Percussionist

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WINTER, 1979

PERCUSSIVE ARTS SOCIETY
(PAS)

PURPOSES OF THE PERCUSSIVE ARTS SOCIETY -- To elevate the level of percussion performance and teaching; to expand understanding of the needs and responsibilities of the percussion student, teacher, and performer; and to promote a greater communication among all areas of the percussion arts.

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In this issue

LOU HARRISON'S FUGUE FOR PERCUSSION

by Stuart Smith

Lou Harrison (b. Portland, Oregon, May 14, 1917) studied composition and musical analysis with Henry Cowell and Arnold Schoenberg. He was an early associate and collaborator with John Cage in the development of percussion ensemble music. Harrison and Cage presented percussion concerts in San Francisco as early as 1939. They collaborated in the composing of *Double Music*, for percussion quartet (1941). Cage composed parts one and three; Harrison composed parts two and four. Harrison continues to be a very active and prolific composer-performer. His recent work is characterized by the use of intonational systems other than equal temperment, an integration of Western and non-Western musical styles, and the invention of new musical instruments.

One of the most important and potentially influential achievements in the period of early percussion music is Lou Harrison's *Fugue* for four percussionists (1941).

> At the time of composing the *Fugue* I was working as a florist and decorator at the Palace Hotel in San Francisco. I had for several years been concentrating on composition for percussion ensembles . . . and had, of course, become fascinated with advanced rhythmic problems. In my notebook of the period I notice the remark 'cross-rhythms -- the chromatic behavior of rhythm: constant-base -- the diatonic behavior of rhythm . . .' I had got the idea of the identity of cross rhythms with the overtone series from Henry Cowell's book *New Musical Resources* years before and the idea of making a fugue for percussion which really employed some of the 'tonal' relations in rhythmic form intrigued me.[1]

To further illustrate his early interest in advanced rhythmic problems, Harrison told me in a phone interview how he used to learn polyrhythms. He would make small notches in a 78 r.p.m. record that corresponded to the rhythm he wanted to learn. For instance, if he wanted to hear and learn four against five, he would make four equidistant notches on the record, and then five equidistant notches on the same record. The resulting sound of the scratches or notches would be four against five.

Fugue for percussion is one of the few compositions to employ some of Henry Cowell's concepts of rhythmic organization. It is necessary, therefore, to review the basic ideas and history of Cowell's book *New Musical Resources*.

Cowell finished *New Musical Resources* in 1919. He wrote it with the guidance of Charles Seeger in music and Samuel Seward in English. The book remained in manuscript form until 1929 at which time it was published by Alfred A. Knopf. "Cowell once said, that Seeger had

taught him two things: the necessity to systematize his use of musical resources, and the necessity for the innovator to create a repertoire using his innovations."[2]

The main focus of the book is Cowell's concept of creating a wholistic musical system based on the overtone series. He saw pitch and rhythm simply as different manifestations of one set of mathematical principles. (If one slows a pitch down, it becomes a rhythm, and conversely, if one speeds up a rhythm, it becomes a pitch.)

> . . . a parallel can be drawn between the ratio of rhythmical beats and the ratio of musical tones by virtue of the common mathematical basis of both musical time and musical tone.[3]

Cowell further states:

> . . . we find that the familiar interval of a fifth represents a vibration ratio of 2:3. Translating this into time, we might have a measure of 3 equal notes set over another two. Corresponding to the tone interval of a major third would be a time ratio of five against four notes; the minor third would be represented by a ratio of six against five notes, and so on. If we were to combine melodies in two (or four) beats, three beats, and five beats to the measure, we should then have three parallel time-systems corresponding to the vibration speeds of a simple consonant harmony.[4]

Cowell goes on to relate dynamics, form, tempo, and metre to the overtone series. His concept of how pitch and metre could be related profides a good example of his thinking in this regard.

> Just as in the matter of tone we start with a simple fundamental tone like the C of sixteen vibrations to the second, so we base our metrical system on a simple base. A measure of 2/4 metre, if completed in exactly one second (which would be the case if the metronome were set at 120), bears a direct relationship to the tone C of sixteen vibrations, since if this tone were carried down three octaves, the result would be a vibration, or rhythm, of two impulses to the second.[5]

With this in mind, he made "a table in which metrical units related to the given fundamental base correspond to tone values related to a given fundamental tone, as the metrical accents will form similar ratios between one another."[6]

COWELL'S TABLE

Serial Number		Tone	Intervals
6	G	minor third	12/4 (6/4, 3/4, 6/8)
5	E	major third	10/4 (10/8, 5/4)
4	C	fourth	8/4 (4/4, 2/4)
3	G	fifth	6/4 (6/8, 3/4)
2	C	octave	4/4 (4/8, 2/2)
1	C	fundamental	2/4

In a similar manner, Cowell constructed rhythmic scales, tempo scales, dynamic scales, etc., all based on the overtone series. Ironically he wrote only two compositions employing his new musical resources, the *Romantic* quartet and the *Euphometric* quartet.

Cowell made an important contribution to music with his discussion of the potential benefits of re-thinking the nature of sound and the mathematical links that exist between the various traditional parameters of music. The next logical step beyond Cowell's thesis is to view music as consisting of just two parameters, namely, rhythm and intensity. Pitches are vibration speeds measured in seconds. The term pitch, then, connotes a fast range of vibrational speeds (18 c.p.s. to c. 22,000 c.p.s.) or micro-rhythms. A 440 means 440 cycles per second. It is therefore a rhythm. 18 c.p.s. is the slowest pitch. Differences in timbre are determined by the vibrational differences and differences in intensity between the fundamental and the overtones. Thus timbre is micro-harmonic rhythm. Intensity is the amount of energy in a sound. The larger the vibrations the louder the sound. So essentially the terms pitch and timbre refer to micro-rhythms.[7] Therefore, it makes perfect sense to create a wholistic system based on one set of procedures according to the nature of the elements involved, since in reality what we traditionally consider four separate musical parameters (pitch, timbre, rhythm, and intensity) are in fact just two inseparable elements. This wholistic concept conforms, then, to the very nature of sound itself.

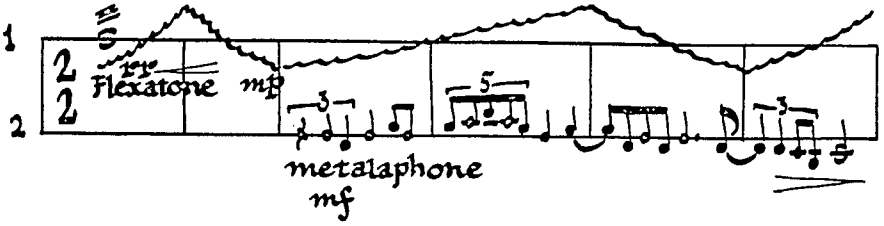
With Cowell's rhythmic-pitch concept in mind, Harrison decided to compose a fugue for non-pitched percussion instruments which would follow the traditional tonal scheme of a fugue. He wanted to 'transpose' the tonal scheme of a fugue to the realm of rhythm.

Before analyzing Harrison's *Fugue*, it may be helpful to some readers to review the basic procedure employed in the tonal fugue. A tonal fugue begins with a subject, which is the basic thematic material of the entire composition. The presentation of the subject is followed by an answer in another voice. The answer is the subject transposed up a fifth or down a fourth. The voice that originally presented the subject provides an accompany counter-subject to the answer. The subject is presented again, in still another voice, this time transposed up or down an octave. And it is accompanied by the previous voices that have already entered with a presentation of the subject. This process of introducing the subject in various transpositions continues until all the voices have presented the fugue subject. This section is the exposition. The exposition is then followed by a section which alternates between presentations of expositional material and episodes.

Harrison's *Fugue* begins with a two-measure flexatone solo. This sustained flexatone part continues until the fourth re-entry of the subject. Mr. Harrison told me that this flexatone part represented a pedal tone of a tonal fugue.

After two measures of solo flexatone, the metalaphone performer (usually seven iron pipes) presents the subject.

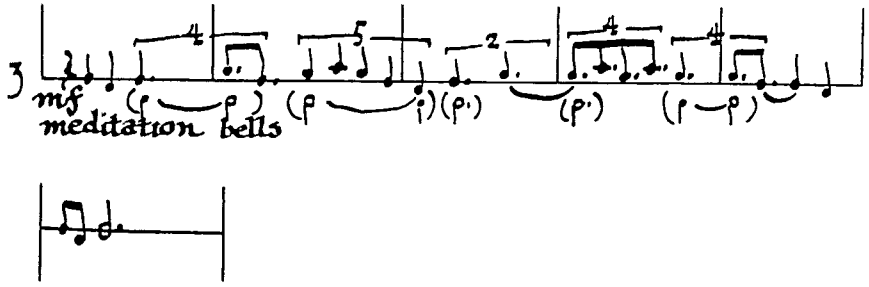
Subject:



The duration of the four-measure subject is then 'transposed' (augmented) to 1-1/2 times the original length, representing the interval of a fifth (2:3) of a tonal fugue. The four-measure subject is thus lengthened to a six-measure answer.

6/4 -- 3/2 (ratio of a fifth)

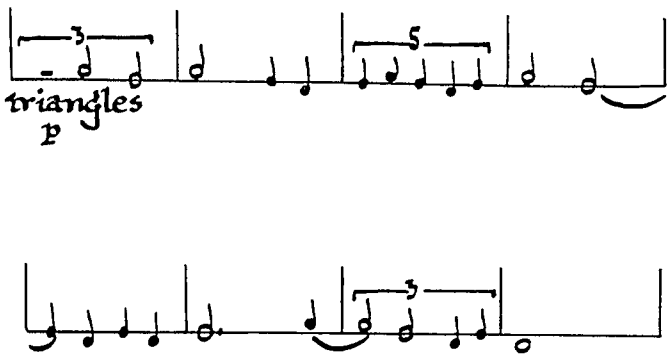
Answer:



The answer is followed by the subject, 'transposed' (augmented) to 2 times the original length, representing the interval of an octave (1:2) of a tonal fugue. The four-measure subject has been lengthened this time to eight measures.

8/4 -- 2/1 (the ratio of an octave)

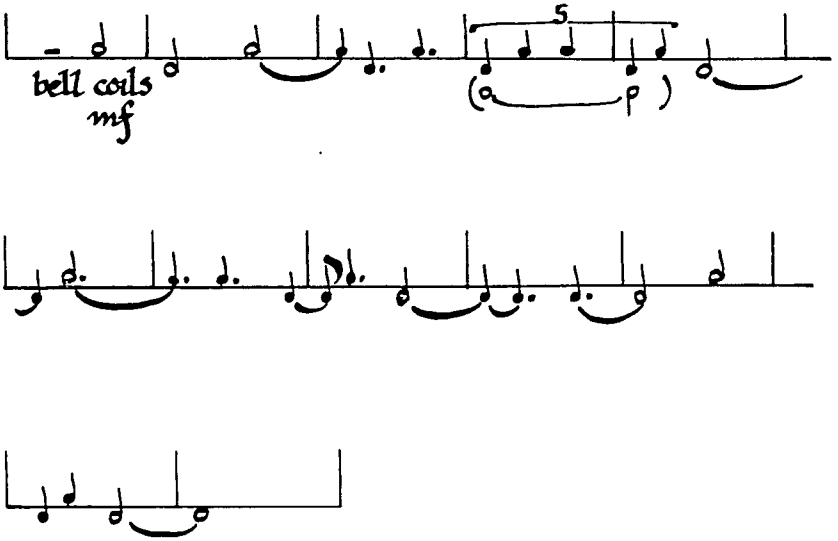
Second entry of the subject:



This presentation of the subject is in turn answered by the subject 'transposed' (augmented) to 3 times the original length, representing the interval of a twelfth (1:3) of a tonal fugue. The four-measure subject has been lengthened to twelve measures.

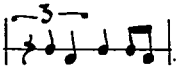
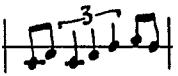
12/4 -- 3/1 (the ratio of a twelfth)

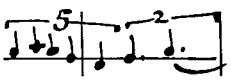
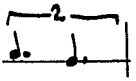
Second entry of the answer:

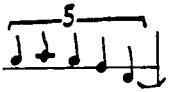


Each appearance of the subject in each of its temporal 'transpositions' is accompanied by a countersubject. The countersubjects are all derived from some portion of the subject.

Examples:

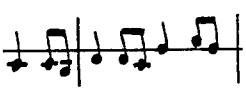
This cell of the subject in the first countersubject.  becomes 

This cell of the answer  becomes 

 in the second countersubject.

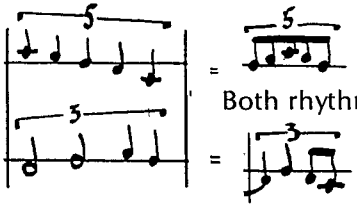
Harrison also utilizes the technique of sequence throughout the composition.

Example:



measure 19-20, metalaphone

There is one codetta in the exposition - measure 21. It consists of



Both rhythms are derived from the subject.

The exposition ends at measure 34.

Diagram of the Exposition

	Section	Instrument	Augmentation	Ratio
measures 1 - 2	introduction	flexatone		
measures 3 - 6	subject	metalaphone		
measures 7 - 12	answer	meditation bells	1-1/2	(2:3)
measures 13 - 20	subject	triangles	2	(1:2)
measures 22 - 33	answer	bell coils	3	(1:3)

The instrumentation of the exposition is characterized by metalic sounds.

The first episode occurs between measures 34 and 44. The instrumentation has changed to claves, wooden box, brake drums, and bass drums. Harrison used the rhythmic 'transposition' technique here also. (See Illustration I.)

