THE RELATION OF MUSIC TO ANIMATION

Define metronome -- a machine invented by a German in 1815 for measuring the time or duration of notes by means of a graduated scale and pendulum, which may be shortened or lengthened at pleasure. It is a pendulum with a movable counterweight which can be set at any designated figure, and which will then swing to and fro that number of times per minute, an audible click accompanying each oscillation.

There is a definite relationship existing between what we call beats and animation of a sequence, and the numbers on a metronome; for example, in animation of what we call 2/12's, the metronome is set at 120, and beats twice a second. In animation of 2/10's, the metronome is set at 144, and each beat of the metronome at that speed indicates the passage of ten frames through the projection unit. This principle is involved with all of our beats. As you know, our pictures, unless denoted as free beat, are animated upon the basis of the following beats: 24, 20, 18, 16, 14, 12, 10, 9, 8, and 7. In connection with the discussion of the metronome, it might be wise to refresh our memories as to the speed of film, or, more precisely, the speed of frames of film, because in cartoon production, we are concerned definitely with each frame of film.

As to the speed of film, the following should be kept in mind: there are 16 frames to a foot, and 24 frames to a second. The Music Department is definitely concerned with the speed at which said frames go through the projection unit, because that speed is tied up with the speed of music, or certain accents or moods of music, which must coincide with the action on the screen. Now, with the metronome on the table, we will illustrate the speed of various beats.

The next subject for discussion is notation of music in the common sense of the word. In order to make it clear to those of us who have the knowledge of music, we are going to illustrate in a very simple manner said notation.

On this blackboard we have three staves of five lines each. As you know, the five lines of each staff represent the basis on which music is written.

For our purpose, we will start with what is known as a whole note. (Demonstrate). Next, the half note; quarter note; eighth note; sixteenth note; thirty-second note; sixty-fourth note; and now the dotted whole note, the dotted half note; dotted quarter note, etc.

And now for the moment let us discuss clef signs, the word "clef" meaning key. These signs have no direct connection with any of the problems existing between the animation and music, but we might take a moment or so to demonstrate the two clefs which from time to time you might see in the music room during a discussion of some musical sections. The two clefs are as follows: (Demonstrate G Clef, or soprano.) (Demonstrate F Clef, or bass.)

And now let us discuss the word metre. The word "metre" means "measure". From a literary standpoint we might say that metre is an arrangement of poetical feet, or of long and short syllables in verse. As to music, we might say that it is the succession of accents in music. The metre is the rhythm of the phrase, not of the measure. A phrase, by the way, musically speaking, is similar to a phrase in ordinary conversation. In music, for the sake of tempo and rhythm, we divide said phrases into bars, or more properly, measures.

Now to discuss the word measure. A measure is that division of time by which the air and movement of music are regulated; the space between two bar lines on the staff. (Demonstrate.) The measure is often called a bar, but the terms should not be confused. We use the word tempo, or time. Let us discuss the word time in its relation to music. Time is the measure of sounds in regard to their continuance or duration. The speed of the rhythm. The rapidity with which the natural accents follow each other. This is the correct meaning of time. Nevertheless an almost universal custom prevails of using the word "time" to express the <u>division</u> of the measure, as well as the speed. Such division should probably be called either rhythm or measure. There could be no possibility of being misunderstood if a composition marked "C" (Demonstrate "C" for Common Time) were described as being in 4/4 rhythm, or in 4/4 measure, instead of common time.

Usually, in our work, we are concerned with two division of this so-called time or metre, that is to say, common and triple. The following is a table of principle rhythms or indications of this so-called time, such as 4/4 or 3/4. (Describe 2/2, with two half notes within a bar. Describe 2/4, with two quarter notes within a bar; 4/2, etc; 4/4, etc.; 6/4, 6/8, 3/2, 3/4, 3/8, 9/8, 5/4, 5/8).

Now let us discuss the meaning of the word rhythm. For our purposes, rhythm means the division of musical ideas or sentences into regular metrical portions; musical accents and cadences applied to melody. Rhythm represents the regular pulsation of music. The word <u>time</u> is constantly applied where <u>rhythm</u> is meant. Thus we have common time, 2/4 time, etc., which have nothing to do with the <u>tempo</u> of the music.

And now let us discuss the relation of frames with notes of music. In animation, using a 12 beat, and the bars or measures containing 2/12 beats each, let us see how this applies to musical composition. For example, within a bar or measure of 2/12's, that is to say, 24 frames, we will now assume there are 4 beats or counts in the musical rhythm for said bar. From a musical standpoint, a whole note will be equivalent to 4 beats, or the value of this entire measure, in which case the whole note will be of the same value in connection with speed, as the 24 frames of picture film within said measure. Naturally, there must be a variety of division within each bar or measure of music. Whole notes, four beats -- half notes, two beats; quarter notes; 1 beat. Beyond this there are further divisions which we will now demonstrate. (Demonstrate whole note, half note, etc., and also the method of dotting certain notes, thus increasing their value half that of the value of the note which is dotted).

