

PERCUSSIVE NOTES

INDIANAPOLIS PERCUSSION ENSEMBLE
c/o 16 Digby Court
Indianapolis, Indiana 46222

Richard Paul

POINTING AT PERCUSSION

The Percussion Ensemble-Its Impact

by **Maurie Lishon**

(reprinted with permission from Chicago AFM "Intermezzo")

"Percussion" looks like it has finally "busted out" of its long embryonic state and is now bursting into full bloom! Percussion ensembles, groups comprised of 4 to 10 or 12 players, have **long** been rehearsing and performing all over the country; now the laymen are beginning to sit up and take notice of "the percussionist" and realizing that he is more than "just the guy on the drums."

The percussion ensemble is actually akin to chamber groups, string **quartets**, etc. which organize to perform works written with a specific complement of a family group of **instruments in mind**. The percussion ensemble is completely musically self-sufficient with such members of the family as vibraphones, marimba, xylophone, chimes, bells, **etc.** providing all the melodic **"front line"** necessary, prime example of the small group is our "Chicago Percussion Ensemble," composed of Jim Ross and Al **Payson** (of the Chicago Symphony Orchestra Percussion section), Gerry **Payson** (Al's wife and a fine all-around percussionist in her own right) and Roy **Andriotti**. This quartet has done several of the **Petrillo** Fund School concerts with tremendous acceptance by their audiences.

This new avenue has not only awakened the interest of many drummers, but has also produced many more fine "musician-drummers" from student ranks who, until the percussion ensemble came into being' could not get enough exposure to all around percussion playing (outside of **their** school band) to improve on an over-all basis. Some of these players **are** now starting to gain professional recognition as capable all-around performers; and I am certain that if asked, they would attest to the fact that exposure to certain types of percussion literature made them more cognizant of "the job to be done."

Years ago, **the** "studying drummer" went to a teacher - "**touched**" on all the percussion **instruments** in his studies as the **years went by**, and, in most cases, wound up as "a drummer" or a "mallet man", a "tympanist", etc., or 'in a very, **few instances**, an "all around guy."
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A MOTION AND MUSCLE STUDY OF PERCUSSION TECHNIQUE

by Lt. Donald W. Stauffer

(reprinted and abridged with the permission of the author from the U.S. Naval School of Music Clinic Manual 1959.)

The careful study of body movements with special attention to muscular fatigue and economy of motion as they relate to job requirements, has been an important part of the work of "Time Study" efficiency experts for many years in the industrial **scene**.

Even though the problems and goals of the technique of percussion performance are not identical to factory work situations, there are many principles that are significant in both areas of study. It is felt that a general understanding of the principles of motion, leverage, and action of muscles by teachers and students of the percussion instruments will **serve as** a basis for a more intelligent direction and assimilation of the learning **processes involved**.

Our study will not attempt to fulfill the functions of a method book and private teacher in spelling out in detail exact directions for performance upon all instruments of the percussion family. These sometimes are controversial due to differing viewpoints as to the musical end results' to be accomplished, as well as individual methods of approach: Rather it is our aim to present the various principles underlying the **movements** required in percussion performance in the hopes of clarifying the thinking of students and teachers in their evaluation of methods and results.

Muscular Action

Even the simplest of movements of any part of the human body is not the result of the action of a single muscle, but involves the coordinated assistance of other muscles either in active participation or **instation** ary tensing for contribution support, Thus the smallest of movements has some muscular **spread**.

More spread or active cooperation of other muscles is required either if the motion is of greater extent or if more force is **required**. In other words, if a motion is

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POINTING AT PERCUSSION(continued from page 1)

He did not have the fine recordings and recording orchestras to listen to, where modern arranging and orchestration has learned to take advantage of the percussion "sounds" to strengthen and punctuate ANY musical passages emanating from any melodic section of the orchestra. Now, attuned to the over all sounds, the percussionists are coming into their own as an integral part of the MUSICAL output of an orchestra. Very seldom today, will you see "one drummer" on a recording date, playing full drums and all the other percussion instruments. Why? Because the arrangements call for many percussion sounds simultaneously and it requires 2 to 5 men to produce them!

This is where "basic training" in percussion ensembles can help the aspiring PERCUSSIONIST to gain experience, and exposure to all the percussion "sounds" and literature in the same manner that string players, for example, can improve their techniques, and repertoire by playing with chamber groups in their own "instrumental family."