Illustration I

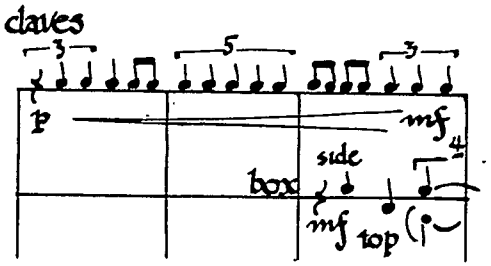
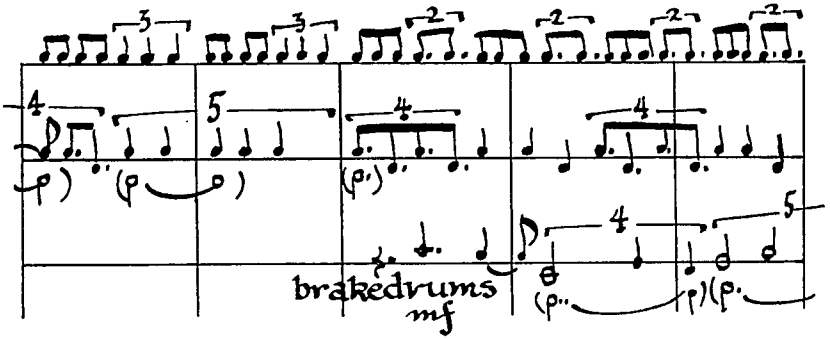
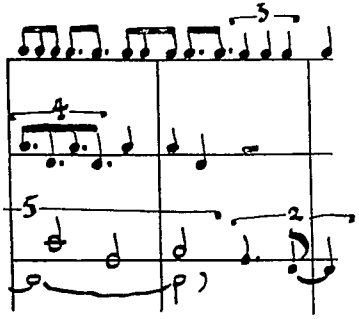


Illustration I, continued



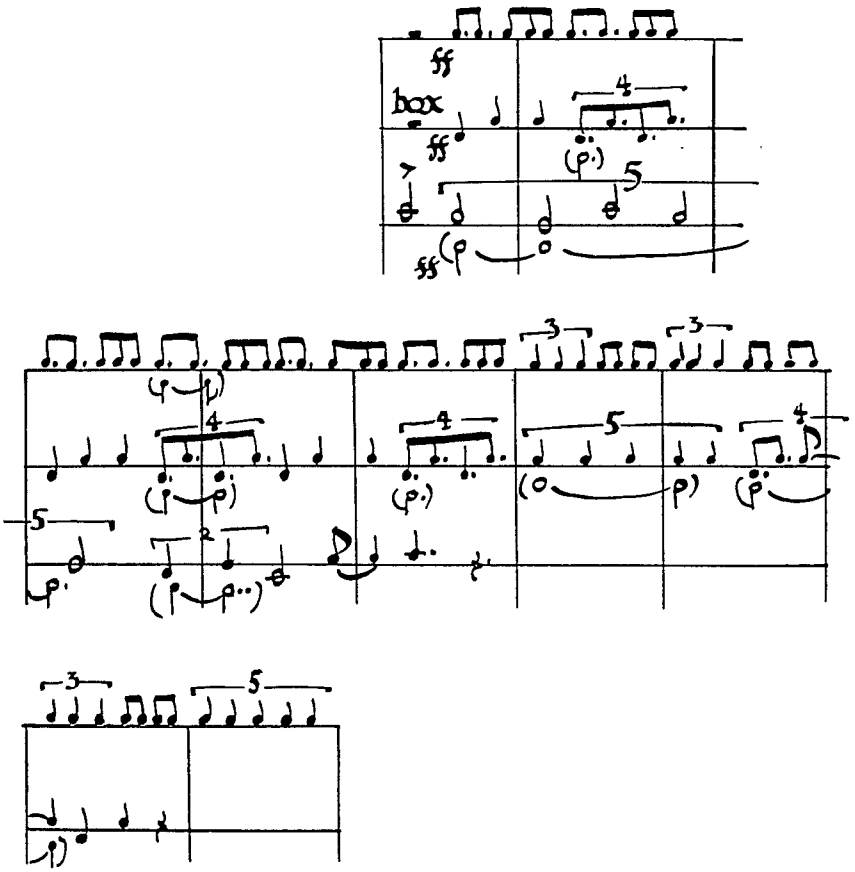


In the above example, the rhythmic figure initiated by the claves player is imitated by the box player and the brakedrum player. The box player's imitation is temporarily augmented 1-1/2 times the original figure. The brakedrum player's imitation is temporarily augmented 2-1/4 times the original figure. This procedure represents the canonic technique of a tonal fugue.

The next section (m 45 - 75) is the exposition repeated almost verbatim. The two changes are one, the flexatone part is replaced by a sustained maraca accompaniment, and two, the instrumentation is now cowbells, brakedrums, gongs, and bass drum.

The second episode (m 76 - 98) has the same instrumentation as the first episode. The first nine measures of this section is the retrograde of the first episodic section. (See Illustration II, and also Illustration I.)

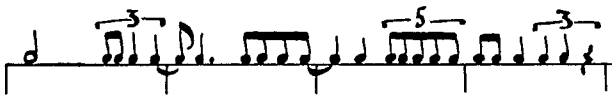
Illustration II



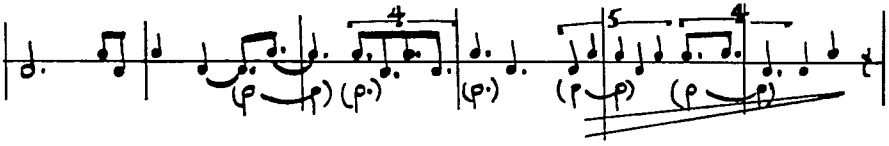
In measures 84-87 of this episode, Harrison introduces and establishes a sustained cymbal roll (to represent a pedal tone) and an ostinato  derived from the first countersubject.

This texture serves as an accompaniment to a claves solo, part of which (m 88 - 92) is the original subject in retrograde. In measure 92, the original answer to the subject is also presented in retrograde in the washtub part until measure 97.

Claves solo (m 88 - 92)



Washtub (m 92 - 97)



After the second episode Harrison presents the entire exposition in retrograde with the original instrumentation (m 99 - 132), thus creating an overall arch form.

Overall Diagram of Fugue

	Section	**Instrumentation**
measures 1 - 33	exposition	metal
measures 34 - 44	first episode	wood, skin, metal
measures 45 - 75	exposition repeated	wood, skin, metal
measures 75 - 98	second episode	wood, skin, metal
measures 99 - 132	exposition in retrograde	metal

Mr. Harrison informed me in a phone interview that John Cage helped him with the math of the composition. "John and I were sitting on San Francisco beach having pie a la mode and coffee and he helped me with the 'Is-tos and As-tos' of the piece."

Some of the issues raised by Harrison's *Fugue* are: Can one transfer the mathematics of the tonal fugue to the realm of a rhythmic fugue and have it be recognizable to the ear as such? Can we develop our ears so that they recognize to what extent a motive has been rhythmically augmented or diminished? By 1/5; 1/7; 1/3?

For centuries we in the West have concentrated on refining our notions of harmony and manipulating twelve pitches. We have developed an elaborate terminology for pitch classification and myriad techniques of tonal analysis. This same terminological sophistication has not been applied to rhythm, however. What terminology that does exist is too primitive or too derivative of pitch nomenclature to accurately describe and codify the reality of rhythm. This very lack of terminology, and thus pedagogy, contributes to our more or less subliminal approach to the study of rhythm. (It is difficult to recognize that which has no name.)

My own experience of repeated listenings to *Fugue* is that one can aurally recognize the retrogrades, the canon, the degrees of rhythmic augmentation, etc. It is just a matter of educating one's ear; a matter of reorientation. An accurate performance, where care is taken to delineate the sections and bring out the subject and its temporal modifications is essential.

I asked Mr. Harrison, "Do you hear your *Fugue* for percussion as a tonal fugue or as a composition that was composed using the procedures of a tonal fugue in a symbolic manner?" He replied, "I hear it as a tonal fugue. For me, it is a fugue."

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2. Henry Cowell, *New Musical Resources*, Something Else Press, New York, 1969.
3. Lou Harrison, *Music Primer*, C. F. Peters Corp., New York, 1971.
4. James Higgs, *Fugue*, H. W. Gray Publications, Melville, New York.
5. Richard Kostelanetz, John Cage, Praeger Publishers, Inc. New York, 1970.

FOOTNOTES

1. Lou Harrison, *Fugue*, album notes, Opus One Records, Greenville, Maine.
2. Joscely Goodwin, Preface to *New Musical Resources*, p. xi.
3. Henry Cowell, *New Musical Resources*, p. 50.
4. *Ibid*, p. 67.
5. Henry Cowell, *New Musical Resources*, p. 67.
6. *Ibid*, p. 68.
7. While pitch and timbre are useful terms to describe fine distinctions between various sounds, their over-use tends to obscure the very nature of sound.

—————————O—————————

THE BEAT

By Professor Richard Hochrainer
Translated by Harrison Powley

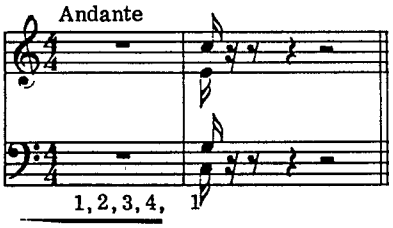
Richard Hochrainer is professor of percussion instruments at the Hochschule fur Musik, Vienna, Austria. He is the author of many articles on percussion and the following texts: *Etuden fur Timpani I, Etuden fur Timpani II, Ubungen fur kleine Trommel, Duette fur Trommler, Cinellen, grobe Trommel und anderes, Trommlerspiele.* In 1970 he retired as principal timpanist of the Vienna Philharmonic and Vienna State Opera Orchestras.

Harrison Powley is an associate professor at Brigham Young University, Provo, Utah. He holds B.M., M.A., and Ph.D. degrees from the Eastman School of Music. In 1965-66 he studied with Prof. Hochrainer in Vienna as a Fulbright scholar.

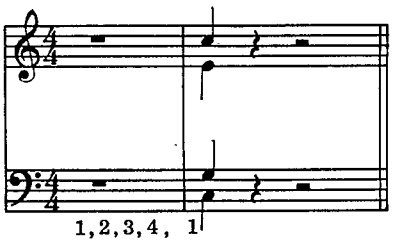
This article first appeared in German in "Das Orchester — Zeitschrift fur deutsche Orchesterkultur und Rundfunk — Chorwesen, Organ der Deutschen Orchestervereinigung" 16 Jg. Heft 9/1968 and has been translated at the request of Prof. Hochrainer. Permission for publication of this English translation has been granted by B. Schott's Sohne.

The translator has tried to obtain an equitable balance between the many subtleties of Prof. Hochrainer's idiomatic Viennese style and idiomatic English.

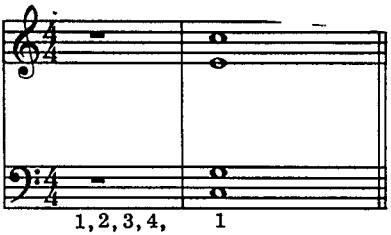
A string player draws his bow over the string, for example, the length of a half note, a wind player must blow just as long. What does the percussionist do? He "strikes just once" and allows his cymbals, drums, triangle, or timpani to ring and then he accordingly muffles the sound at the end of the half note. This view is false! Experienced percussionists generally allow the tone of their instruments to ring much longer than the note value indicates and usually at least a little longer. For string players the note value is controlled by the duration of the bow stroke, for wind players it is the duration of the air steam, but for the percussionist it is controlled by the beat and not by the duration of the sound. No good percussionist would simply strike when he sees a note in front of him. No, he must carefully consider that his beats ought to express the appropriate note value quite exactly so that instead of mere striking the result may be true performing. A simple experiment on the piano, also a percussion instrument, can easily show us the correct way. One counts in *andante* -- one, two three, four -- a full chord notated as a sixteenth note will be struck on the next downbeat. (Ex. 1a.)



The exact attack of the fingers and hands should be noticed in this experiment. In the next experiment in *andante* -- one, two, three, four -- a full chord notated as a quarter note will be struck on the next downbeat. (Ex. 1b.)



The third experiment in *andante* -- one, two, three, four -- a full chord notated as a whole note will be struck on the next downbeat. (Ex. 1c.)



With the larger note values the movement of the fingers and hands is slower, therefore, the player is obliged to take more breath for these chords. This is self-evident to the wind player and even the string player will lift more with his bow for an entrance of a whole note than, for example, a quarter note. Moreover, there is in our good and long-tested notational system a very interesting, but difficult to explain parallel. (A whole note is rarely written immediately after the bar line, but a single sixteenth note almost certainly is.)[1] To the percussionist the nature of his entrance and his beat is an important part of his musicianship -- of his function in the orchestra. Although many believe that the roll is the most important technique on the timpani, snare drum, or other various percussion instruments, it should be realized that the *most important factor is merely the beat.* The roll, a means of prolonging sound, which is analogous to a string tremolo, is, therefore not so typical of the instrument as the simple beat.

What then is beating? Do we *pound* with a stick on the skin? Is it a *chopping* motion or do we *knock* the tone out of the skin with the stick? Do we make the skin vibrate with a *push* or do we *throw* the head of the stick on the skin? Do we *press* the mallet on the bells? Do we *pound* our two sticks on the timpani and *sling* the two cymbals against each other? Do we allow the beater to *fall* on the triangle? Of all the above similar actions, however, none is a genuine *beating!* Certainly everyone has heard something about free fall, but what about a beat? Nevertheless, each one who has driven a nail at one time carefully distinguishes whether it is a large nail or a tack. Where is there a beat in this technique? Yet, only when one takes a hammer or a similar tool in his hand and strikes a nail or another solid object is one careful not to hold the hammer so stiffly that it hurts the hand. On the piano an almost similar action is clearly seen in the hammer action which strikes from underneath. Conversely our hands can only work from above. Every percussionist should remember this when he picks up a stick.

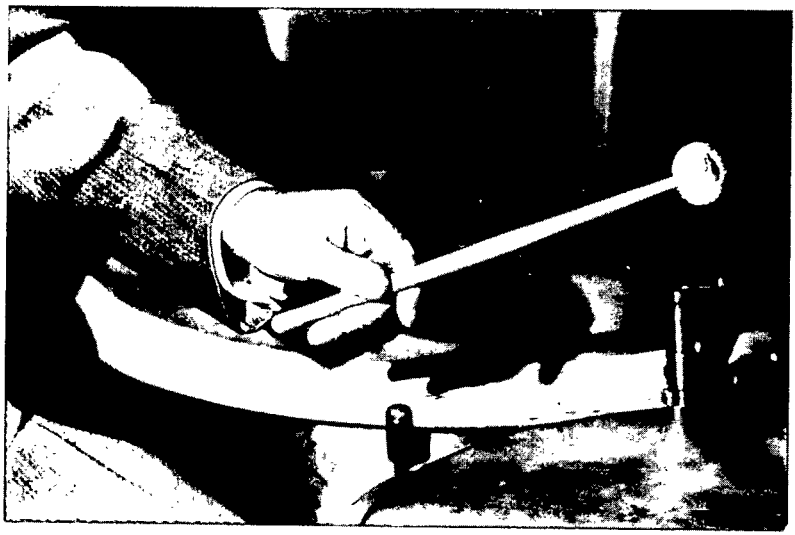
Beating is lifting, accelerating, and relaxing. Lifting is the power which is in the hand and arm that brings the stick to a vertex from which it will be able to be accelerated. It is impossible to make a good beat from a distance of a yard, for example, without lifting.

