drive netted a huge black bear with two cubs clinging tightly to their mother's back. The huge bear came out of the jungle so close to my camera elephant that he became startled and reared back on his hind legs, and in turn gave me quite a scare not knowing whether he would crash back on me and the equipment. The elephant finally settled down and surprisingly enough we had some very good pictures with sound of the elephants trumpeting wildly and loudly. The Mahareni's guests made no attempt to shoot the bear because it is not considered sportsmanlike to shoot a mother bear with cubs.

In our next beat-in, we rounded up a leopard, and the following day we rounded up a large tiger weighing nearly 400 lb. This is really a sport of kings as one has to be an invited guest to take part in a hunt of this nature.

In April 1930 we returned to Calcutta. The city was in an uproar. The Ghandi riots had started; so instead of returning to New York we shot a lot of material in Calcutta, and then proceeded to Bombay where the fighting was more intense. We made thousands of feet of riot pictures.

NEWSREEL SOUND

WARREN M. McGRATH*

The wedding of sight and sound in motion pictures was pioneered in no small extent by newsreel soundmen and engineers. Since the remarkable sound picture record of Lindbergh's takeoff on the first Trans-Atlantic flight early in 1927, a small group of intrepid field soundmen have brought back a library of sounds and sound effects that should remain a lasting tribute to their skill, ingenuity, and daring. The few field soundmen who remain continue to record sound under acoustic conditions that would be the despair of the average studio mixer.

It was inevitable that newsreel sound should pass through an era of growing pains before settling down to a specific treatment acceptable to all major newsreel producing companies. Since early 1932, the commentary type of newsreel story has increased in popularity until today it is accepted as the most lucid manner in which to present

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current events. This, of course, has resulted in a steady decrease in the amount of natural sound recorded in the field and thus the work of the newsreel synchronizer has become increasingly important. It is through his efforts that commentary mixed with music and sound effects, and an occasional interpolation of natural sound, results in a pleasing composite sound track at a level constant throughout the reel and unvarying from week to week.

The newsreel synchronizer, or recording engineer, handles the final stage through which newsreel make-up proceeds. His work commences when the film has been edited, music carefully selected from a vast library of prerecorded tracks, and sound effects tracks and script all prepared in final form. The tools of his trade are:

(*1*) An acoustically treated narration stage, equipped with a pickup microphone and a motion picture screen visible to the commentator and the mixer;

(*2*) Several film rerecorders, or film phonographs, used for the rerecording of music and sound effects;

(*3*) Several loop machines. These machines are rerecorders so arranged that a continuous loop of sound track can be run through them during the scoring of a picture and thus furnish a constant source of a particular sound, available to the mixer whenever required;

(*4*) Disk recorders and playbacks for the premixing of complicated sound tracks when required;

(*5*) A recording console with its associated amplifiers, mixers, and equalizers;

(*6*) A high-quality monitoring system;

(*7*) A film recorder;

(*8*) An interlock drive system which will furnish the motive power for all rerecorders, loop machines, projection machines, disk machines, and film recorders, and which will keep all of the machines being driven by the system in perfect synchronism.

All of this equipment is maintained at a consistent high efficiency. Routine measurements, gain runs, and film tests are compared with standard equipment data to insure a minimum of breakdowns and a maximum of quality. Spare equipment units and a jack panel provide a flexible means by which the mixer may substitute apparatus, cascade amplifiers, or introduce equalizers for a desired effect.

Newsreel subjects are infinite in their variety. A routine procedure for mixing sound can have no application here. Each subject must be handled with tact and discernment befitting its especial

nature. The editorial department furnishes the mixer with a "spot" sheet on which each scene of the newsreel subject is carefully listed in its proper sequence. The spot sheet also indicates the desired sound that is to be synchronized with the particular scene and the footage. A comparison between the narrator's script and the spot sheet will give a fairly close idea of the treatment the newsreel subject should receive.

Two music tracks are provided for most subjects. The tracks are prints of the same music negative but have "start" marks so placed that one is synchronized to start with the beginning of the picture and the other to finish with the end of the picture. The mixer must use a suitable spot during the recording to change over from the first music track to the second. This is usually done during sound effects, natural sound, or long periods of narration in order to mask the operation. Of course, careful note must be made of the key in which the particular part of the music track is played, as changing from one key to another is instantly apparent. This system of using two identical music tracks eliminates the necessity of having music passages recorded to a precise length.

The newsreel sound crew consisting of two soundmen, a projectionist, and the mixer, work as an efficient unit. Each man has his duties and co-operates with his fellow department members to insure a swift and efficient handling of the newsreel scoring. The mixer depends upon the efforts of the machine room soundmen to thread correctly the music and sound effects tracks in the rerecorders and loop machines, and properly to thread and "sync-mark" the recording film. The recordist, *i. e.*, the soundman in charge of the film recorder, must also keep a careful check on the over-all recording level and the recording lamp current; each man must carefully check the machines assigned to him to insure their smooth operation. The projectionist's duties are too well known to enumerate here.

One and sometimes two rehearsals are required before the timing and co-ordinating of all sound is mastered. During these rehearsals, the mixer must find time to check the tonal quality of the narrator's voice, his volume level, and the general level and synchronization of the sound effects that are to be used. Important, too, is the spotting of the story wherein the commentator and mixer carefully check the script for timing. Each line of copy must be spoken at precisely the spot for which it is intended and there must be a smooth transition from narration to field recorded dialogue when required.

Rehearsals completed, we are now ready for a take. A swift résumé of the sound to be used on the subject might indicate that two channels are required for music tracks, one for synchronized sound effects, one for the continuous running loop machine, one for the pick-up of field recorded sound from the picture film, and a narration channel. Six channels which the mixer must manipulate in an average time of less than two minutes and with only two hands.

All recording for our national newsreel is done by the double-system method wherein the sound is recorded on a separate piece of film than that used for the picture. For this type of recording, and as we use a variable-density type of recording, Eastman Type *1373* Fine-Grain Recording Positive is used. Excellent quality is obtained when developed to a density of 0.55 and a gamma of 0.55. After much experimentation we have determined that little is to be gained by the use of noise reduction when using this type of film. Although the film is used solely for the sound track, it has been found advantageous to print a picture image on it before developing in order to facilitate the work of the editorial department and to aid the final check on the sound recording work that has been done. The lavender picture used by the mixer and narrator in scoring is used for this purpose, and lining up the start mark on this with a corresponding one on the sound track enables the laboratory to print a backward, negative, "in-sync" image beside the sound track. At least once during the scoring session the mixer must check with the laboratory to assure himself that the sound track is properly exposed for density and gamma heretofore mentioned. For this purpose a small strip of unmodulated sound track is sent to the laboratory well in advance of the start of the evening's recordings. The report returned by the laboratory enables the mixer to correct the recording lamp current accordingly.

From the foregoing it can be seen that the recording engineer's responsibilities are many and varied. Equally important, however, is that sixth sense which for want of a better definition, can be called a sense of timing. Newsreel subjects being essentially fast-moving and of short duration, it is often necessary to bring in sound effects precisely on a frame. Then again, the time in which all recording must be completed is very limited. Although some lengthy subjects have taken as long as one hour to score, the average time taken by the recording room, from the start of rehearsals to the completed take, is less than 15 min.

It is not possible to discuss the many electronic and mechanical devices by which the recording room accomplishes the varied sound recordings which it is called upon to produce in the course of a single newsreel. Like any sound department, improvements are always under way at Movietone News. To Earl Sponable and William Jordan go unstinted praise in their constant pioneering in the electronic field. The installation of sound recording equipment at this studio remains as a tribute to their skill and forethought.