Editors Note:

PERCUSS-O-RAMA-63 held on Manday November 3, 1963 at Maine West High School, Des Plaines, Illinois, in conjunction with Frank's Drum Shop, Inc. was presented free to all persons interested in percussion. The Maine West High School Percussion Ensemble was featured. Clinical questions and answers were discussed by Gordon Peters, Chicago Symphony Orchestra and Northwestern University; Jake Jerger, one of Chicago's top professionals and director of the Maine West H.S. Percussion Ensemble; and Maurice Lishon of Frank's Drum Shop and percussion editor of Chicago AFM "Intermezzo."

DRUMMING AROUND

The Indiana University Percussion Ensemble under the direction of Prof. George Gaber was one of the feature performing organizations at the Indiana Music Educators Convention in Indianapolis November 21-23. A most significant statement by Prof. Gaber was that "nearly all cultures other than our Western Culture are percussion orientated in their folk and art music." The percussionist is a most important and respected member of musical ensembles in all of these other cultures. The percussionist has every reason to be respected on an equal basis with all other instrumentalists.

The Indianapolis Percussion Ensemble has welcomed versatile Dave Ertel to their group. Dave, who is a member of the double bass section of the Indianapolis Symphony Orchestra, performs on bass, piano, and celesta with the ensemble. His talents make him a very valuable and busy member of the ensemble.

The ensemble uses a complete mallet percussion setup consisting of marimba, xylophone, bells, vibes, chimes, celestette, and piano to exploit fully the melodic possibilities of percussion performance.

A percussion department has just been created at Illinois Wesleyan University headed by Bob Bankert, a graduate of the University of Illinois.

Ed Metzenger, who retired this past year after many years as timpanist with the Chicago Symphony Orchestra, is now teaching at Ball State Teachers College in Muncie, Indiana. This gives the Ball State percussion department two outstanding teachers in Metzenger and Erwin Mueller who divides his time between Ball State and the Indianapolis Symphony Orchestra timpani job.

Jim Sewrey is now percussion instructor at Wichita University. He had formerly been very active in percussion ensemble work and in teaching at Denver, Colorado.

The Chicago Symphony Orchestra Percussion Ensemble is now in its 7th season. A number of concerts and school programs have been scheduled in the Chicago area for the 1963-64 season.

The Indianapolis Young Audience's chapter's phenomenal first and second year strides have been lauded by Young Audiences, Inc. New York City--both for number of concerts booked and number of performing groups. As a member group of Young Audiences, the Indianapolis Percussion Ensemble is booked at present for 24 school concerts during the 1963-64 season.

PEOPLE IN PERCUSSION

(P.N. has had the opportunity to correspond with percussionists in several countries including Japan, Canada, and Argentina. We thought it would be of interest to our readers to hear of the activities of percussionists in other countries.)

Ruben Osvaldo Lago began playing percussion in small combos fifteen years ago. He is now timpanist with the Chivilcoy, Argentina Symphony Orchestra. At present he is studying

timpani under the prominent timpanist Antonio Yepes, who performs in the large Theatre Orchestra at "Colon." Mr. Lago also does jazz, radio, TV, and recording dates. He teaches drumming, and writes much of his own instructional material for his students. Makoto Aruga is first timpanist with the Japan Broadcasting Corp. Symphony Orchestra, and Chairman of the Tokyo Percussion Ensemble. He founded the first percussion ensemble in Japan (see programs). This past summer he attended the Berkshire Music Center held at Tanglewood, Mass. Mr. Aruga is presently studying timpani in Boston with Mr. Vic Firth, the timpanist of the Boston Symphony Orchestra.

PROGRAMS

Tokyo Percussion Ensemble	+Marching Trojans Percussion Concert
March 1963	+March 1963, Mentor, Minnesota
Makota Aruga, Director	+Miss Betty Masoner, Director
Percussion Music M. Colgrass	+Chant of the Jungle-Tom Toms
Sonata for Two Pianos & Percussion B.Bertok	+Old Dan Tucker- S.D.
Toccata for Percussion C. Chavez	+Solo Piece for Timpani (Britton)
Amores J. Cage	+Modern Jazz (Hanson)
Ionization E. Varese	+Petticoats of Portugal-Latin Amer. Instru.
*****	+Children's Marching Song-Bells
Pottstown, Pa. H.S. Percussion Ensemble	+Easter Parade- Marimba
August 1963	+A Certain Smile- Vibes
William J. Schinstine, Director	+True Love
Mallet Ensemble	+Tom Tom Foolery (Abel)
Pizzicato Polka Strauss	+Batter Up, Snare Down (Prentice)
Blue Moon	+Three Dances (McKenzie)
Pavanne Gould	+Lady of Spain
Percussion and Mallet Ensemble	+South of the Border
Speak Low	+Hawaiian Wedding Song
Hoe-Down for Perc. J. Missal (Mus. for Per.)	+Scotch Drumming
Rondina for Hand Clappers W. Benson (Marks Mus. Corp.)	
Girl Watchers Schinstine (Unpub.)	
Piece for Eight Snare Drums Schinstine (unpub.)	
Rat Race for Percussion Ensemble Schinstine (unpub.)	
A Salute to the S. and S. School Schankwesler (unpub.)	