Picture 1.[2]

The stick must be accelerated so that the small mass of the head of the stick can bring into vibration with an essential strong impulse another mass -- skin, wood, or metal. Relaxing after the beat is, perhaps, the most important step for the reason that the first vibration can freely expand, because the rebound is not hindered and the sound, therefore, will not be stopped. Our wrists move much slower than the vibrations of a sound producing body. Certainly in *staccato* playing this "slower" movement has its proper function because in this case the sticks will be tightly held and thus the first vibrations already will be stopped.

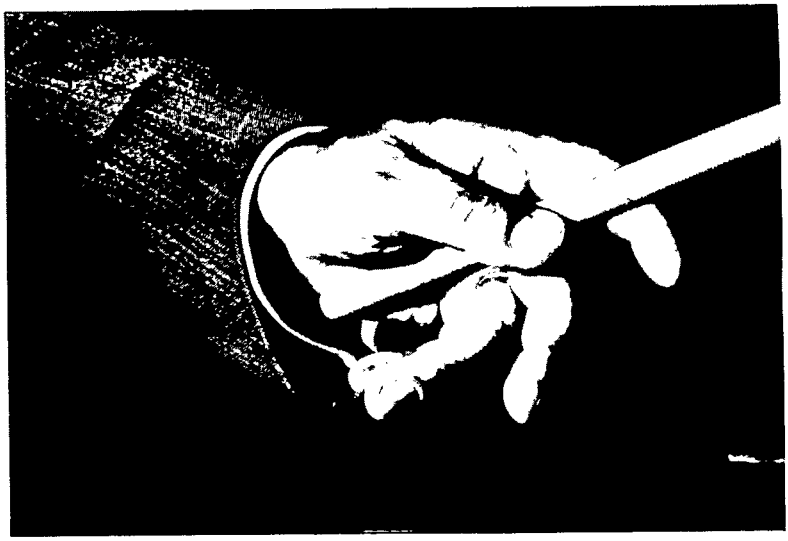
How the sticks will be held is also important for the quality of a beat. On this point experienced timpanists know anatomically as well as mechanically two correct ways -- the position of the hands in soft and loud timpani playing. In playing softly the sticks are held between the first joint of the index finger and the thumb, while the third and fourth fingers lie underneath in order to assist the playing.

Pictures 2, 3.



The true nature of the beat which forms our style uses first the finger and only afterwards the hands and arms. In playing loudly it is better to hold the rotation axis (fulcrum) of the stick between the thumb and the last joint of the third finger whereby the third, fourth, and fifth fingers can assist the playing by moving the stick. The sticks are allowed to swing freely.

Picture 4.

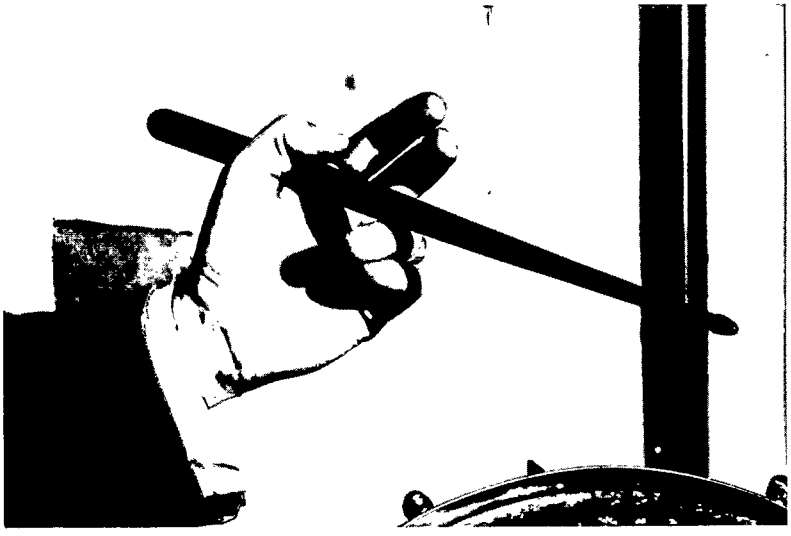


They never should be held for loud playing between the thumb and the second joint of the index finger because their freedom of movement would be too limited. We play the snare drum which is always slanted so that the tone does not echo against the floor with one hand in a different position. The thumb and the third finger of the right hand form a support and the other fingers move the stick as in timpani playing,

Picture 5.

whereas in the left hand the stick moves freely between the thumb and the index finger.

Picture 6.

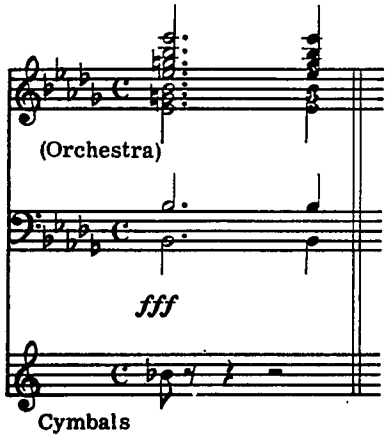


In this case the movement of the stick is controlled by the motion of the bent fourth finger against the tip of the thumb. In order that a ringing beat may be produced, the sticks must always make more movement than the hands and arms. Many a percussionist could play much better if he would only exchange his tightly held sticks for deliberate control. In the last century, as history records, the timpanist could distinguish exactly among a half-, a quarter-, or an eighth-note beat.[3]

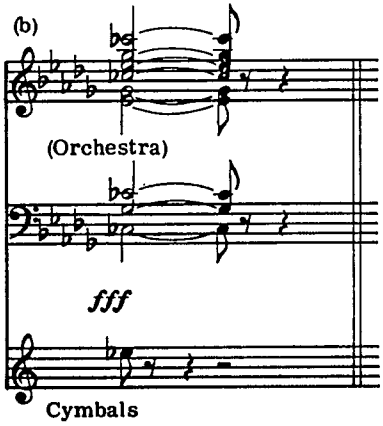
Because the strong entrance of a large body of sound, for example, on a sustained chord, is always somewhat sluggish, composers do not write, in such instances, a whole note for the percussion instruments, but only a quarter or even an eighth as, for example, Anton Bruckner in his Eighth Symphony. In the slow adagio movement he notates only an eighth note for a *fortississimo* cymbal crash although all the winds sustain it. (Ex. 2a.) Certainly this great composer wrote each note and chord with great care so that in a totally foreign chord it was not beyond him to write something other than the usual notation for a cymbal crash. In passing Bruckner notated the high piercing ring of the cymbals as b-flat in the treble clef of an E-flat major chord (ex. 2a.), and later respectively as an e-flat of a C-flat major chord. (ex. 2b.)

Ex. 2. Anton Brucker, *Symphony No. 8 in C Minor,* m. 239 and m. 243.[4]

Example 2a



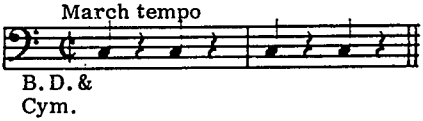
Example 2b



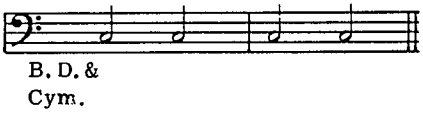
However, one often reads that percussion instruments were notated in smaller values because their sound does not last any longer. Example (3a,) the usual notation for bass drum and cymbals in martial music, shows that this cannot be completely true. In this example no percussionist would dampen the notes because it would be technically too difficult. Often for this reason people say that the method of notation is wrong and that each measure has to be notated with two half notes. (Ex. 3b.)

Ex. 3

Example 3a



Example 3b



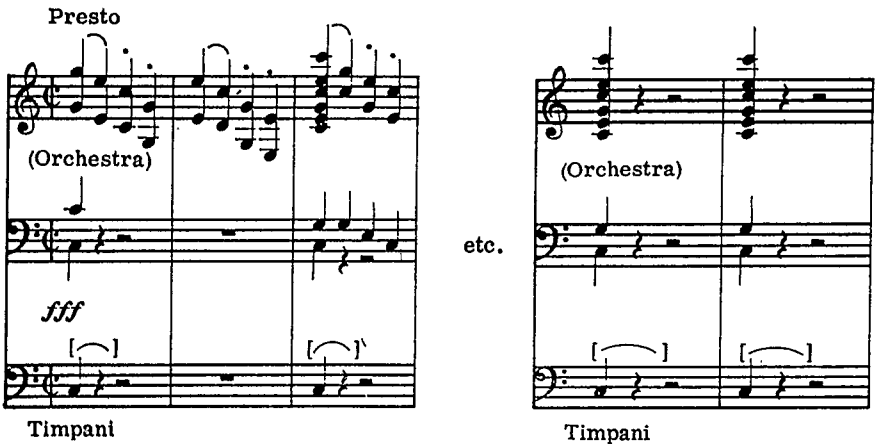
No! Perhaps a composer would write a triumphal march in this way if it was determined more by brilliant music, corpulent steps, and a certain repose. The quarter notes plus quarter rests are better suited and correct for strict inspiring march music and also would be performed accordingly by the drummer. Many similar examples for the bass drum, tam-tam, and especially the triangle could be noted. It should be mentioned that the German name for the triangle is *der Triangle* (nominative masculine singular) because of its masculine,

steellike sound. This is affirmed by all my professional colleagues as well as the Duden dictionary. The neuter use of the word triangle (*triangulum* has a little pertinent connection and no one says that he would like to play *"das Dreieck"* (a three-cornered piece of steel).

If the note indicates to us the type of beat, how long may the struck tone ring? Before any answer to this question can be suggested, we should mention that about fifty years ago many composers tried to notate the length of sound of percussion instruments. But soon it was evident that by this means the orchestral sound became too weak and also somewhat sluggish, and the brilliance of the entrance was lacking. Today this is no longer done.

Therefore, how long may our tone sound. The first rule reads: "As long as the harmony lasts, that is to say, does not change." This means that if the orchestra plays a single quarter note, the bass drum, for example, may not ring any longer. Consequently, it must be dampened according to rule one and its corollary, "when dampening, damp in time and not earlier." Unfortunately, premature dampening is heard all too often and this always produces an ugly sound. The second rule, which was established by experienced percussionists as was the first, reads: "The tone is controlled according to the good taste of the percussionist." It will sometimes be correct to adopt these statements to the character of the music -- one beat being quickly dampened, another allowed to ring with special effect over the orchestra. For example, a loud unmuffled timpani tone can be very effective if played on a short orchestral chord.

Ex. 4. Ludwig van Beethoven, *Leonore Overture No. 3, Op. 72a*, mm. 628-33.[5]



In order to remember the different ways of playing the notes, experienced percussionists write a free tie [♩͡♩] for the notes which are to ring indefinitely and an apostrophe [♩'] for the notes which are to be dampened.

Exact attention to the conductor's movements, a most acute sense of concentration, and thorough knowledge of the composition are requisite to the percussionists's profession. The ringing beat which is a very diverse, an extremely interesting, difficult and a splendid art, should generate from the play of the fingers and hands; from *beating* should come *performing.*

Translator's Notes

1. The reader is referred especially to the musical autographs of Mozart as reproduced in Emanuel Winternitz, *Musical Autographs from Monteverdi to Hinde Smith* (New York: Dover Publications, 1965), 2:60-80. The whole notes it will be observed, are written clearly in the middle of the measures and not next to the bar lines. Professor Hochrainer believes that this notational tradition is extremely important to the correct interpretation of timpani and percussion parts during the Classical and Romantic periods.

2. The pictures of Professor Hochrainer demonstrating on the several percussion instruments were taken under the translator's direction in the orchestra pit of the *Staatsoper,* Vienna, Austria in the spring of 1966.

3. Johann Ernst Altenburg, *Versuch einer Anleitung zur heroizch = musikalischen Trompeter=und Pauken=Kunst* (Halle: Joh. Christ. Hendle, 1795; reprint eds. Leipzig: VEB Deutsscher verlag fur musik, 1972 and Monuments of Music and Music Literature in facisimile, 2d series, no. 36, New York; Broude Bros., n.d.) pp. 129-30.

4. Anton Bruckner, *VII Symphonie C-moll,* ed. L. Novak (Vienna: Musikwissenschaftlicher Verlag der internationalen Bruckner-Gesellschaft, 1955).

5. Ludwig van Beethoven, *Fidelio,* edition with the Leonore Overtures and introduction by Wilhelm Altmann (Leipzig: Peters, [1957]).

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TIME FOR MARIMBA: AN ANALYSIS

by Greg Murray

About the Author:

Mr. Murray received the B.M.E. degree from Baylor University where he was a student of Larry Vanlandingham. He is currently completing the M.S. degree with a concentration in percussion and composition at Indiana State University where he is a student of Neal Fluegel and Robert Chappell. He is presently a member of the Terre Haute Symphony and has performed with the Waco, Sun City, Phoenix, and Houston Symphonies, and is a graduate teaching assistant in music theory at Indiana State University.

Time for Marimba, written in 1969 by Minoru Miki, presents an interesting challenge for the performer both in its technical demands and its musical content. The piece, scored for solo marimba, is dedicated to Keiko Abe, one of Japan's foremost marimba artists. It explores many non-tradiational techniques such as rapid 4 mallet manipulation over the four octave range of the instrument, mallet independence, glissandi, and unusual chord and double stop spacings. The above list mentions but a few of the technical and performance aspects of this work; to deal with them all would require an essay of great magnitude in itself. Rather, my aim will be to provide an analytical insight into the musical elements of *Time for Marimba.*

Tone rows or tone sets form the basic constructional element of *Time for Marimba*. Twelve sets of 3, 4, 5, 6, 10, or 12 tones are employed in this piece; 8 transpositions of two of the original sets are also used. It should be noted, however, that two sets, one of 6 notes and one of 10 notes (arrange in a 53 note pattern), form the primary material for the entire work. The remaining sets are used for transitional, accompaniment, and episodic material.

The pitch content and interval relations of the tone sets exhibits a great deal of similarity. Although all 12 tones of the chromatic scale are employed, many of the sets return to the pitches of the first two tone sets (in order of appearance in the opening section of the piece (C B $E^{\flat}$ G $E^{\natural}$ $A^{\flat}$, F G $F^{\#}$ $F^{\natural}$ E $A^{\flat}$). The tone sets also show the predominance of the intervals of the seventh, major and minor third, and the second. These characteristics partially delineate the shape and content of the melodies and lines used in this work.

