answered a number of questions from the audience. After the long shot a new set-up was made for a close-up of Miss Durbin, repeating a portion of the song. The difference in lighting technic, sound pick-up, etc., were explained.

At the conclusion of the demonstration the audience reconvened upon stage 10 where the scenes made during the foregoing demonstration were projected. They were first shown in the form of "dailies," take by take, exactly as photographed, showing the slates identifying the scene numbers and other information. The cut sequence was then projected, from which the slates had been removed and into which several takes had been intercut into a continuous scene, as would appear in the finished picture.

(It is hardly necessary to state, of course, that the finished scene, as projected, was not the actual one shot during this evening's session; such would have been impossible in view of the time required for processing, etc.).

MR. TASKER: It must be evident by now that the mere taking of a scene on the stage does not constitute a completed picture, but that there is a tremendous amount of finishing work that must be done before the picture is ready to be shown in the theater. What happens next is the function of the editorial department. Mr. Maurice Pivar, supervising editor of Universal Pictures, will discuss the subject of film editing, followed by a demonstration of some of the work.

FILM EDITING

MAURICE PIVAR*

Film editing is perhaps one of the few branches of the motion picture industry that are least appreciated by the layman. The efforts of the director, the writer, the actor, and the cameraman are clearly defined upon the screen, and the layman is at all times fully aware and, in fact, appreciative of their contributions toward the success or failure of the picture. True, the film editor's name always appears upon the screen, but very few persons know of the intricacies involved in his share of the work in making the picture. To them he is, perhaps, just another cog in the wheel. On the other hand, those who have had occasion to contact with the editorial department of any studio will admit that the film editor is more than merely a cog in the wheel.

Unlike most of the technical branches of the business, film editing does not follow any particular routine. Each picture and each sequence of a picture present a different problem to the film editor,

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especially so today, when the situations are tied up and involved with sound elements.

The average successful editor must apply not only intelligence but ingenuity to his work. He must not only know the mechanical routine of editing but he must thoroughly understand and appreciate screen values—whether they be dramatic, photographic, or otherwise, and must take full advantage of the film he has in hand so that it will play up to the audience to the best advantage.

In other words, a proficient editor must be one who *feels* dramatic and comic impulses to the extent that he may convey these expressions to the screen to the best advantage. An editor of a picture who is devoid of this instinct would be of very little assistance to the average director, even though he may be fully versed in the general mechanics of editing.

Those who are familiar with production are aware that the average feature picture involves approximately thirty thousand to sometimes three hundred thousand feet of film, and it requires efficiency and system for an editor to be able to place his hands upon any particular scene at any time, without having to wade through thousands and thousands of feet of film. The systems used for keeping track of this excess film vary in the different studios. At this studio we have systematized this phase of cutting through the coöperation of our laboratory and production departments. After each day's work on the set, the script girl sends to the editor a copy of her record of the day's work. This record records clearly the number, length, and dialog of each scene, and is kept on file from day to day by the editor. Time and again during the course of editing a picture, a director will wish to change a scene from one angle to another; and sometimes there is a question as to whether such a scene may have been shot, or whether such a scene was complete—and to avoid wading through the film to find the answer, the editor instead refers to the script girl's notes.

In addition to the script girl's records, a laboratory record is also kept by each editor. This record is sent through with the film printed up each day by the laboratory (commonly termed "dailies"). The edge numbers and scene numbers of each scene printed are marked upon this record. These records are used for reference continually while the picture is in the process of editing, particularly when reprints of certain scenes are required.

Through the medium of these records, the editor is enabled, by

checking the edge number on the film with the edge number on the record, to find the scene number of the particular scene required to be reprinted. Quite often during the editing of a picture, a scene is either damaged or, more often, cut up by the changing of cuts, to the extent that a reprint is necessary for practical handling. The laboratory records and the script girl's daily records facilitate ordering these reprints and checking the various scenes of the picture.

As we all know, in cutting a sequence a number of trims are left over from each scene. These trims, likewise, are kept in orderly fashion. The trims of each sequence are kept intact and labelled, then placed away with the name or number of the sequence. In this way, the editor, should occasion arise, can find the trims of any scene by looking through the trims of the sequence involved. If there should be fifteen sequences in a picture, the editor would have fifteen separate files of trims on hand in his cutting room.

The mechanical routine involved in the preliminaries of editing a picture also vary somewhat in the different studios. The majority, however, favor the use of separate sound-track and separate action films during the process of editing. Several studios, however, use movietone prints—prints that have the sound already printed on the film with the action. This method may be more economical from the standpoint of saving film, but I prefer the separate sound-track for the reason that it offers greater latitude in editing and makes the process of cutting more flexible.