PUBLICATIONS

CONTEMPORARY STUDIES FOR SNARE DRUM by Fred Albright, pub. Henry Adler, Inc. \$2.50. This book contains 64 pages, of which 62 pages are advanced etudes for snare drum. The text is limited to a few very brief remarks at the top of some pages. The emphasis is on advanced reading material. The studies exploit in a great variety of ways two of the most important aspects of contemporary composition, namely: (1) artificial divisions, and (2) changing, asymmetrical meters (i.e. 5/4, 7/4, 3/8, 5/8). This book is one of the finest new collections of etudes for the professional and college level percussionist.

FIVE SOLOS AND ONE DUET by Harold Firestone, available from: Trafford Drum Studio, 1717 Southwood Drive, Elkhart, Indiana, \$2.50.

For those of you who are familiar with the great success that Mr. Firestone had in developing consistent 1st division rudimental contest winners, this release of his original solos is a welcome addition to the rudimental contest literature.

MINUET TRES ANTIQUE Serge de Gastyne Pub. Fereol Publications, Alexandria, Va. 75¢

Serge de Gastyne is a modern composer who has taken an interest in writing for the vibes in a vein other than jazz.

This lightly scored, delicate number is for unaccompanied vibes. The suggested method of performance is to use four mallets and to strike the indicated mallet on the arpeggiated figures; this rather than running up the arpeggios with two mallets. This four mallet arpeggio technique is not widely known or used, however it offers great possibilities for musical and technical execution on mallet instruments. Solos such as this one that favor this technique may help to bring this style of playing into greater use and acceptance.

SOLO AND ENSEMBLE LITERATURE FOR MALLETT PERCUSSION INSTRUMENTS compiled by James Dutton, available from: Musser, Inc., 8947 Fairview Ave., Brookfield, Ill., \$1.00.

A graded listing of method books, studies, collections, and solos for keyboard percussion instruments. An annual supplement is planned to keep this publication up to date. Of special value are extensive listings of manuscript material available from several sources.

SCHINSTINE-HOEY INTERMEDIATE METHOD by William Schinstine and Fred Hoey, pub. Southern Music Co. \$3.50.

This method is a new approach to teaching drums beyond the elementary stage. It was designed to encourage a better understanding of the exact technique of execution of all drum rudiments as well as many varieties. Each section includes a solo, a duet, plus the explanation of the technique. Student tests and creative writing projects are innovations of this text also. A liberal number of photos help with the explanation of the standard traps such as, claves, maracas, triangle, castanets, suspended cymbal, etc. The authors have had a great deal of teaching experience and their techniques should prove of value in teaching the intermediate level percussion student.

PERCUSSION DISCUSSION

Joel T. Leach, percussion instructor at Michigan State University writes; "I just read your excellent article in the latest P. N. publication and was thrilled to hear that you are among the ranks of those who cite the poor percussion training given band directors in college as one of the causes of the poor quality of "percussionists" in our high schools today. This particular area needs prompt revision if the graduates are expected to be able to conduct a well rounded program where they choose to teach. It is too bad that we graduate so many high school drummers and so few percussionists!"

Thomas A. Brown, State Chairman of Percussion for New York State School Music Assoc., writes; "I thoroughly enjoyed the articles in your October issue of P. N. In the future I will send you news items or information about percussion in New York State. The best of luck to you with this paper, for it is certainly a worthwhile contribution toward promoting percussion in many ways."

PRODUCTS

Al Payson of the Chicago Symphony Orchestra percussion section makes and sells a castanet machine consisting of two rosewood castanets mounted on a rosewood block. The base is padded, and the block has impressions in it to match the "sound chambers" of the castanets. For information write: Al Payson, 6146 N. Ozark, Chicago, Illinois. 60631.

The editors of P. N. acknowledge with appreciation the contributions since last issue from the following firms and individuals. Their support and interest has helped keep us in the mail.