The melodies and lines in measures 1-28 and measures 52-54 create an almost hypnotic effect with the constant repetition of the tone sets. The rapid repetition creates a circular motion; a melody constantly returning upon itself. This creates movement within a static framework. This circling effect is carried further in measures 29-31 when the pitch content is centered basically around three related pitches (F $F^{\#}$G, E F $F^{\#}$, etc.). Transposition of sets or their members is used to increase the range of the pitch spectrum (m.4) and to add diversity to the static framework which is created by the constant repetition of tone sets. In particular, octave transposition and augmentaion are used to increase the tessitura of many of the melodies. The opening tone set is broadened from a range of a major seventh to a range of almost three octaves by employing octave transposition (m.4); examples of this technique may be found in measures 4-6, 8, 20, 35, 40-44, and 52-54.

In measures 23-51, Miki employs diminution and pedal tone effects to vary the tone sets and melodies. A set is stated in measure 23 ($B^{\flat}$ $B^{\natural}$ G D $E^{\flat}$ $F^{\#}$); the same row is stated again in measure 26 with the addition of a sustained F tremolo (two octaves) which acts as a pedal tone in the following measures. In measures 26-28, the row is shortened and the interval content is slightly changed. This gives the effect of diminution. In addition, the pitch content of measures 26-28 foreshadows the pitch content of the set used in measure 29.

The pedal effect is further displayed in measures 29-32 with the reiteration of the same note in the repeated sixteenth note pattern (C m.29, $C^{\#}$m.30, D m.31, $E^{\flat}$m.32). A further set treatment can be seen in measures 36-37. The set is used in an alberti-like accompaniment figure. The presence of an implied tonality might be felt from a visual inspection of the score. Beginning on, constant returns to, and ending on C might give this impression, but from an aural standpoint tonality even in an implied sense would be hard to find. Thus, this work lies somewhere in the middle of atonality and pandiatonicism.

Throughout the piece, octaves, unisons, and fifths form the final notes of the cadence points. They are generally extensions of the final tone of a set, and are often approached by a third from above or below. The cadences in measures 12 and 16 are approached by chords. Using a Hindimethian chordal analysis, these chords are both in the classification III^2 (chords without a tritone containing seconds or sevenths or both-root lies above the bass tone).

Measures 9-16 and 46-50 contain the only chordal material in the work. The material is limited to 3 or 4 voice chords covering a range of a diminished fifth to a twelfth. Again, using a Hindemithian chordal analysis, the chords used in those sections of the piece fit in the following classifications: $I^1(1)$, $I^2(2)$, IIa(1), $III^1(7)$, $III^2(10)$.[1] The material in measures 33-34 may also be looked at in a chordal sense. From an aural standpoint, however, the material in that section seems to be a contrapuntal extension of previous set material.

Rhythm, meter, and tempo are the second major group of constructional elements used in *Time for Marimba.* Unusual rhythmic groupings, shifting accents, lack of meter signatures, multi-metric passages, and metric modulation mark some of the interesting rhythmic facets of this work.

In several sections of the piece (measures 1-16, 17-21, 52-54), the quintuplet and sextuplet in various forms serve as the predominate rhythmic figure. Both the quintuplet and sextuplet are placed over half a beat (m.6) and over a whole beat (m.1). In addition, the quintuplet is spread over two beats in measures 9-10 and measures 13-14.

The constant shifting between quintuplets and sextuplets which occurs in the sections mentioned above creates the effect of alternation between a 5 note pattern (^{5}16) and a 6 note pattern (^{6}16). (It should be noted that the quintuplets and sextuplets are performed in the same amount of time, not sixteenth note equal sixteenth note). The aural effect of the passages creates a shifting accent pattern (5 notes to 6 notes and 6 notes to 5 notes). This alternation also creates a tension and release effect; the quintuplet being a more tension filled (unstable) rhythmic figure than the sextuplet.

The combination of unusual rhythmic patterns and tone sets of varying length creates rotating orders within the tone sets. This idea is illustrated in the first measure of the piece. The opening row (C B $E^\flat$ G $E^\natural$ $A^\flat$ - 6 tones) is stated in quintuplets; this tends to give the impression of a 5-tone pattern beginning with C then $A^\flat$, E, G, $E^\flat$, and B. This idea can be seen throughout the opening section.

Another facet of the relationship between rhythm and the tone sets is the varying amount of space in which single tone set statements are presented. In the opening section of the piece most single set statements cover one or slightly more than one beat. In subsequent sections, however, set statements cover from 6 to 14 beats. This occurs particularly at the end of each section of the piece (measures 7-16, 28,

46-51, and 54). This feature displays the trend toward constant reiteration of tone sets early in each section with a shift to longer single set statements at the end of each section.

In this work, Miki presents a metrical dichotomy. Throughout the work, there are no meter signatures, but it is obvious that meter and tempo are always present. The technique used to achieve this dichotomy is similar to Messiaen's ametrical rhythmic organization.[2] The basis of ametrical rhythmic organization is freely ordered short fractional units such as sixteenth notes serving as a constant value. Bar lines represent phrase divisions, but do not necessarily represent the beginnings of metrical units. However, within the various bars of this work, one is able to assign meter signatures. An example of this is measure 29; the tone set in measure 29 consists of 10 tones arranged in a 53 note pattern. The pattern may be grouped 2/4 + 2/4 + 7/8 + 2/4 + 3/4 + 10/8 + 11/8. This meter pattern also exists in measures 30-33; they also use a 53 note pattern. This section exhibits a tendency toward the use of shifting meters which is found throughout the piece.

A further interesting rhythmic device which Miki employs is metric modulation. This occurs between measures 32 and 33. The eighth note in measure 32 becomes the sixteenth note in measure 33; this forms a simple metric modulation.

The textural elements in *Time for Marimba* cover a wide spectrum from monophony almost approaching pointillism to homophony to polyphony. The opening section of the work employs a single melodic line in a homophonic texture; this style is also used in measures 17-21 and 52-54. In measure 35, monophony is carried almost to pointillism; a single line is created from wide leaps almost imitating the unconnected texture of pointillistic lines.

The end of the first section (measure 8-16) employs a homophonic texture. This texture is also used in measures 40-50; this section presents a slow circling theme treated in octaves followed by a chorale-like statement combining two predominate themes (tone sets). In addition, measure 36-37 also employ a homophonic texture. The tone set is used as a melody above an alberti-like accompaniment figure created from another tone set.

Measures 33-34 employ a polyphonic texture. The tone set in measure 33 is treated in a 3 voice repeated sixteenth note pattern which is imitated in measure 34 with the addition of a fourth voice and a switch in voice positions.

Instrumental timbre is another textural consideration. The marimba has several range characteristics; low range -- very smooth, very resonant; middle range -- smooth less resonant; upper range -- bright, short. These characteristics along with the choice of mallets (soft mallets -- hard at ff are specified) and the type of rolls (tremelos) used will give the final textural decisions to the performer.

Miki employs an expanded ternary form (AABA) in *Time for Marim-*

ba. The major sections are A(m.1-16), A(m.17-28, B(m.29-50), and A(m.52-54). The second A section acts as a written out repeat of the original A section with the addition of a codetta. Measures 5-16 and 20-28 of the A sections and measures 33-50 of the B section are a series of variations on the original material of each of the sections.

The material for the A sections is primarily based on the tone set C B $E^{\flat}$ G $E^{\natural}$ $A^{\flat}$ and several of its transpositions. The remaining material is from additional tone sets. (Refer to Sectional Tone Set Content Charts).

The material for the B section is based primarily on a 10 tone set arranged in a 53 note pattern; it is supplemented by several transpositions of the original set and other tone sets.

Both the A sections and the B section are created of episodic treatments of the various set statements. Each section begins with rapid set statements and gradually closes with longer single set statements.

In measures 26-28 (second A section), the material that is used foreshadows the material of the coming B section. This technique is used again at measures 46-51. The upper voice uses a transposed version of the first set used in the B section, and the lower voice uses the first set from the A section. This passage serves as a transition to the final return of A. The fanfare-like statement in measures 23 and 39 signal the departure from A material or the return to it.

The use of several contemporary notational symbols present another interesting aspect of this work. In measures 1-2, Miki uses non-traditional accelerando and ritardando markings. These markings are used throughout the work; they give the performer a visual reference with regard to tempo changes. Rhythmic markings such as those found in measures 10 and 14 indicate a quintuplet in the space of a half note. The duration symbol found at the end of measure 28 indicates a very long tone. Glissandi in measures 6, 22, 24, 35, and 39 are marked with an arrow or line in the direction of the gliss.[3]

Miki also indicates short and long pauses or holds with certain symbols (m.28 - short pause, m.51 - long pause). The combinatin of seperate notes with three slashes (m.10) indicates a tremelo.[4]

Time for Marimba presents a challenge for the performer both from a performing aspect and from a musical aspect. Its varied use of tone sets, diverse rhythmic complexities, changing textures and dynamics, episodic form, and contemporary notational practices make it worth studying and understanding.

Footnotes

[1]For a full explanation of Hindimethian chordal analysis refer to *Craft of Musical Composition*, Book 1, by Paul Hindemith, translated by Arthur Mendel, New York, Schott, 1945.

[2]Leon dallin, *Techniques of Twentieth Century Composition: A Guide to the Materials of Modern Music*, 3rd ed. (Dubuque: Wm. C. Brown Company Publishers, 1974), p. 66.

[3]Howard Risatti, *New Music Vocabulary: A Guide to Notational Signs for Contemporary Music* (Urbana: University of Illinois Press, 1975), pp. 1-57.

[4]*Ibid.*

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Sectional Tone Set Content Chart
A Section, Measures 1-16

I P_0 C B $E^{\flat}$ G $E^{\natural}$ $A^{\flat}$
18 repetitions m. 1&2
13 repetitions m. 4&5
2 repetitions m. 7&8

II F G $F^{\#}$ $F^{\natural}$ E $A^{\flat}$
4.5 repetitions m. 2
1.5 repetitions m. 5

III P_6 $F^{\#}$ $F^{\natural}$ A $C^{\#}$ $B^{\flat}$ D
5 repetitions m. 3
5 repetitions m. 6
1 repetition m. 14-16

IV C $F^{\#}$ B $F^{\natural}$ $E^{\flat}$ A G $C^{\#}$ E $B^{\flat}$ $A^{\flat}$ D
7 repetitions m. 3
2 repetitions m. 6
V $D^{\flat}$ C E $A^{\flat}$ F $A^{\natural}$ 1 repetition m. 9-12

Sectional Tone Set Content Chart
A Section, Measures 17-28

I P_0 C B $E^{\flat}$ G $E^{\natural}$ $A^{\flat}$
18 repetitions m. 17-28
13 repetitions m. 20

II F G $F^{\#}$ $F^{\natural}$ E $A^{\flat}$
4.5 repetitions m. 18
1.5 repetitions m. 20

III P_6 $F^{\#}$ $F^{\natural}$ A $C^{\#}$ $B^{\flat}$ D
5 repetitions m. 19
5 repetitions m. 21

IV C $F^{\#}$ B $F^{\natural}$ $E^{\flat}$ A G $C^{\#}$ E $B^{\flat}$ $A^{\flat}$ D
7 repetitions m. 19

V P_7 G $F^{\#}$ $B^{\flat}$ D $B^{\natural}$ $E^{\flat}$
1 repetition m. 24
VI P_3 $E^{\flat}$ D $F^{\#}$ B $G^{\#}$ B
1 repetition m. 28
1 repetition m. 24
VII P_8 $G^{\#}$ $G^{\natural}$ B $E^{\flat}$ C $E^{\natural}$
5 repetitions m. 21

VIII P_1 $C^{\#}$ $C^{\natural}$ E $A^{\flat}$ F $A^{\natural}$
2 repetitions m. 22
IX P_{11} B $B^{\flat}$ D $F^{\#}$ $E^{\flat}$ G
1 repetition m. 24
X $B^{\flat}$ A D $F^{\#}$ $E^{\flat}$ G
5 repetitions m. 21
XI $B^{\flat}$ $B^{\natural}$ G D $E^{\flat}$ F
1 repetition m. 23
1 repetition m. 28
w/variations m. 26-28

Sectional Tone Set Content Chart
B Section, Measures 29-51

I P^0 C D $E^{\flat}$ $E^{\natural}$ F $F^{\#}$ G $A^{\flat}$ $A^{\natural}$ B M. 29
II $E^{\flat}$ F G A B $C^{\#}$ M. 30
III D F $A^{\flat}$ B M. 31
IV $E^{\flat}$ G B M. 32

M. 33, 34, 35
Use set material from M. 29(P^0)

M. 36
Melody uses row material from M. 29 transposed to P^{10}

$E^{\flat}$ D $E^{\natural}$ $E^{\flat}$ F $E^{\natural}$ $E^{\flat}$ D $E^{\natural}$ $E^{\flat}$ F D $C^{\#}$ $C^{\natural}$ D
$C^{\#}$ $E^{\flat}$ $E^{\natural}$ D $E^{\natural}$ $E^{\flat}$ F $E^{\natural}$ $E^{\flat}$ D $E^{\natural}$ $E^{\flat}$ $C^{\#}$ F F G G $G^{\#}$ $F^{\#}$ $F^{\natural}$ E $E^{\flat}$ D $E^{\natural}$

M. 37
Melody uses row material from M. 29 transposed to P^4

A $G^{\#}$ $B^{\flat}$ A $B^{\natural}$ $B^{\flat}$ A $G^{\#}$ $B^{\flat}$ A $B^{\natural}$ $G^{\#}$ $G^{\natural}$ F $G^{\#}$ G A A $G^{\#}$ $B^{\flat}$
A B $B^{\flat}$ $G^{\#}$ $B^{\flat}$ A $G^{\natural}$ $B^{\natural}$ B $C^{\#}$ $C^{\#}$ D $C^{\natural}$ B $B^{\flat}$ A $G^{\#}$ $B^{\flat}$

M. 38
Uses row material from M. 29 transposed to P^4

A $G^{\#}$ $B^{\flat}$ A $B^{\natural}$ $B^{\flat}$ A $G^{\#}$ $B^{\flat}$ A $B^{\natural}$ $G^{\#}$ $G^{\natural}$ $F^{\#}$ $G^{\#}$ $G^{\natural}$ A A $G^{\#}$ $B^{\flat}$
A B $B^{\flat}$ A $G^{\#}$ $B^{\flat}$ A $G^{\natural}$ $B^{\natural}$ B $C^{\#}$ $C^{\#}$ D C B $B^{\flat}$ A $G^{\#}$ $B^{\flat}$

octave augmentation and displacement

M. 36-37

C F♯ D A B M. 36
C F♯ E♭ A D♭ M. 37

harmonic material

M. 40-50

Uses P0

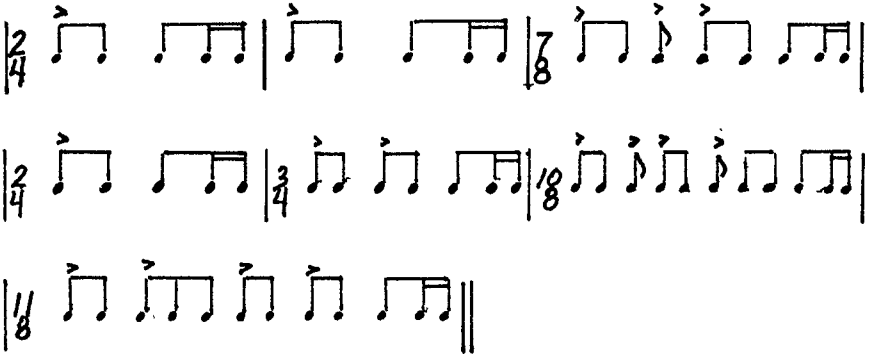
M. 46-51
Harmonizes (combines) the 10 note group of P0 from the B section with the P0 tune set of A section.