Now let us discuss the word "accent" as it so often applies to music written for a definite accent, or as we say, a "take", in the animation of a certain scene or sequence. The "accent", as applied to music, means a stress or emphasis upon a certain note or passage to mark its position in the measure, or its relative importance in regard to the composition. Accent is the force given to certain notes or chords greater than that upon the surrounding notes or chords. It can be either natural or artificial. The natural accent is indicated only by the rhythm-mark, since the succession of natural accents constitutes the rhythm. Yet not all of the natural accents are alike in stress. The primary accent, which falls upon the first beat of a measure; the secondary accent on a weaker note of the rhythm, etc. (Demonstrate in 2/12's, 4/4 metre, various places where accents might be used normally for their musical value, then demonstrate where oftentimes accents must be written to conform to certain bits of business in the animation.)

And now we come to a discussion of what is probably the most important problem that exists between the Music Department and the Animation Department. We will say that the animation is in 2/12's, and your exposure sheet is so worked out and divided that measures or bars of the scene which you are animating contain 2/12's, or 24 frames or drawings within each measure.

Generally speaking, it is important for us to keep in mind the normal division of said 24 frames, or drawings, within each measure. Let us imagine (demonstrate) the following four measures of one of our exposure sheets. We are using a 12 beat. We will say that these are measures 1, 2, 3, and 4. We know that within each measure there are 24 frames, unless, as we will discuss later, one of the measures happens to be in 3/12's, which as you know is often the case.

All right, now to discuss these four measures. In Number 1, let us divide the frames as follows, in direct connection with what we might say would be musical notation. 24 frames, in this case, would be equivalent to a whole note (demonstrate). Now in the second bar, we will divide said 24 frames into two equal parts (demonstrate), with two half notes. We can see that during the playing of these half notes, which equally divide the measure musically, there are 24 frames. Therefore it is obvious that the first 12 frames will run through the projection unit at precisely the same speed or duration of time required for the playing of the first half note, and that the second 12 frames, in like manner, connect with the playing of the second half note. This same principle is involved with further division, for example, (demonstrate). We will now divide the third measure into four equal parts. Each part now will be equivalent to 6 frames, or four times six, equaling 24 frames. Now we see that what is known musically as a quarter note is equal to six frames, and in this bar or measure each quarter note, there being four of them now, will have the same duration musically as the speed at which six frames run through the projector unit.

Now to go on with the division further. The note of half the value of a quarter note is what we call an eighth note. If, with the 12 beat, there being 2/12's within each measure, the quarter note has a value of six frames, we can see that the eighth note, half its value, would have half the value of six frames, or three frames. And now we will show, in the fourth measure (demonstrate), the division of eighth notes and their relation to frames within said measure. It should now be obvious why, within reason, it would be a great help to the Music Department to have definite accents on certain frames within a measure of animation that can easily be taken care of musically according to this simple law of dividing notes into various values, from the whole note on down to the eighth or sixteenth, or beyond that, which seldom occurs in relation to said accounts.

And now let us discuss what is a very simple fundamental principle of music writing -- the 4-measure phrase. The smallest complete melodic sentence, called the phrase, generally embraces four ordinary measures (demonstrate on blackboard with the melody of the first four measures of "Way Down Upon the Swanee River").

We can see now, by the notation of "Way Down Upon the Swanee River", that within four measures a complete sentence or musical phrase has been enunciated. Therefore, there is a close relationship existing between simple music or simple melodies, and the construction of poetry. This would come under the heading of simple rhythmic music, such as, "The World Owes Me A Livin'," which has become a

sort of theme song for our character, the Goof; or some simple melody which might be sung by any character on the screen.

However, the greater portion of musical background for our pictures is that of music which must be written in such a manner as to fit the mood of a sequence and to coincide precisely with certain extremes of action or accents of the business.

This should make us realize how important it is, always assuming the animation of greatest importance is a case where music furnishes said moods or background, and to have certain "takes" or accents on frame or frames within the equal divisions of a measure, as we have just discussed.

I would like now to use as an example a problem that came up in a certain scene of "Little Hiawatha". It has to do with the definite action of Hiawatha pulling up his pants, or when his pants would slip down. This was sort of a running gag throughout the picture, and I felt it an important one to catch musically. Generally speaking, this business was so animated as to make it easy to catch, or write to, but unfortunately there was one instance where it was very difficult to catch, because the extremes of the action of pulling up the pants did not start on, or end on, a frame within the equal division of a measure, as we have already discussed (demonstrate).

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