- Emile Sholle- percussionist Cleveland Orchestra
- Musser Marimbas, Inc.
- Fred B. Young- perc. student Eastman Sch. Music
- Sandra Roseblum- perc. inst. U. Kansas
- Al Payson- percussionist Chicago Sym.
- John K. Galm- perc. U.S. Air Forces Band

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Stauffer (cont. from page 1)

through a range of one inch, the number of muscles involved, and the amount of energy expended by each one will vary in direct proportion to the intensity of force required by that motion. Similarly, if a given force is required, the number of muscles and degree of energy expended of each is in direct ratio to the spacial range or extent of the movement. It follows that the minimum spread and energy would be required for a very light movement of negligible force such as lightly tapping a table with a finger while the hand and arm rest on the table. This is in contrast with the maximum coordinated response of the muscles of the entire body which might be used in a movement of greatest extent and force such as the powerful swinging of a heavy sledge hammer for greatest possible impact.

A muscle works most efficiently when operating up to one-half of its total potential power. In demanding close to the maximum capacity of a muscle, not only is endurance sacrificed because of the early onset of fatigue, but also fine gradations in sensitivity of control become more difficult.

The activation of movement is never located at the joint making the motion, but always involves a muscle located closer to the trunk. Thus, a finger movement is caused by muscles in the forearm etc.

Most movements are not restricted to the motion of a single joint, but involve the active coordination of two or more fulcrum points, which decidedly enlarges the spread or scope of the muscular complex used. This principle is not always apparent to the casual observer.

THE LAWS OF MOTION

The first law of motion which includes, but is more inclusive than the law of gravity can be stated as follows: A body acted upon by a constant force will move with constant acceleration in the direction of the force, and the amount of acceleration will be directly proportional to the acting force and inversely proportional to the mass of the body.

Secondly, inertia is that property of matter by which it will remain at rest or in uniform motion in the same straight line or direction unless acted upon by some external force. More commonly stated, a body at rest will tend to remain at rest, and one in motion tends to continue in motion. Our experience points to the fact that the heavier and more massive a body is, the more it shows this property of inertia.

The third law of motion is the principle of action and reaction, which can be stated thus: When any object is given a certain momentum in a given direction, some other body or bodies will get an equal and opposing momentum.

BASIC SINGLE STROKE STUDY

The percussion instruments by definition depend entirely upon the forceful impact of a striking agent for production of tone. In every case the tone is greatest at the moment of striking, and dies away suddenly at first and then more gradually after reaching a much lower dynamic level.

The two resulting factors that are of greatest concern in the study of the single stroke are (1) loudness (intensity) and (2) quality (timbre) of the resulting sound. These factors, of course, are caused directly by the amplitude and character of the motion of the vibrating agent itself which in turn excites the surrounding atmosphere into similar pulsations. Since the vibrating agent is excited (in our study) only by a percussive stroke of some kind, differences in dynamics or timbre of a given instrument can only be caused by (1) differences in the stroke itself or (2) weight and texture variations in the striking agent.

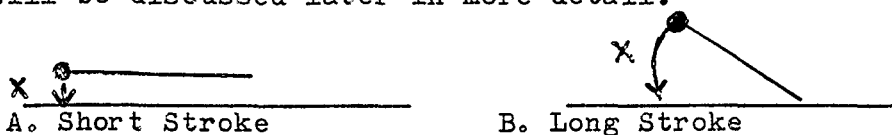
There are six principle factors involved in the act of striking that affect the intensity and timbre of the resultant tone. They are: (1) The weight of the striking agent. (2) The speed with which the striking agent comes in contact with the vibrator. (3) The point of contact of the striking agent with the vibrator. (4) The angle at which the striking agent comes in contact with the vibrator. (5) The flexibility or elasticity of the striking agent. (6) The total area of the striking agent that comes in contact with the vibrator during the stroke.

The weight of the striking agent will determine the degree to which the vibrator is thrown out of alignment when being struck. The weight factor is of course intimately related to the speed of stroke in this and other considerations. The principle of inertia (a body in motion tends to remain in motion) causes a heavier object to be more difficult to stop than a lighter one when both are traveling at a given speed. Consequently a heavier beater will cause more displacement of the vibrator than a light beater, other factors being equal.

The speed of the striking agent at time of impact is, along with weight, in direct ratio to the amount of displacement caused. This is also a result of the law of inertia. Therefore, the heavier the striker, and the faster the speed of the stroke, the greater will be the displacement caused by impact on the vibrator. Greater amplitude of vibration will issue with a resulting louder sound.