Sectional Tone Set Content Chart
Final A, Measures 52-54

I P0 C B E♭ C E♮ A♭
27 repetitions M. 52-54
1 repetition M. 54

II P6 F♯ F♮ A C B♭ D
2 repetitions M. 54

Rhythmic Relationships
Measures 29-32



This pattern is repeated in each successive measure (M. 29-32). 3 2 3 2 6 2 3 2 5 2 9 2 10 2 -- 53 note pattern/per measure.

THE TONALITY BASED PROBLEMS OF THE PERCUSSION STUDENT

by Linda Pimentel

Editor's Note:

The following represents part one of a four part Ph.D. exam completed by the author for Dr. James L. Moore, Ohio State University, Columbus, Ohio.

The Question

Dr. Moore.

Testing and observation have shown that many percussionists, at all levels from elementary school beginners through college percussion majors, and even some professional players, have a lower level of skills in some basic aspects of musicality than many other instrumentalists. This is evidenced in particular by:

1) a lack of understanding of, and ability to perform, basic *melodic* and *harmonic* material on bar percussion instruments.

2) difficulty with basic skills in the areas commonly referred to as "ear training" and "sight singing," which adversely affects their ability to perform such tasks as: a) tuning timpani accurately, b) identifying components of a musical texture and relating to a total musical environment of a performance (more simply put -- listening to what is going on, balancing dynamics, etc.), and c) lack of awareness of major historical periods in the development of music (i.e. composer dates, performance mediums, stylistic practices, etc.) and lack of ability to relate this type of information to their own performance.

In view of the above, discuss:

1) Reasons for the existence of the above conditions and any other deficiencies you feel exist in percussion performance today, and

2) Proposed and presently ongoing courses of action, activities, pedagogical approach, organization efforts, indoctrination, etc. that will improve the situation.

Does the Problem Exist?

The basic problem suggested by this question is one that is a topic of general conversation among percussionists, ensemble directors, and music educators. Yet a careful search of available writings about percussion and percussion education failed to uncover any definite information concerning results in the area of comparing comprehensive musicianship test results between percussionists and other musicians. Articles in both the *Percussionist* and *Percussive Notes* as well as articles pertaining to percussion in the leading music journals discuss

melodic and harmonic materials and basic skills in "ear training" and "sight singing" in only a superficial manner. Percussion methods texts cover little more ground. In only one area did the writer find a wealth of information: the specialized area of timpani tuning is thoroughly explored in several texts and articles.

Musicians tend to agree with the observation contained within the question. In an effort to find out if long term testing confirms this observation, the writer briefly compared the precollege testing results of then future percussion majors with that of the complete population of then future music majors who entered Ohio State University from the autumn of 1969 through the autumn of 1974.

Comparison of Testing Scores.

Aural and notational test. Ohio State University's aural and notational test, devised by William Poland in 1961, concentrates heavily on melodic and harmonic ear training. The test contains 50 items. Only six of these are devoted to rhythmic dictation. This test, of the three given to entering freshmen, is the most likely to indicate both melodic and harmonic ear training problems.

During the time span of the autumn of 1969 through the autumn of 1974, 1,317 students entered Ohio State University's School of Music as freshmen. Their scores on the aural and notational test ranged from zero to 50. The mean score for this population was 37.44, the median was 38, and the mode was 40, with a standard deviation of 7.57. During this same time span 54 freshman percussion majors entered Ohio State University. Their scores on the aural and notational test ranged from 15 to 49. The mean score for this population was 32.89, the median was 34, and the mode was 33, with a standard deviation of 6.77.

Other pertinent information. Of these 54 entering percussion majors, only 24 finished their two years of music theory training. With Ohio State University expecting a student to maintain a "B" average in areas of major emphasis, the testing office predicted that 2 of the percussion majors would receive music theory grades of "A", 12 would receive "B", 21 would receive "C", 13 would receive "D", and 6 would receive "E." Based on predicted grades, both students designated to receive "A"s completed two years of theory. Nine "B" students completed two years of theory with 3 dropping out. Of predicted "C" students, 9 finished two years of theory and 12 dropped out. Only 4 "D" students remained while 9 dropped out. None of the predicted "E" students finished both years of theory. During their last quarter of theory, of the 30 students discontinuing percussion majors, 24 were at or below their predicted grade, with 6 having climbed above predictions.

Of those students finishing their final quarter of sophomore theory, 16 students' theory grades for that quarter were higher than predicted, 5 students' grades were at the predicted level, and 3 students' grades were below the predicted level.

The music testing office personnel suggested that students who studied piano tended to perform better on the aural and notational test. Of the 54 measured percussion majors, 11 of the 24 who continued (46%) and 11 of the 30 discontinuing students (37%) had studied piano. Of the 11 discontinuing students who had studied piano, only 4 had studied for longer than a year. These four students tended to do better upon first entering theory class, with their grade slipping the quarter before they discontinued school.

In an apparent effort to further enhance their skills, all but one percussion major had, during their precollege years, explored music studies beyond the normal school band/orchestra sequence. Of three possible areas of study, private percussion lessons, piano lessons, and music theory, 38 students had studied one or more years in at least two areas. These extra efforts were not exhibited predominantly by individuals scoring high on the aural and notational test. Individuals in the bottom 10% had from 3 to 11 years of extra study.

Concluding observations. At Ohio State University, percussion majors' norms were considerably below those of the general music major population on the aural and notational test (this observation is also consistent with the norms of both populations on the other two music tests given at Ohio State University). Percussion majors who were predicted as poorly equipped for theory classes tended to drop out of the music program. Ohio State University music testing office's predictions of theory grades were reasonably accurate. Assuming the music theory department to have consistent and high standards of teaching and grading, percussion majors at Ohio State University, if they survived the first two years of music theory, tended to exhibit a higher growth potential than expected.

Extra study on the part of the student percussionist, even in the area of piano, which percussion educators repeatedly advise high school students to explore, at best gave only a small extra margin of success in the basic melodic and harmonic ear training skills.

Those who choose to become music majors in college tend to be those who exhibited extra skills in music during their high school years. If we may assume that the 54 entering percussion majors were encouraged by circumstances and educators to think that they had the extra skills necessary to become professional musicians, we may also assume that they represented some of the better percussionists within their local environments. With a ratio established of percussion majors having a lower average score than other music majors on the three tests given by Ohio State University's music testing office, we may also assume that the high school percussion population in general would tend to score lower than the average high school music students on these same three tests. Yet, because 67% of those who finished sophomore theory improved their skills beyond expectations, the high school percussionist may be capable of exhibiting more growth in the areas of melodic and harmonic ear training.

The results of this brief exploration of Ohio State University's music testing program substantiate the premises of the general exam question.

The Problem as Related to Involved Percussion Instruments

Instrument Performance

The basis for part of the problem exists within the performing techniques of the instruments of the family. A large portion of the instruments are never "tuned" after the manufacturing process is complete. An even larger group of instruments are pitched only within general range frameworks and/or have irregular overtone series that blend well with a variety of pitches within music organizations. The primary areas of instruments with which the percussionist needs the tools of ear training and sight singing within melodic and harmonic frames are the bar or keyboard percussion instruments and the timpani.

A brief survey of the percussion methods' texts studied (Pimentel, 1977) indicates that discussion of and musical examples for bar percussion instruments rarely take up more than 1/3 as many pages as does that of the snare drum. The majority of these 1/3 as many pages are generally devoted to the descriptions of and pictures of the basic bar percussion instruments. The pages that are devoted to the timpani, while even fewer in number than those dealing with bar percussion instruments, generally contain more information about techniques, including the problems of timpani tuning. This ratio of there being about three times as much material for snare drum as for bar percussion instruments in percussion methods texts appears to remain consistent in the area of instruction books and sheet music, with an even smaller fraction being devoted to the timpani. This material gap appears to be closing as music composed specifically for bar percussion instruments makes rapid gains, with music for timpani appearing more slowly.

Timpani Intonation.

Books and articles about the timpani tend to agree on the basic problems surrounding timpani intonation. Timpani instruction books and percussion methods' texts cover, in a "hit and miss" fashion the information contained in the more detailed books.

The basic theoretical source quoted by well-known authors such as Blades (1970), Kirby (1930), and Taylor (1964) is *The Sensations of Tone* (Helmholtz, 1875, pp. 40-41). No new studies of the acoustical properties of timpani were found except for the now-in-progress studies of Rossing and Kvistad (1976). The two areas that are presently under research concern the accoustical properties of the bowl and the overtone series of the timpani.

The writer has observed five basic timpani bowl structural types: the shallow hemisphere, the deep hemisphere, a drum-type with

cylindrical sides and a bottom consisting of a shallow hemisphere, a drum-type with shallow parabolic sides and a bottom consisting of a shallow hemisphere, and a drum-type consisting of deep parabolic sides and a bottom consisting of a shallow hemisphere. Attempts have been made to describe the varying tone quality produced by different shaped timpani. It is hoped that the research underway mentioned above will lead to answers to the purpose and characteristics of varying shaped bowls. Yet, to the percussion performer the problem runs in a slightly different vein: he must adjust to tuning and striking varying shaped drums.

The research of Rossing and Kvistad confirms that the predominantly sounding pitch of the timpani is the principal and not the fundamental tone of the overtone series. The second partial, the fifth above the predominantly sounding partial, is also clearly heard on a well-tuned head. This landmark, of the ringing fifth, while a sense of surety to the experienced timpanist, is a source of confusion to many percussionists and to musicians transferring from performing on other instruments including such close pitch range neighbors as the cello and the trombone.

Preparing the timpani for performance is a major operation. In order to obtain an evenly pitched tone, the complete drum and head must be in excellent working order. The drum must be symmetrical, level, free of undue friction, and with all parts in good working order. A head of skin, though it produces a generally more preferred so· ıd (at the present time, although the preference for the plastic head is clearly on the rise), has many natural irregularities that affect the tone. The stretching and the tucking of the skin head requires a skill that few percussionists have mastered. The plastic head is more dependable and is of even texture and density. Age and wear affect both skin and plastic heads. Once set in place the head must be balanced at each post or lug, throughout the entire range of the drum. The range of the drum must be correct for its size and duties. The pedal or handcrank should be set so that the middle of its travel scope matches the middle of the drum's range. These types of tuning adjustments need to be performed when setting the head, before practicing or performing, and often, in the middle of a performance.

In a questionnaire replied to by the timpanists of 60 major symphonies and 35 college percussion instructors, Houston (1967) found that, 48% of those answering suggested that the beginning timpanist employ a pitch pipe to establish a basis for tuning, 16% preferred the pitch pipe for the intermediate timpanists and 8% still preferred it at the advanced level. The tuning fork was preferred by 20% for the beginning timpanist, 48% for the intermediate timpanist, and 42% for the advanced timpanist. A keyboard was chosen by 22% for the beginning timpanist, 10% for the intermediate, and 5% for the advanced. No tuning devices were preferred by 10% for the beginner, 26% for the inter-

mediate, and 45% for the advanced timpanist. In order to set the head in motion before tuning, 51% tapped it with a stick and 49% employed a finger or wrist flick; 80% listened while 20% hummed as they tuned in the pitch. Considering the use of gauges, 50% were opposed to their use, 45% used them for fast changes and for difficult repertoire, 5% of those answering made frequent use of them. It must be mentioned that since this survey, new gauges have been developed that are more accurate than were previous gauges. Gauges that measure pedal tension are generally conceded more accurate than those measuring head tension.

Duff (1968) suggests that when tuning by ear, "The tuning is achieved in relative pitch by the study of intervals which is developed to such a high degree of efficiency that the player is positive about it, or by absolute pitch. Interesting though, is the fact that often those with absolute pitch do not have the most perfect intonation, possibly because they do not adjust so readily to conditions."

Some of the above mentioned "conditions" are due to weather and to hot stage lights affect the heads including, to a lesser degree than those of skin, plastic heads. Orchestras tend to raise their pitch during passages with high tension and lower their pitch during slow, relaxed sections. Ensembles vary between just and tempered tunings. Certain scale tones tend to be played higher or lower in relationship to the whole. This is especially crucial in older compositions that employ two timpani. The pitches for the timpani were initially set by the composer for the tonic and dominant of the key. As the work progresses into the dominant area, the timpani tone that was originally the tonic is employed on the seventh pitch of the secondary dominant. In this role the tone needs to be minutely lowered. Timpani pitches tend to sound a bit sharp during loud rolls. They become flat immediately after such a roll and immediately after changing from a higher pitch to a lower pitch. The way in which the drum is struck can affect the pitch.

In a lengthy discussion with the writer about teaching timpani lessons, Olmstead (1977) suggested that the predominant advantage that the timpani student gains from studying the piano is the visual, special relationships easily discernable on that instrument. He found vocal/ear training classes to be more of an aid in developing timpani tuning skills.

Peinkoffer and Tannigel (1969, p. 40) explain two problems: "At the outset he (speaking of the student) is tested for both rhythm and ear training because he must be able, eventually, to tune his timpani under all possible circumstances, even while counting rests and hearing "wrong" and contradictory harmonies in the orchestra." Tuning timpani while counting rests and during passages in distant keys, rapidly changing key centers, or unusual tonal patterns requires constantly practiced skills even among percussionists with high degrees of ear training.

In addition to having to be able to count extremely long stretches of rests, the timpanist often must tune one to four drums within a limited and absolute time span. This involves employing precise, rhythmical motions. For longer stretches, Blades (1970, pp. 356-357) suggests: "The more usual method is for the timpanist to compare the pitch of the drum with an identifiable or cued note in the orchestra, where possible a holding note on the horns or lower brass. The pitch of the forthcoming notes is also determined by using already established notes on the drums as reference notes, in which case the player is obliged, as far as possible, to isolate himself from the sound of the orchestra."

