if necessary, and the shutter is made to rotate, its various openings producing a different type of flash.

Wind and storm are simulated, apart from visual phenomena, by another ingenious device. An electric motor operates a series of radial rods of cane or steel, which when rapidly rotated produce a whistling sound, the loudness of the effect varying with the speed.

Even a rainbow can be thrown on the Artificial Horizon. The light from a projection lamp is split into its component colours, giving a similar result to that obtained when the sun's rays pass through the drops of a shower and fall upon a cloud. A shutter with an opening shaped to a small arc is placed in front of the condenser, and the rainbow appears in its familiar prismatic hues. It can be caused to appear and fade gradually.

Typical Cloudscape showing Alto-cumulus formation.

SUN, MOON, AND STARS.

As a general rule, the sun and moon are not reproduced in theatrical art, their light-effects only being shown by reflection on the Artificial Horizon.

If, however, it is considered necessary that they should be seen, special arrangements are needed, the character of which depends on the problem to be solved.

Stars are shown, if the plaster screen is used, by small lamps placed behind tiny perforations, the lamps being controlled from the switchboard. When the movable canvas Artificial Horizon is used, other special methods are required.

CONCLUSION.

We have endeavoured in the foregoing explanation of the Schwabe-Hasait apparatus, to give the reader a general idea of the scope and possibilities offered by the new lighting methods which are now available, and, in concluding this somewhat necessarily brief survey of the new field opened up to the Producer as a result of the patient experimental work of recent years, culminating in the successful evolution of this system, we would draw attention to the following advantages claimed for it.

Firstly—It is possible to do away with a considerable number of 'drop' scenes as the Artificial Horizon itself forms the only background now required for the presentation of sky effects of every description, and, as each new play necessitates a fresh supply of scenery, it is obvious that a considerable economy should result in this respect.

Bank of Cloud of the Cumulo-nimbus order.

Secondly—It should be noted that the tremendous range of effects obtainable upon the screen are under the control of a single operator, who, in addition, works all the subsidiary lighting, such as battens, floats, projectors, flood and spot-lights. This centralisation of the complete operating system in the hands of one man, not only conduces to efficiency, but should also result in an economy in personnel.

Thirdly—It may be pointed out that this system is not limited to the presentation of purely realistic effects, but it may be used to produce futuristic or impressionistic results by calling in the aid of the Scenic Artist to design suitable slides. It will therefore be seen that, while satisfying the ideal of perfect realism, it may also be used for the representation of the most fantastic ideas of the modern producer.

It may be thought that the system is only suitable for use in purely outdoor scenes, but a little consideration will show that it can also be employed for brilliantly illuminating landscapes, etc., seen through windows and doorways in ordinary "chamber" plays.

Finally, the artificial and somewhat crude attempts at nature effects which we have seen in the past are completely eliminated, a new field is opened up to the Producer, who now has at his command resources enabling him to represent within the four walls of the Theatre, the whole majestic range of atmospheric phenomena to be observed in nature.