The first step in connection with editing, as a rule, is to synchronize the sound-track with the action. This is accomplished by the use of a mark or punch at the beginning of each scene. The punch or mark is made on both the action and the corresponding sound-track films, and it is necessary, therefore, to see that both punch marks are at corresponding points.

To simplify handling separate sound-track and separate action, numbers on the edge of the film, spaced one foot apart, are necessary. These numbers are made in duplicate, and the same number that appears upon the edge of the sound-track film appears also upon the edge of the action film, identical numbers being in the same relative positions from the start marks.

Two methods are used for placing the synchronizing edge numbers upon the film: (*1*) by a machine specially constructed for the purpose; (*2*) by printing the Eastman Kodak edge number (which is already on the sound-track) upon the action film corresponding to the

sound-track. The latter method is used at this studio, and is regarded as the more desirable. The difference in the cost involved is negligible, yet the results attained by printing the edge numbers upon the positive are by far better, because of the permanency of the numbers.

With the dailies synchronized and properly numbered, they are then shown to the director or other executives interested in the production. When there are more than two takes to a particular scene, the director, as a rule, selects the one he prefers. It is then set aside for use in the picture, and the other takes are filed.

The efficient editor, as a rule, begins to edit his picture upon the completion of a sequence. All the film of the sequence is assembled in continuity order. This gives the editor an opportunity to familiarize himself thoroughly with the film, and enables him to visualize the cutting possibilities of the sequence. The editor's objective, then, is to cut the sequence to the best advantage, utilizing such angles as he feels will present the sequence in the most effective manner upon the screen.

This procedure is continued as the director shoots the picture, so that within a few days after the shooting has been completed, the film is practically ready to be shown to him in what is termed "first or rough cut." Most directors are thoroughly familiar with cutting, and at times are of great help to both the picture and the editor. The director, having made the picture, naturally may have his own ideas with regard to the choice of angles for presenting the scenes. In shooting the sequence, he may have been striving for certain dramatic or comic values in the situation, and quite often the editor may have cut the sequence from a different point of view. This, naturally, brings about discussion and, with an intelligent editor, the director may sometimes find that the editor has already got the most out of the situation with the film in hand. Best results are generally attained when both the director and the editor work in close harmony and are open-minded to suggestions.

The picture in first cut naturally runs considerably longer than the general releasing length, and before final eliminations are made the picture must be previewed; in other words, presented to the public for the public's reaction. All further cuts or eliminations are determined by the effect of the picture upon the audience. Quite often certain situations that look very appealing during the process of cutting fail to impress the audience, and, conversely, situations that apparently do not seem to carry much weight in the studio projection rooms

sometimes evoke strong reactions from the audience. Thus, through the medium of the preview, the director and everyone else concerned are enabled to judge the actual screen values of all the situations and business in the picture, and to decide which of them are not essential or effective.

Before the preview is held, however, there is considerable mechanical work through which the picture must go. First is the work of embellishing and refining the various cuts in the picture. Then there is the matter of adding sound effects and music, and also of injecting certain photographic effects in the form of lap dissolves and other tricks to which the picture may lend itself. Today, with the perfection of optical printing, these effects which previously were produced upon the sets by the directors and which proved very costly because of the time involved, are made on optical printers after the picture has been completed. The preparation of sound effects and incidental and other music and the dubbing of all the sound-tracks into a single track for the purpose of a preview and later for release, will be discussed later this evening by Mr. Edwin Wetzel.

With the introduction of sound into pictures, the latitude of the editorial department has been lessened to the extent that where originally the possibilities of realigning and recutting silent pictures were unlimited, today we are confined more or less within the limits of dialog. For that reason, preparation for the production of pictures today is as vital as the actual shooting. Today, a script, before it is put into production, should be practically letter-perfect. While it is true that the average editor who knows his business thoroughly can, as a rule, overcome certain deficiencies in dialog or action, or both, by manipulating the film and sound-tracks, there are times when even the ingenuity of the editor is of no avail; with the result that retaking the scene may be necessary, which, of course, means additional expense.