The timpanist must learn to deal with several different pedal mechanisms. Choosing the right drum on which to place a specific pitch can be important. Vernon (1976, p. 64) describes the tone at the bottom of a drum's range as having loose tension and being indistinct and distorted; at the top it is tight, dry, and choked. The preferred tone, he notes is about 2/3 of the way up the range. If two drums are in tune, one tuned a fifth lower may vibrate in sympathy with the other. This special tuning problem involves some extra hand dampening.

The above overview of the problems of timpani tuning should adequately convey to the reader the complexity of this one area of the problem. Little has been said about the relationship of timpani tunings to different historical style periods. Yet this is a clearly implied part of the question.

In attempts within the framework of timpani practice, to establish methods of ear training, several courses have been followed. Friese and Lepak (1954) prepare simple melodies to be sung. These employ the common timpani intervals of fourths and fifths combined with stepwise motion. These simple melodies are considerably extended in timpani practice exercises. Britten (1967) employs first scalewise movement for one drum, gradually introducing interval leaps of widening distances. Different types of chords are explored. Tilles (1971) starts out with intervals of fourths and half steps. He expands and contracts, adds other intervals, and employs scale-like passages.

"Awareness" in Bar Percussion Performance

The variety of tuned instruments within this category presents the first area of concern. Commonly used instruments are the marimba, vibes, xylophone, orchestral bells, marching bells, and chimes. Increasing attention is being paid to the more unusual members of the family such as chromatic crotales and members of the gamelan gong family. This area of instruments can also include the Orff instruments and a variety of hybrids. The instruments vary tremendously from one another in size and range. Even within one type of instrument the variations are considerable. For instance, marimbas are commonly found at the present time with six different ranges: 4-1/2 octaves, F2 to C7; 4-1/2

octaves, C3 to F7; 4-1/3 octaves, A2 to C7; 4 octaves, C3 to C7; 3 octaves, F3 to F6; and 2-1/2 octaves, C4 to F6. In addition, on the most common range of instrument, the 4 octave marimba, the writer teaches each week on instruments that vary in their bar width so much from each other that the writer must treat them as five separate entities. The bars of each of these instruments also graduate in width throughout the range, employing as many as four different size bars within one instrument.

Most percussion instruments, because they are struck with tools, tend to be difficult to play with accuracy. Motions made by the performer often are exaggerated by the tool. The performer also does not get the immediate touch nerve sensations because of the "stilt-walking" method of tone production.

Stoutmeyer (1971, p. 36) observes that the xylophone bar is generally more narrow, thicker, and longer than that of the marimba. The predominant overtone produced by striking the marimba bar is two octaves above the fundamental; that of the xylophone is the twelfth above the fundamental. The xylophone tuning tends to somewhat disturb the writer, causing a small degree of unsurety when reading. This is typical of similar "comparison" problems that occur throughout the entire range of bar percussion instruments, and tend to contribute to notational errors in performance.

Articles and methods books only hint at the wide range of problems involved in this area of the question. By picking out small fragments of ideas from many articles and methods books, the writer was able to piece together some concerns. Green (1936, p. 6) some years ago suggested that, "Low hammering is essential to speed and accuracy. . . . SLOW PRACTICE. . . . EVERY NOTE must be played correctly."

"Many mallet players should place more emphasis on phrasing instead of thinking and attacking each note as a separate entity," suggests Bailey (1963, p. 11).

Snyder (1974, p. 62) suggests some of the reading problems encountered: "One of the most common problems among beginning mallet students is keeping the eyes on the music. Students tend to look at the keyboard rather than the music. As a result, reading ability may deteriorate or fail to develop, and, of course, the student may continually lose his place in the music. To avoid problems in this area, students must learn to use peripheral vision, concentrating on the relationship between the keys on the upper and lower keyboards."

In an article on vibes performance, Brown (1973, pp. 11 and 26) describes more variety in voicing of chords. He says, "The use of four note chords in a smooth voicing beneath the melody is the first concern. The graceful transition between closed and open voicing is the second concern for a variety of sounds in successful four mallet playing. . . . Remember, however, that the melody, harmony, and voicings are the most important aspect of the successful jazz vibist and one that must

come as naturally as common sight reading." This thought will be further developed when discussing Burton and Hilley.

Applebaum (1970, p. 6) lists several reasons why the marimba ensemble should be an integral part of the percussion curriculum. Among these reasons are, "Increase in performance facility, sight reading, and ability to perform well in a chamber ensemble situation, and to embellish and supplement music history and theory class experiences, especially in such areas as notation, analysis, and established traditions of the various musical eras."

Feldstein (1968, p. 333) touches on some important areas of reading: "The expanding literature of mallet percussion requires the performer to be able to read and perform music on more than one stave. Often this music will contain a melodic line and embellishing harmonies. The performer, when using two mallets, must have complete control of each hand in order to bring out melodic parts and important harmonic lines."

McMillan (1962, p. 3) mentions his awareness of the importance of proper use of the feet in bar percussion performance. He suggests, "The important point to keep in mind is not to cross one foot over the other. An awkward shift of balance will interfere greatly with playing accuracy."

Peterson (1966, pp. 18-21) suggest, through pictures and descriptions, a number of four-mallet positionings that greatly facilitate accurate pitch performance. Having a preconceived visual image of such patterns in relationship to interval structures and knowing how to interlock a chain of such patterns in a smooth and flowing manner may be the most important technical aspect of performing bar percussion literature as it is evolving at the present time.

The concept of area duties for each different mallet (Pimentel, 1974) has come to the fore during recent years. By carefully structuring mallet usage along harmonic patterns, accuracy, even in predominantly melodic passages, can be greatly improved. Ervin (1975, p. 60) illustrates this concept in patterns simple enough to be understood by an inexperienced percussionist.

Burton (1973, pp. 77-78) has made a large-scale contribution to our area of concern. His ideas clearly outline directions that percussionists need to take in order to combine techniques with aural training: "The mallet instrument leads itself most aptly to visual shapes and patterns as related to harmonies and pitches . . . the visual-aural aspect I mentioned earlier. What it means is that as one becomes more and more familiar with the keyboard, the processes of playing become increasingly automatic in response, since functioning in this 'visual-aural' way, our brain can perform much more efficiently than on an ordinary conscious level. For instance, if I see a chord symbol or group of notes written on the page, before I can even think about it sufficiently to give things names and decipher the information, my brain has already

flashed a dual image to me. . . . I see the shape and pattern of the notes on the instrument and hear the sound they will make in my imagination. This reaction is virtually instantaneous, and remarkably free of error. I have spoken to many players about this, and they all attest to the fact that this takes place as technique develops. The technical aspects of the instrument eventually become automatic and seemingly instinctive abilities, while the performer's main attention is turned to the musical considerations of the moment. . . . I seriously question the advisability of developing a technique in the style of an athlete in training, going over and over specific maneuvers until they become habitual and regimented. Instead, I believe that the mental faculties are what really determine the scope of technique, and that practice should be toward a better understanding of the instrument characteristics, and technique based on freedom of the keyboard, with the mind in charge."

In an article on teaching beginning marimba lessons, Pimentel (1974, pp. 26, 40) notes that percussion instructors need to observe other fine teachers at work teaching things other than percussion. Suggested observations range from attending a "Suzuki" clinic to observing a first grade teacher at work. Other areas of discussion include teaching the student to play by ear before beginning note reading, developing basic techniques through play activities, beginning the use of four-mallets from the start, using "discovery"-type techniques, incorporate the whole range of keys in drills, transposition of easy tunes, and developing scale techniques through ear training and pattern building.

Pimentel (1976, pp. 1-21) also extensively develops the visual patterns that use peripheral vision and the hearing facilities to determine when the performer is accurate. Emphasis is placed on developing interval training through correct use of the body and discriminate listening. Examples from several marimba compositions illustrate the concepts.

The writer stresses the use of the ear in determining not just which bar to strike, but also where the performer is striking the bar. Many percussionists have now trained their ears to become aware of whether they are striking the bar on center, tip, or close to the node. The writer suggests that the performer, through close listening, can also determine which side of the face of the bar is being struck. When the bar is being struck repeatedly, such as during slow, rolled passages, the performer tends to occasionally "bounce around" the true pitch. By using the above described procedure, the performer can tell when his mallet is about ready to slip off the correct bar and onto the neighboring bar, giving him split-second warning that he must retrieve the mallet tip to the center of the bar.

In conclusion, basic skills in melodic and harmonic ear training on bar percussion instruments are made more complex by varying instruments of different sizes, lack of direct touch sensation when performing, unusual overtone series, peripheral vision problems, foot work,

new trends in malleting (area duties, etc.), and body movement. Various writers conclude that bar percussion practice can be used to strengthen music theory and history background, and that pattern reading combined with highly developed visual/aural skills are important tools for the percussionist to learn to use. Broader concepts of beginning bar percussion lessons that have materials and ideas adaptable to varying age levels and needs, and that have sound teaching practices that make better use of research, borrowed concepts, materials adaptable to various ages and needs, are being proposed by some percussionists.

Potential Information from Other Sources

Research and Writing for Related Instruments, Music Notation, and Musical Ideas.

Other musical instruments are closely allied to the bar percussion instruments and the timpani, in pitch range, keyboard layout, harmonic and contrapuntal possibilities, and reading problems. Much of the material researched and written about other instruments pertains also to percussion instruments.

The similarities between bar percussion instruments and the piano suggest the potentials of exploring the same types of problems on that instrument. A wealth of information, that is applicable, is readily available to the percussionists.

Kochevitsky (1967) further extends some of the ideas tentatively suggested by percussionists. He (p. 31) clearly corroborates Burton's (1973) ideas: "The piano teacher must find a fine balance between the natural development of the movement, as described at the beginning of this chapter, and the cultivation of movement by reasoning--through understanding and regulation of the proprioceptive material. Along with this, he must make sure that the sense of hearing is always a leading and controlling element. . .Two aspects--the musical idea and the technical means for its realization--should go hand in hand. The musical idea, always going slightly ahead, should stimulate technical development. If technical aspects take the leading role, there is danger of degradation into superficial virtuosity."

The concept of reading music through shapes and patterns is futher developed by Hilley (1977, pp. 28-29). In order to enhance sight reading she recommends interval practice, particularly that of long chains of thirds. She uses carefully constructed abstracts that outline directional flow of three voices, step-wise ornamental passages, chord structure, fingering patterns, and chord names.

Clark (1975, pp. 49-55) writes of her plan to help her piano students learn to practice more efficiently. She visited each student during his practice time every day for one week. The first day she observed practice habits. During the next six days she worked to correct problem areas and build on strengths. Many of the problems she observed are

directly related to timpani and bar percussion practice habits: not practicing a work in small enough sections; no attempt to pencil mark fingerings (malletings and stickings), noted errors, and difficult patterns; lack of SLOW practice and HARD work; ignoring basics like clefs, key signatures, octaves, and rhythm; lack of concentration resulting in many pauses; waisting great amounts of time with "confusion"; playing straight through pieces; repeating automatically and without definite objective. Clark notes that some pupils had poor concepts of what fine performances were. She, at times, resorted to dramatics and teacher performances. Other areas of concern that Clark observes are: a tense attitude; little understanding of fingering patterns, lack of metronome practice; how to locate "trouble spots", glue phrases together, and visually jump from line to line and page to page; learning to sing sections in order to understand articulations and inflections; and shaping melodic and harmonic contours. Clark clearly espouses this kind of in-depth, short-term, teacher-student exchange.

Bar percussion malleting and timpani sticking are often determined by melodic and harmonic structures. The study of piano fingering patterns can be relevant to percussionists. Montandon (1975, p. 45) lists eight possible fingerings, all employed by well-known pianists, for the first eight notes of Beethoven's *Sonata Appassionata.*

Dawson (1976), pp. 20, 21) stresses ear-eye coordination in saxophone reading. Beginning with some step and leap combinations within an octave range, he moves on to more unusual intervals and octave misplacements in sight reading increasingly difficult music.

In *An Experimental Study of Perceptibility and Spacing of Music Symbols,* Wheelwright (1939) notes (p. 15) that, "Music read at twenty-six inches makes retinal images of only one-half the size of the same music read at thirteen inches." He observes that the piano score is read about 24 to 28 inches from the eyes and that orchestral scores are read from 24 to 60 inches from the eyes. Obviously the percussionist often reads with the music close to 60 inches from the eyes. This, combined with necessary flexibility in movement, creates a situation that needs further study. In relationship to percussion education, Wheelwright's (p. 3) major findings are applicable:

"1. Spacing is not used consistently or precisely in children's song materials to indicate time values.
2. Patterns of notes are successively compared more accurately when spaced in consistent proportion to time values than when not so spaced.
3. Music is sight-read and performed at the piano with significantly fewer errors when the symbols are spaced in proportion to their time values than when spaced in the traditional manner."

Without touching upon the more extensive problems encountered in reading beginning percussion literature, this research does prepare groundwork for future research by percussion educators.

O'Brien (1974, p. 39) explores note reading problems through the relationship of understanding symbols. He says, "The English language has twenty-six symbols, but there are only seven pitch names in music--discounting the #s and bs--and only five important note values (whole, half, quarter, eighth, and sixteenth), with two devices, the tie and the dot, to alter them. It seems that with half as many viable symbols, music reading should be twice as easy as reading English. This glib conclusion overlooks innumerable factors. The novice in language reading has been speaking for more than five years before he becomes concerned with symbols. He has had ample time to experiment with and test words."

Coker (1972, pp. 18-19) states, "A MUSICAL GESTURE is a complex stimulus to the response of composer, performer, and listener as well as to further musical development; it comprises a recognizable formal unit and consists of selection and organization of sonic and rhythmic properties in sonorous motion, which signifies other purely musical objects or non-musical objects, events, and actions. . .As with other kinds of signs, a musical gesture is capable of many different significations, which are explicated by reference to its semantic, syntactic, or pragmatic dimensions. . .Also, because of differences in interpretation, what is taken account by means of the gesture will vary from time to time with the same or different interpreters. . .Moreover, as suggested above, the situations in which the gesture appears and diverse contexts in which it is composed, performed, or heard influence its meanings."

In conclusion we may note that visual-aural problems of pianists and other instrumentalists are closely related to those of percussion. Further study in these areas is invaluable to the serious percussionist. Music symbol reading is another field that particularly demands the attention of percussion performer and educator. Percussionists need to study formal units from many frames of reference.

Pitch Recognition Factors.