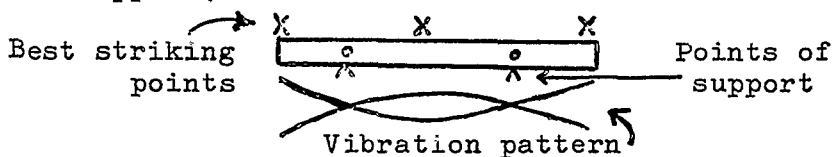
It should be noted at this point how the length of the stroke varies inversely with the degree of force required to overcome the resistance of inertia (a body at rest tends to remain at rest) and cause the beater to move at a given speed. The beater should be traveling completely under its own momentum at the instant it strikes so that the natural elasticity of the vibrator will cause a sudden rebound of the beater in keeping with the natural period of vibration of the struck object. It can be seen that if the inward force is still being applied to the stroke at the point that the elasticity of the displaced object has stopped the stroke and is attempting to repel it in the opposite direction by regaining its original shape, a stalemate will occur that will largely nullify the sound.

In order to obtain a given speed at the time of impact, much more acceleration is required through distance x in example (A) than the greater distance x in example (B). This required a sudden surge of greater force to accomplish the required acceleration in less time. This factor will be discussed later in more detail.



The manner in which the vibrator reacts is dependent to a certain extent upon the place that it is struck. Percussion instruments as a class do not conform to the usual pattern of overtones as exist in string or wind instruments, due to the highly varying types of vibrators utilized by the various members of the group. Erratically tuned upper partials are the rule even in the so called definite pitch instruments such as timpani, bells, xylophone, etc. Percussion instruments of fixed pitch have two types of vibrators: namely (1) suspended bars and (2) stretched membranes (plates).

The greatest number of fixed pitch percussion instruments make use of the suspended bar vibrator. The suspended bar does not vibrate as a complete unit with no nodes as is true of the fundamental tone of the stretched string. Rather it vibrates with two nodal (stationary) points at approximately one-fourth and three-fourths of its length. These should be the points of support, so as to least interfere with free movement.



The best striking points illustrated above are in the center or at either end, so as to elicit the fundamental tone to the maximum extent.

The timpani illustrate the best example of the stretched membrane with a definite pitch. Here, due to the fair harmonic agreement of the higher modes of vibration, the beating is usually done near the rim so as to accomplish the maximum clarity in pitch definition, by enlisting the aid of the supporting upper partials. In the bass drum, where a full resonant boom is preferred over exactness of pitch, the striking is customarily done near the center.

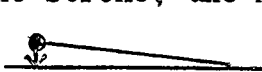
The angle at which the striker comes in contact with vibrator is best illustrated, and has greatest effect in the glancing blow technique common among bass drummers. The greatest advantage seen through using this practice is in the more natural rebound accomplished from the displaced membrane.

The flexibility or elasticity and the area of contact of the striking agent are two factors that work together for much the same effect in the resulting sound, namely the reduction of the shrill and dissonant higher modes of vibration that accompany impact noise on certain percussion instruments. This is so because the greater area and longer duration of contact covers the nodal points of the small segment oscillations of the highs without materially affecting the fundamental vibration. The resulting practical situations are not difficult to understand. Consider the effect of striking a bass drum with a snare drum stick where both weight and elasticity are minimized, as against playing the high bars of a xylophone with large heavy gong mallets, where sharpness of contact is indicated to properly excite the relatively inflexible wooden bars.

REPETITIVE STROKE STUDY

The consecutive repetition of single strokes bring another dimension into our study, namely time. If all the strokes under consideration are to be of the same dynamic level, this may be accomplished by keeping the weight and the momentum speed at impact the same in all cases. Thus if we slow up the tempo of playing by increasing the time between impacts, a greater arc of travel will logically ensue to accomplish more natural stops and starts and acceleration in the outer portion of the beat.

It should also be observed at this point the positive relationship between length of lever arm and the difficulty with which it can be wielded into stops, starts, acceleration, and deceleration. This can be dramatically demonstrated by tapping the finger on a table as fast as possible through a distance of one inch using a movement from the knuckle joint, and then doing the same movement with a stiff arm from the shoulder joint. If we can accomplish this at all at the same speed it will be done only with much greater difficulty and energy expended. The principles discussed above might be summarized in a shorter form as follows: (1) The longer the stroke, the more time will be consumed between repetitions other things being equal:



(2) The longer the lever arm, the more time will be consumed between repetitions, other factors being equal:



In combining these two principles given above, it may be said that the smaller the interval of time (faster repetition) between strokes, the more necessary is the short stroke with short lever arm with greater compensating power for a given dynamic level. Therefore, to insure the greatest speed of stroke repetition by an individual, the beater should never be raised more than necessary, thereby keeping the strokes as short as possible, and ascertain that the lever arm is the shortest one practical to use. Just how this is done involves a careful study of the human anatomy as it might be adapted to the problem at hand.