The question of preparation applies also to timing the scenes on the sets. In the silent days, a director had to watch the positions of his actors when changing from one angle to another. He had to make certain that he picked up his actors in the same positions when changing the camera angle. Today, he must watch not only positions of the actors but also note the words spoken when the actor is in a certain position. Perhaps the greatest amount of grief that confronts the editor of today results from the apparent carelessness of some directors who overlook this vital point. To illustrate more

clearly: Assume that the director is shooting a scene in which an actor is seated at a desk. The actor rises and walks across the room, during which bit of action the actor speaks certain lines, both when arising from the desk and when walking across the room. Now assume that the scene was a long shot, and that the director now wishes to shoot the same scene from a closer angle. Quite often we find that when the closer shot was made, the actor did not speak the lines corresponding to the action in the long shot. We may find that in the long shot certain words were spoken while the actor was rising from the deck; whereas in the closer angle the same words were spoken while he was walking across the room—with the result that the editor is compelled to choose the scene in the angle that will not show a break in the action or the dialog, even though there may be a decided advantage in going to the other angle.

Another point is the question of timing the dialog. Sound pictures call for more close-up action than the silent pictures. In order that the audience may be impressed by the delivery of lines, close action is very necessary and at times the director when shooting his close-up scenes may change his camera angle, showing the reaction of one of the actors to the words of another. The dialog may be very rapid, and the practice, as a rule, is to place the camera against the character speaking the lines while the other character answers the lines off-scene. When intercutting the two characters, and in order to register certain facial expressions (unless the director has emphasized these reactions and had the other characters off-scene pause sufficiently to allow for them), the editor is at a decided disadvantage, because all that he can do in most instances is to cut from one angle to the other while the dialog is going on continuously. The editor's only alternative, as a rule, is to break the dialog by interspersing it with silent track to allow for the pause. Sometimes that can be done, but in most cases it is almost impossible, and it is needless to say that timing the dialog should not be dependent upon the editor but should be done on the set.

The practical director today is one who appreciates thoroughly the limitations of cutting. Directors, however, differ considerably in their method of shooting. Some directors safeguard themselves by overshooting their pictures; that is, they shoot scenes from many different angles, for protection. Other directors, being more familiar with cutting pictures, cut most of their scenes in the camera. Both methods have their advantages and disadvantages. From the

producer's standpoint, overshooting pictures is very expensive; and from the editor's standpoint, undershooting pictures causes untold grief.

Many obstacles arise as a result of the director's trying to cut the picture in the camera. In the effort to economize, the editor at times finds himself in the position of being limited in cutting the picture to the manner in which the scenes were shot by the director; and unless the director is perfect in his timing, we find when trying to connect certain scenes, that either the sound or the action does not match. It is always a very good expedient for an economical director, when attempting to cut his scenes, to overlap at least part of the dialog and action when progressing his scenes through various angles, and particularly to see that the dialog is timed perfectly with the action in each angle that he shoots.

It is also a very good expedient for the director—from the editor's viewpoint—to shoot long scenes from at least two or three angles. This permits the elimination of dialog, if necessary. More than often we find that a lengthy scene that reads well on paper does not hold when recorded and shown on the screen, and unless the editor is protected by having a variety of angles, he has no alternative other than to let the scene run, as there is no means of cutting such a scene. Where there is a doubt in the mind of the director as to the merits of a lengthy dialog scene, he should by all means protect himself by shooting the scene from various angles.

Some minor difficulties arise from time to time. One is the practice of directors at the end of a scene of yelling into a camera and not allowing the film to run a few additional feet. Sometimes the extra footage is very valuable when trying to carry out lap dissolves or fades. Some directors, likewise, have the habit, while a scene is going on, of cueing the actors during the pauses of dialog, with the result that sometimes the director's voice can be heard at the beginning of a line of dialog.

These difficulties, as explained, emphasize all the more the importance of *preparation* in the production of pictures today. Preparation is the keynote to a successful picture.

The mechanical features involved in editing pictures are more or less simple. They embody the use of the synchronizing machine, the moviola, the splicing machine, and the rewinder. These devices are very simple in operation, and require only a slight amount of experience to attain more or less perfection in handling them.

We have explained previously the synchronization of film when received from the laboratory, but, in addition to that each cutter is supplied with a synchronizing machine, the purpose of which is to enable him to keep his film in synchronism as he handles it. The synchronizing machine can best be described as a shaft carrying anywhere from two to four sets of sprockets. The editor, while handling his film, places both the sound-track and the action films over the sprockets, which keep the film in sychronism at all times as he passes the film from one reel to another during the editing. Should the film by any chance slip over the sprockets, the editor has the numbers on the edge of the film to guide him. This avoids the necessity of going back to the original start mark in order to check the sound-track with the action.

Experienced editors, however, do not use the synchronizing machine much during the editing, but instead use the moviola. The practice is to place the sound-track film beneath the action film, both passing over the same sprocket wheel. Inasmuch as the sound-track film is clear, the light passes through it, and the editor is able to handle both sound-track and action films. He can also notice the modulations on the sound-track, and the average editor after a little practice becomes so adept and "film-wise" with regard to modulation of sound-track, that he can almost be certain, by noting the modulation as against the action, whether the picture is in synchronism or not.