Percussionists need to reassess beginning instructional concepts through the research of childhood aural development. Testing of the human and aural faculties in connection with melodic, harmonic, and rhythmic materials has been continuouly explored since the original contributions of men such as Seashore (1938) and Mursell (1937).

Gelber (1962) conducted tests with 1,000 Flemish children that are of particular interest to percussionists. The author noted that tonal perceptiveness increased strongly between the ages of four and six years. This was compared to the parallel increase in the familized use of language that occurs during the same years.

In Sergeant's research (1969), two surveys were made to determine the incidence of absolute pitch among musicians, and what environmental factors may have contributed to it. Sergeant noted that musicians with varying degrees of pitch recognition invariably drew the highest success when tones were played on the instrument that they

had first studied. This was consistent even if they no longer played this instrument. The younger the musician had been when he started his musical training the higher the incidence of perfect pitch. Generally musicians who began playing before the age of eight had tonal centered pitch memory; those after the age of eight had key centered pitch memory.

Early Childhood Education

Beginnings of early childhood education in the United States had three basic themes (Lazerson, 1972, pp. 33-53), that of social reform (often as a means of adapting the immigrant family to predominant culture values), introducing the uniqueness and importance of childhood, and reform of then current educational practices. The development of early childhood education involved persons whose contributions are valuable to percussionists as they explore this overlooked age. Among important names are G. Stanley Hall who fostered child study, two of his students, Arnold Gesell, authority on child development and Lewis Terman, authority on educational measurement. The kindergarten movement in the United States had its roots in the concepts of Friedrich Froebel (1782-1852). John Dewey recognized how industrialism dramatically altered the structures of society including the role of the home. In stressing the importance of the school filling a role vacated by the home, he emphasized problem-solving and socialization for the younger child. Maria Montessori (1914), dealt with patterns of learning that are directly applicable to music instruction. She stressed the strengthening of both motor and sensory functions and their connecting relationships. Music was an important part of her school program. The *Journal of Childhood Education* was established in 1924, opening avenues of communication that are still accessible to us.

In the areas of music instruction, the development of programs for the young child, generally named after the individual who conceived the idea, has a vital influence on our musical environment. The concepts of Kodaly, Dalcroze, and Orff have long traditions. Suzuki's influence has permeated string instrument instruction in the United States since the early 1960s; Yamaha music classes (piano orientated) for young children are established throughout our country. Though only a small percentage of our actual pre-school aged children are actively involved in these musical structures, bits and pieces of their ideas slip into most nursery school, kindergarten, and first grade classrooms.

An active study of these programs is important for percussionists for several reasons. From the previously mentioned studies about ear training we must be aware that the key to many of our ear training problems lies within the structures of early childhood.

In a comprehensive longitudinal study of the aural understanding of the musical elements by first through sixth graders, Petzold (1966)

demonstrated that the greatest growth potential (significant at the .01 level) was between the grades of one and three. Children in grades 3 through 6 usually performed on the test at approximately the same level of accuracy indicating that a plateau had been reached. Children with high or low scores for the initial year did not usually change their position in relationship to the other children during subsequent years.

Another important observation is that the above mentioned music programs usually make considerable use of various types of percussion instruments. Thus the children involved in these programs are being exposed to percussion sounds that mold their future expectations of percussion sounds. Of the approximately two dozen sessions of such organizations that the writer has attended, in only two sessions have percussion instruments been employed in ways that allowed the beauty of timbre and pitch to emerge.

In the Suzuki program, the child is exposed to good models of violin performance and musical interpretation in a systematic fashion from birth onward. With the addition of one or both parents also being involved in violin practice, the child has an optimum model to copy. If he were also involved in performing, observing, and listening to excellent percussion sounds, what would be his frame of reference in adulthood in comparison to others who had poor or no models? Thus the interchange between percussion educators and early childhood music educators could be of value to both groups.

Because physical movement is an essential part of these groups' activities, they are, along with child psychologists, questioning if movement may be the basis of much learning (Garson, 1973). Dexterity, strength, and size are not the large-scale problems many percussionists would envisualize with young students attempting percussion study along with the above programs. The writer has found a sturdy, walkable bench brings much of percussion playing within the range of younger children. A valuable guide to early childhood skills has been prepared by the Educational Testing Service for the Board of Education of the City of New York in 1965. It, along with an article on music-movement for young children, by Aronoff, can be found in the March, 1974, issue of *Music Educators Journal.*

Searching Outside of the Field of Music

In a profession as all consuming as that of the musician, we tend to ignore things of the "outside". Some of the better research, some excellent models for patterns of learning that encompass music performance are to be found through explorations in this direction.

Bruner (1968, p. 85) speaks about the need to organize: "One of the most notable things about the human mind is its limited capacity for dealing at any one moment with diverse arrays of information. It has been known for a long time that we can deal only with about seven independent items of information at once; beyond that point we exceed

our "channel capacity", to use our current jargon. We simply cannot manipulate large masses of information. Because of these limits, we must condense and recode."

Bruner (1966, p.5) also discusses the child's gradual acquisition of these organization and storage skills: "Growth depends upon internalizing events into a 'storage system' that corresponds to the environment. It is this system that makes possible the child's increasing ability to go beyond the information encountered on a single occasion . . . Intellectual growth involves an increasing capacity to say to oneself and others by means of words or symbols, what one has done or what one will do. This self-accounting or self-consciousness permits a transition from merely orderly behavior to logical behavior, so called. . . . Intellectual development is marked by increasing capacity to deal with several alternatives simultaneously. . ."

Besides the value of his analysis of types of learning, Gagne (1965) offers insight into learning motor skills. He first subdivides motor performances into "fine" versus "gross" performances, "gross" referring to those that employ the large muscles and most of the body, and "fine" to the smallest muscle movements that appear to require extremes of precision. He further divides motor tasks into "continuous" versus "discrete". Discrete tasks are ones of one stimulus and one response. Continuous tasks require continuous adjustments and corrections. Gagne's final categories are "closed-looped" versus "open-looped" tasks. "Closed-looped" tasks can be performed with the eyes shut.

Of "open looped" tasks, Gagne says, "some kinds of 'open-looped' skills are controlled in part by stimulation which must have the form of an intellectual plan, distinct from muscular feedback. Such is the case with the skills of piano playing. . . . In these instances, the individual discrete movements occur with rapidity that is too great to allow for correction based upon feedback from the muscles. The attainment of skill in such activities can apparently not be accounted for on the basis of a simple 'linking' of specific motor movements. Instead, it seems reasonable to suppose that the individual must acquire 'executive routines' or 'motor programs'."

In a sense similar to Suzuki's concept of employing several types of models (recordings of great artists, parallel parental study of the violin), Piaget (1932) stresses the importance of the parental image on the development of the young child. After the age of ten, Piaget tells us, the child no longer considers the game (in this instance Piaget studied the social structures of the marble games among the children that he was observing) sacred, eternal, and he no longer considers his parent as a Godlike figure, quasi-divine. Up until this age of the child, Piaget clearly implies the pervading strength of the parental model which the child copies.

Pertinent Questions to Explore

Within the framework of suggesting that percussion training perhaps should begin at a younger age for the child, should we question at what point should a child be confined by highly structured learning? Different ways in which varying societies treat the structural development of the child have been explored.

The high school percussionist needs to be able to play several instruments with quite varying techniques. He usually plays his part alone, which contrasts with the dozen or so players that inhabit a violin or clarinet section. He must maintain and repair a variety of equipment. He must choose from several tools when playing any one instrument. Composers, even at the present time, often do not write precise and consistent percussion parts, thus the percussionist often has to rewrite or improvise parts. His parts are often more rhythmically complex than those for other ensemble members. He should be able to read both bass and treble clefs. He is entrusted with several thousand dollars worth of the schools' equipment. Does the elementary school instrumental instructor encourage students who exhibit the necessary traits of maturity, responsibility, and musicianship to explore the field of percussion?

Because the Ohio State University percussion major who remained for two years generally exhibited more growth potential than expected, should we not ask the high school instrumental music specialist, the private percussion teacher, and the private piano teacher if they are giving as good of tools to the percussionist as they are giving to other students? Does the public school instrumental music specialist, because of his own feelings of inadequacy in the area of percussion skills, tend to ignore the percussion students so long as they do not misbehave and play their parts reasonably accurately? Has the private percussion instructor become involved in a wide enough variety of tonality experiences and teaching techniques to give the students a solid foundation? Does the piano teacher tend to become more involved with students who excel at playing the piano, and not consider how and what to teach students with special needs?

The influence of the parent and the home on the child's instrumental choice needs further exploration. Jager (1963) notes that the family unit does not transmit the whole of society, only the parts the parents deem appropriate or "good". He also stresses that early learning has primacy over later learning. What are our societies values in terms of which instruments highly motivated and supportive parents suggest to their children? Do percussionist educators need to educate parents whose children are likely to make fine percussionists about the beauty and values of percussion music?

Why should we seek to train better young percussionists when the field of professional percussion playing is already so crowded? This question is closely linked with discussions concerning the levels of

specialization. Madsen and Kuhn (1976) ask a number of pertinent questions concerning this issue and its direct relationship upon the quality of performing organizations at the various levels of education. Jersild (1933) points out that children, from a relatively young age are able to make thoughtful and realistic evaluations of their capabilities. Bettleheim (1962) suggests that a child of two and a half needs to and can be made aware of limitations of self and the acceptance of ones immediate surroundings and possibilities. Ausabel (1968) terms the elementary school age child a "generalist" and states that the child of this age needs to explore many avenues in order to have valid choices later in life. The writer questions the large quality gap that exists between the percussion performance within the major professional organizations in this country, the smaller professional ones, the semi-professional organizations, and the local amateur organizations.

Are we overlooking ways to further explore percussion opportunities? Many children, including those who eventually study other instruments, are intrigued by percussion instruments. Early childhood classrooms often make extensive use of simple percussion instruments. Could many young percussionists or other interested students become involved in percussion at an appropriate level without the rigid structures and wide range of skills necessary for fine high school band and orchestra performance? The writer thinks this is an avenue that needs considerable further exploration.

Teacher Implications

Percussionists Write of the Problem.

Leaders within the percussion profession are at least somewhat aware of the scope of the problem and its implications upon their profession. Because the percussion section is one of the smaller ones within the normal organizational frameworks, the profession itself tends to be somewhat small. In the past, due to the lack of well-trained percussion instructors, much of the United States was without the services of these specialists. Percussion leaders have, in the past, gone to great lengths to explain basic percussion procedures (primarily snare drum techniques) to the amateur. The advice to those students who have been far from the services of a trained percussion teacher has been consistent: start piano lessons and, as often as possible, travel to the professional percussionist for "real" lessons.

The college percussion instructor who teaches the percussion methods class is regularly confronted by the lack of ease exhibited by other musicians trying to master percussion techniques. Realizing that many percussion procedures are far removed from those employed by other instruments, some of these instructors tend to dwell on snare drum rudiments.

Mueller (1968) surveyed Wisconsin high schools and found that while 96% of the directors had received snare drum training, 66% had

received timpani training, and only 26% had received mallet training. These same directors indicated that they were the most unsure about teaching mallet instruments and timpani. Even if Wisconsin colleges and universities, after observing the results of this survey, immediately changed their percussion methods class procedures to correct this imbalance, the majority of the music teachers presently employed in the state of Wisconsin probably still reflect this lack of training.

Thus the problem, though it has tended to dwell upon the student, reflects back to the profession and its support from other music educators. As professional percussionists tend to become more assured and assertive, they voice ideas that are more encompasing in scope and they are more specific in demanding excellence. This new surety of purpose should be felt throughout music education circles.

Beck (1973, p. 13) addressing the New York State School Music Association Annual Conference, stated: "It is just as much a fault to have excellent equipment and poor players (speaking of student percussionists) as it is to have excellent players and poor equipment."

Britten (1973, p. 22) suggest, "It is not possible for a beginner to know the kind of musical and technical demands with which he will have to cope as he progresses to becoming a competent musical performer, be it for personal aesthetic enjoyment or involvement in the professional world. Such demands change due either to the individual's interest, the general trend of the world of music, or both."

As the writer questions the directions this inquiry has led, she agrees with a basic Suzuki tenet that percussion training is simply a tool with which to enrich the student's life potential through music. Mueller (1972, p. 173) states it thus: "The percussionist can and should be taught to play as musically as possible. He must be able to do more than play the right notes on the right instrument at the right time. Although accurate rhythmic interpretation and technical skills are essential to good playing, a musical application of these skills aimed at fitting the part into the total structure of the composition should be the true goal of the percussionist. Students must be made aware of the factors of musicianship: dynamics, phrasing, structure, form, style, tonal colors, balance and the relationship of all of these to their part. Musical playing will come about quite naturally if it is always expected of the student."

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THE STEEL BAND

by Gordon B. Peters

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The Steel Bands

Where African influences have blended with European and indigenous Indian musical idioms, as in the Caribbean islands, a flourish-

ing musical culture has developed. This culture has been expressed in various idioms such as the *Calypso* in Trinidad, *Voudon* in Haiti, and *Afro-Cuban* in the U.S.

An intriguing variety of percussion instruments has evolved from the various strains of developing instruments, such as claves, maracas, bongos, conga drums, and timbales. Among the more recent instrumental evolutions in the Caribbean area are the *Steel Bands* of the West Indies. An interesting history preceded these bands.

Many years ago, during the early European influx to this area, the British and other European ruling powers banned the use of ritual drums on islands in the West Indies. The colonists did so because they were greatly out-numbered by the Africans, and, in the effort to maintain law and order, some means was sought to inhibit the continuation of African tribal practices. In an attempt to shame the natives into European patterns, such practices were labeled as backward, savage, and primitive. Cooperative individuals were rewarded by types of work regarded as "plums" -- household duties or supervision of recalcitrant fellow Africans.

Introducing Subterfuges By Drum

This introduced a special kind of stress into relationships between Europeans and Africans, for in African life, the main musical medium, the drum, played an important part. At rituals, ceremonies, and gatherings of all sorts, it was the chief medium of expression. A ban of drums, therefore, threatened to remove one of the pillars of native existence. But the legal restraints on drumming merely resulted in subterfuges to obtain the same emotional effects. At the same time, the Europeans were not unaffected by what they were trying to eliminate. Syncopated hand-clapping, used in Negro Spirituals and songs, gave new life to the traditional Anglo-Saxon hymns. In the process of avoiding the letter of the ban on drums, cultural traditions of African drumming were mixed intimately with the Spanish musical heritage of melody and line.

This system of repression and discrimination against native cultural practices has often resulted in the decimation of the original culture, as in the case of the North American Indian. Yet the African clung to his tradition of drumming and kept it.