Some editors, however, might find it necessary, when three or more cameras are involved in shooting a scene and where there is only one sound-track for the three or four scenes, to use a synchronizing machine that carries four sets of sprockets. The expert editor will cut the action without the use of these "syncing" machines and will match the film by action rather than by sound.

As the editor proceeds with his cuts the successive lengths of film are temporarily fastened together by clips, after which the whole roll is patched on a modern splicing machine. This machine enables the assistant to make a thin patch that is generally more or less permanent. All assistant cutters are familiar with the use of these splicing machines, and particular stress is laid upon the fact that the loss of frames must be minimized. Every time a piece of action is cut, there is a loss of one frame of film to allow for the patch. A careless assistant cutter will lose three or four frames, and for each frame that we lose we must insert spacers to keep the sound-track in synchronism with the action. The reason for trying to save the

frames is not so much with regard to the ultimate release of the picture as for keeping the film in as good condition as possible for previewing. Scenes that contain an over-abundance of black spacers require reprints so that the picture may be presented to the public in as clean a condition as possible. Reprints, however, involve expense, and whereas a single-frame spacer will pass through unnoticeably, spacers of greater length will be very noticeable and generally will require reprinting.

Two types of patches are used: one covering the full sprocket and the other covering the half sprocket. At this studio, we use the half-sprocket patch, and find it very satisfactory. It seems to pass through the projection machines more easily and has a long life. A full-sprocket patch is inclined to tear apart. The question of rewinding is very simple. Particular attention is called to the practice of tightening the film while rewinding, which causes scratches. This fault is avoided wherever possible.

The satisfactory assistant cutter is one who exercises speed, care, and system in handling his film. System in a cutting room naturally results in cleanliness. Film at all times should be kept filed in cans and in fire-proof cabinets. Fire is a great hazard wherever film is handled, and it is important that the amount of film on hand be kept at a minimum. We can not emphasize this point too strongly. The efficient editor, with the aid of an able assistant, seldom has much film in the open at any one time.

The following mechanical devices comprise the essential fittings of a cutting room: metal rewinding tables (each with one set of rewinders and racks for filing small rolls of film; with either artificial or natural light in the background, facing the rack); steel cabinets for filing excess film; combination sound and silent moviolas; film bins; clips for fastening film together, preliminary to splicing; and the necessary reels required in handling the film. Give an efficient editor this equipment—and one pair of scissors—and no picture is too great a task for him.

The writer has found it of great advantage to surround himself with men who have had a number of years of experience back of them. He finds that the longer the experience the greater their ability. An editor, handling one picture after another, continually encounters situations that perhaps have never confronted him before. Through his experience he becomes thoroughly familiar with dramatic, comic, and fast tempo situations. He becomes very confident in handling

the cutting of these situations and at times is able to create situations in a picture that, from first appearances, the film would not permit. Summing up, a thorough knowledge of film editing is perhaps the best requisite for success in almost any branch of the production end of this business, and particularly where direction is concerned. Directors who have risen from the ranks of editors are among the ace directors of the business, having found that their knowledge of editing is of untold value to them in their work.

MR. TASKER: When the film editor has finally finished his work, the next step is to prepare a musical accompaniment for the picture. This is the work of Mr. Charles Previn, who will discuss the problem of "Setting Music to Pictures."

SETTING MUSIC TO PICTURES

CHARLES PREVIN*

The scope of the subject of setting music to motion pictures is so broad that I hardly know where to begin. However, the picture is turned over to the music department, and we are told, "Well, here is a picture. Can you have the music all ready for it by tomorrow?"

We then go over it with the director—if he is available, or the assistant director, and others, and ask them to give us their ideas as to where music would help the scenes in the picture. Then I get an assistant cutter to time the sequences, which he does by running the film through a footage counter to measure the length of each scene to which we are required to put music. Then the length in feet is converted into seconds of time, so, as an example, we find that we have two minutes and thirty seconds in a given sequence to set to music. We get a complete idea of the picture, what it is all about—the scenes, the dialog in different spots; and in writing the music try to catch the mood of the dialog and of the scene and plot.

Sometimes the director himself does not know exactly what is required. For example, I might be told that a certain scene was intended to be dramatic, and that I should build up the situation with dramatic music. Later, hearing the dramatic music I had put into the scene, he might say that it was too "heavy," that I had taken the scene too seriously; it was not what he wanted, but rather something

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