In the past 20 or 30 years, black musicians have found new means of beating out their rhythms. In the early 1920's garbage can covers were notably missing from the back porches of some Trinidad homes, and as late as 1928, Trinidadians were actively practicing Tamboo-Bamboo. This was a means of making musical rhythms by striking sticks of bamboo at the resonant joints. "Tamboo" was derived from the French *tambour*, meaning "drum."

"Bamboo" also finally was banned by the police when it degenerated into the making of weapons for group conflicts. Instead of making music, the players began sharpening the ends of the bamboo instruments for use as swords. To this day in Trinidad a license is needed to

beat on a drum!

The term "Bottle and Spoon" still awakens many memories in Trinidad. At parties and fetes in private homes, after the beverages had been drunk from the bottles, it became the custom for the celebrants to refill them with water and play them rhythmically with spoons. These sounds, harmonizing with the chanting of popular songs or calypsoes, became the substitute means of expressing the pent-up musical feelings of a people denied the right to freely use their more natural means of musical self-expression. The Bottle and Spoon for minor occasions and the Tamboo-Bamboo for major ones became the visible feature of the slowly diversifying evolution of a distinct musical-culture pattern developing among third and fourth generation Trinidad Negroes.

A New Story and Mussel-Rat

In the late 1930's a man by the name of "Spree" Simon discovered that different musical pitches could be sounded by striking the head of a steel oil drum in different places. This was an exciting discovery, and soon West Indians were playing steel drums of various sizes and designs.

Another "first" was the use of a steel container as a musical instrument in Trinidad. The story of this development was drawn from the memories of the men who were in the Lime Grove in Gonzales, one of the suburbs of Port-of-Spain. They recalled that sometime in early 1945, "the boys" were beating a little "Bamboo." One of the bass-bamboos burst, and the resulting gap in the rhythm was filled when someone accidentally hit the gas tank of an old auto chassis in the yard. This sheer accident started a chain of events that has had far-reaching consequences, and the person who hit the old gas tank is still known by the humorously quaint sobriquet, "Mussel-Rat." He was a bass-bamboo man of no mean proportions, and on realizing that the note of the empty gas tank filled the breach left by the bursting of the bamboo, he kept on stroking the tank, beat after beat.

V-E Day and the First Steel Bands

May 6, 1945 -- the night of the Allied victory in Europe -- adds another chapter to the story. The sirens were blowing, and the populace had been promised a "jump-up" to celebrate the end of fighting in Europe. After five years and eight months, once more the call to Carnival was heard. Old bamboos from former occasions were hauled from under the houses. But they had long since deteriorated and began bursting under the joyous beating. As each was discarded, the jubilant revelers took up whatever came to hand, preferably something metallic for the tones and vibrations necessary to keep the original rhythm and tempo of the Bamboo.

All this mounting crescendo gave life to something brand new -- the first steel band -- born from the rhythmic beat of old pots and pans, the booming of garbage cans, drumming of bamboos, and the chanting

of the famous Victory Road March. Gradually, these crude instruments formed the nucleus of organized orchestras, vying with rival groups in the Indies for notoriety and musical supremacy.

By the end of the week, that 1945 Victory Week, "Fish-Eye" of the famous Hell Yard (traditional headquarters of the Tamboo-Bambooists of downtown Port-of-Spain) had discovered that by bending a piece of reinforcement steel in a certain way and suspending it like a triangle from his thumb he could produce the tune of the first line of *Mary Had a Little Lamb.* By further experimenting he soon was beating out other tunes on this piece of steel.

The metal can-like instruments used in the steel bands came to be known as "pans." The first true pan to be used by bandsmen was a large empty cylindrical cookie container. This was hung around the neck, open and away from the beating hand. The other, or sealed end, was struck rhythmically with the edge of the open palm or the closed fist. This made the "whoomp, whoomp, whoomp" that became the main sound of the steel bands as the players beat on garbage-can covers, aluminum milk pails, and high tempered bits of steel. This strange cacophony of sound, so new and contagious, was the sound of Trinidad searching, albeit unconsciously, for a music of its own.

Pans Become True Instruments

The next development in this intensely exciting period was the discovery that beating a paint pan from the inside outwards with a hammer leaves bumps and hollows that reverberate in different pitches when the can is played. It was not long afterwards in the steel bands that the length of bent steel gave way to the pan that could produce simple melodies.

Trimmed with a hacksaw and tuned with a sledgehammer, the oil barrel produced a fragile, muted, bell-like tone. Sometimes it is compared to the tone of a marimba or a Hawaiian guitar, but most people feel the haunting sound is like no other music. Some of the drums are shallow and hung by straps from the musicians' shoulders. Others stand on the ground, waist-high. Bands may have as many as 30 pieces, and the barrels have been refined to the point that they can be as true to a polonaise by Chopin as to a calypso.

Pans by this time had really developed into instruments. In the rhythm section there was first of all the bass or tuned-boom. This consisted of three or four (today there are as many as six) full-sized forty-four-gallon oil drums. These are cut off at the bottom. The top is stretched by beating into a convex shape. The tones are then marked and "seamed" with a hammer and cold chisel. The pan is then burned and when considered to be just right by the tuner, oil is thrown on the metal. This tempers the steel, and the pan is now ready to be tuned.

Next in tone range is the cello-pan. This is somewhat like the tuned boom, but is rather shorter and has five or six tones compared to three or four tones for the booms. Generally, cello-pans are played hooked in

pairs to give the player more scope for chording. Also, there are guitar-pans with 14 tones. Sometimes these also are played in pairs.

Then, there is the queen of them all: the sweet Ping-Pong. This is a steel drum cut down about six or seven inches from the top. After these are stretched and tempered, the Ping-Pong is marked and tuned for 26 to 32 tones. A steel band is made up of any of the combinations of these pans. The variety of combinations is, of course, almost infinite, and so, consequently, are the arrangements of any tune.

Connotations of Terror

Still, the story of this musical genesis in the West Indies was not over. There was more to the new music than the shapes and sizes and tuning of the scrapyard instruments. The evolution of the steel band also was fraught with violence.

The memory of the garbage-can days lingered on, and before long they nearly went the way of Tamboo-Bamboo when they were banned by the Trinidad police, who were becoming alarmed about some of the social traits developing with the steel bands.

A new generation of steel drum beaters, raised in the poorest part of Port-of-Spain, seemed to have none of the ethical code of their fathers but to take their cues instead from Hollywood gangland movies. Inter-district fights, knifings, and worse crimes were commonplace, and the name of "steelbandsman" carried connotations of terror for many of the citizens. Life was exciting and adventurous where all was fair in love and fighting. Music, which represented both, was a perfect vehicle for irrepressible elements of the community.

Finally, though, a few crumbs of musical recognition began to be scattered before the bandsmen, and steel band players found that they could take their place in the scheme of things once their art was appreciated -- and even paid for. This recognition of the steel band as a worthwhile musical force produced prompt results. The wave of violence, which had for a time consumed Port-of-Spain, died quickly.

More new developments came as leading Trinidadians became aware that the bands, their people, and the changes they were making amounted to something that no amount of sneers, ridicule, or infamous labeling could stop. A movement began to coordinate the efforts of the bandsmen into the formation of what was to become the present Steel Band Association. To this end a committee was set up to organize the first island-wide steel band competition. This was in 1950.

The Bandsman Becomes Musician

The night of the contest performance came. The grandstand of the Trinidad Turf Club at the Grand Savannah was packed to capacity. Some came to wonder, some to jeer, some because there was nothing else to do, and some came to listen. Bands played what everybody expected: calypsoes, road-marches, and even a few sentimental ballads.

The final organization on the program was the Casablanca Steel

Orchestra. Their first piece was *The Bells of St. Mary's.* At the end there was a long sigh, as though the collective breath of the audience had been released. Then silence . . . until someone started to clap. Soon the whole audience broke into wild cheers. All were shouting for "More! More! More!"

Reveling in the glory of the moment, Russell Manning, the bandleader, lifted his arms. The crowd grew still. A slight movement of his fingers -- the band began to play -- and jaws fell open in amazement. For here in Trinidad, musicians who knew not a single note of written music, were playing a most professional arrangement of Chopin's *Nocturne in "E" Flat!* The audience followed the nimble-fingered players in rapt silence and attention. The steelbandsman finally had been accepted as a musician.

Ritual Becomes Entertainment

The African religious ritual, the emotional "spirit possession," and the voo-doo or "Shango" are still practiced literally or in sublimated symbolic form in some places through the islands and the Guianas. But the impulses that originally made ritual a universal practice are now liberated in the evolution of the steel drum. Followers of calypso may have wondered what has happened to this form in recent years. Today's calypso is sung to the accompaniment of a steel band. Tomorrow it may be something else.

Today there are hundreds of steel bands in Trinidad alone. The island's Tapso All-Star Band traveled to England for the British Festival. Others have been invited to give concerts and television performances in the United States. One band almost missed a New York television engagement because the customs officer would not allow their "pans" to come into the country as musical instruments. He finally listed them as "junk" and let them pass!

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Report of PAS Research Committee:
Dr. Harrison Powley, Chairman

Several important projects have been begun by this committee. In this issue of *Percussive Notes* an information-seeking form has been printed. We are attempting to revise and update the *Percussion Research Bulletin.* We urge all members of the Society who have published or who have completed percussion related theses or who are currently working on percussion related projects to complete this form (and additional copies as needed) and return it to me at the address listed below and on the form. The data will be published by the Society and will be updated in the *Percussionist* yearly. For those involved in percussion-related research, this listing will help to eliminate duplication of efforts as well as inform and hopefully bring together interested scholars. The committee is also completing an index to the *Percussionist* vols. 1-15; *Percussive Notes* will receive similar treatment at the end of vol. 20.

At the recent PASIC meetings in Tempe several papers on historical and performance problems were presented. These types of presentations will be continued at future conventions. Please send me your ideas and comments concerning these activities. If you want to read a paper or present a research oriented lecture/demonstration at future PASIC meetings, please send me an abstract of your proposed topic. When appropriate these papers will be published in the *Percussionist* or *Percussive Notes.*

Send inquiries and index forms to:

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Letters to the Editor

My Colleagues,

I cry out to you for a change. We must verify our art now; heaven knows it is late enough in this century to do so. Look through the vast numbers of programs submitted for reproduction in Percussive Notes and what is there . . . . Bach organ fugues played by 8 marimbas and a drumset, the Comedians Galop for xylophones and gongs, and lately choral works of Palestrina for marimba ensemble (it was a sin to play these sacred works on instruments in Palestrina's time and I dare say it should be declared so nowadays). These works of past centuries were conceived for specific instruments and make for a fine musical effect in their genre. To reproduce their music on percussion instruments can only be described as a rude and ludicrous parody of a great man's past work.

How can we expect other artists to take our ensembles seriously when we parade these burlesques before them, and attempt to pass them off as a serious art form.

We can and should be to the 20th and 21st Centuries what the string quartet was to the 18th and 19th. Are we to remain a vaudeville act to the end of time . . . . "Gizmo the Xylophone wizard". . . .

And yet there are scores of masterpieces that seem to be ignored. Works that establish the artistry of conductor and percussionist before all. And do they make necessary appearances in our programs? No, is the disheartening answer.

There is so much of this music that I hardly know where to begin . . . . how about with Varese. "Ionization" does receive its deserved number of performances around the country, but who amongst us is programming the other great works, "Integrales" and "Hyperprism" etc. Each of these contain percussion parts that are perhaps more demand-

ing than those in "Ionization". They absolutely belong on our concerts, we owe it to our students. And one rarely sees those two great masterpieces of 20th Century writing, "L'Histoire du Soldat" and "Facade" on our concerts; what great percussion parts those are. Learn them and conduct them, bring them before all your students and show them the pathway.

Why not borrow some of the university chorus and some advanced pianists and do "Les Noces" or "A Stopwatch and an Ordinance Map"; or a few brass players and play the Prologue to "On the Waterfront"; what is to stop us? There is so much more; "deMarteau Sans Matre" or "Et Expecto Resurrectionem"; I know I am leaving out so much first rate music.

Most of the works of John Cage and Lou Harrison are in print. I see that the rather innocuous "Three Brothers" is often done, to the detriment of Michael Colgrass' other superb chamber music for percussion. Or what about the incredible work of men like Daniel Pinkham, Don Erb, Gardener Read, Matthias Bamert or Andre Jolivet, or Samuel Adler?

If your aesthetic is indeed to the older music, there are several unique authentic works that can be done in deference to cheap transcriptions, but almost never are. What about the two Mozart Divertimenti K 187 and 188 with their unusual timpani parts; or an original production of the "Royal Fireworks Music" with enough pairs of kettledrums and sidedrums to create a breathtaking effect (one or two editions of parts are now in print). Don't forget the kettle drum marches of Philidor and Lully, or the military marches of Lully, Handel, Haydn and K.P.E. Bach.

There is another source of original 18th century percussion music. Several of the great composers of that time (including Geminiani, Handel, Mozart et. al.) wrote for the musical clocks and music boxes that were the rage. It would sound absolutely authentic to reproduce these on orchestral bells and other mallet instruments.

It will be said that the audience for these works, at least at the usual state university level will be small or hardly exist at all. But we must choose between the rarefied atmosphere of artistic fidelity or the crassness of commonness. In any case, we as artists, must hold true to the one tenet by which Joseph Haydn judged all musicians, "taste".

Eusebius: Master Raro, what is taste?

Raro: Taste, my dear young friend, is that hardly noticeable but essential ingredient to the graciousness of an artistic being. It is supreme appropriateness. But more than that, it is the germ within the spirit of the artistic being, his minute link with that upper sphere of existence; call it truth; manifest it in art and beauty. Or perhaps call it nobility.

Florestan: But how can one know that it is afterall present in a being?

Raro: You will know it by its veracity, its honesty, its sincerity. Those of wealth who fancy themselves aristocrats may not have even an inkling, and yet those of the humblest stations may be filled. For taste is classless and stationless. It is a gift or a state of existence which must be

cultivated. The swine will never know it, the cynical will shut themselves from it, but those who possess it will see its aura immediately and cling to one another and basque in each others perceptions.

Awareness will breed awareness, art will breed art, and great works if performed enough will take their places and we, ours.

David Davenport
Teacher of timpani/percussion
University of Kentucky
Transylvania University

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Time and Place

PASIC "1979" Oct. 26-28 New York City Hotel Taft Convention Center. For further details refer to next issue of Percussive Notes.

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We would like to express our appreciation to these outstanding organizations in the music industry for their support of Percussive Arts Society, Inc. and hope they will continue to consider PAS as a worthwhile and stimulating force in the percussion world.

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