MOTION AND MUSCLE EFFICIENCY

- (1) Movement at the Wrist- This type of arm movement is most adapted to strokes of light moderate intensity.
- (2) Movement at the Elbow- For a given performer, this type of movement makes possible a much more powerful blow by using the strong muscles of the upper arm for actuation. This must be accompanied by a sufficient degree of stiffness of the lower arm muscles acting upon the wrist and hand, as well as fixed shoulder muscles to get needed rigidity.
- (3) Movement at the Shoulder- The most forceful of strokes can be accomplished by using the shoulder as a fulcrum with powerful muscles of shoulder and back activating the whole arm. In this way the greatest arc of travel, weight, and length of lever arm are employed.

PRACTICAL APPLICATIONS

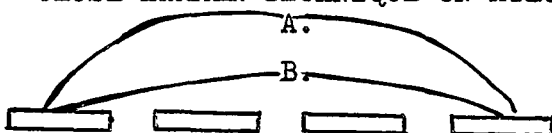
The features of percussion technique which may receive most benefit from understanding and application of the basic principles of motion and muscle as given in this study are: (1) speed of repetitive strokes, (2) proper control throughout the dynamic extremes, and (3) maintenance of sustained control through minimizing the influence of fatigue.

The speed of repetitive strokes has already been referred to during the course of this study. In the case of single strokes on any of the percussion instruments the general principles will apply. If it is desired to obtain the utmost speed of repetition of single strokes in any situation, the following factors should be studied for possible improvement: (1) Shorten the Fulcrum Arm. This may be done by using a more remote joint of the arm for fulcrum movement (transfer from elbow to wrist) or by grasping the striking agent at a point closer to the striking point. (2) Shorten the Stroke. This makes necessary a more powerful muscular impulse to produce the necessary acceleration in a shorter arc, in order to obtain a given dynamic level. (3) Utilize the Double-Bounce. This is, of course, standard practice in snare drum rolls, but may be utilized in other special situations where sufficient elasticity promotes a lively rebound of the basic stroke. (4) Closing in the Double-Bounce. This is essentially shortening the stroke as in 2 above, but by a different process.

Attention should be directed to the speed principle in relation to the hammer technique on the xylophone and marimba. Advanced students sometimes wonder why they cannot work up their technique to a faster tempo, while totally ignoring the simple principle of closer strokes. In many cases of this kind, consistent practice of routine exercises and scales

keeping the hammers as low as possible will bring better results in speed of execution.

CLOSE HAMMER TECHNIQUE ON XYLOPHONE



It can be seen that in the case of the low stroke in B. a much shorter distance is traveled, thereby decreasing the time necessary between strokes.

Proper Control in Dynamic Extremes. In considering this factor, we should keep in mind the principles of muscular efficiency mentioned earlier. If a muscle is performing a task too menial or too demanding, its sensitivity of control suffers. To obtain maximum efficiency, the movement should be made as moderate as possible in terms of muscular effort. This can be accomplished in the case of heavy strokes by using more powerful muscles. This is done by shifting the fulcrum point toward the trunk (wrist to elbow or shoulder) where more powerful muscles control the movement.

It is difficult to get amateur musicians (and professionals too) to perform the extremes of PP and FF. As a practical matter, the conductor may achieve the desired result more effectively by recommending strokes of an extreme nature to correspond to the dynamic extreme desired. For example, if pianissimo is desired, ask the performer to play with an extremely short stroke where it would be practically impossible to play very loud. And in contrast, if extreme Fortissimo is desired, a large free swinging motion from the shoulder will, in certain cases, be suitable and more effectively assure that it will be carried out as desired.

Another very common source of early and unnecessary fatigue lies in the undue tensing of antagonistic muscles due to excessive nervousness or intensive attention and endeavor to play a passage up to or beyond ones' ability.

A certain amount of tensing of antagonistic muscles is necessary, as was brought out earlier, to sustain a given posture against the force of gravity, and in opposition to the force exerted in the stroke itself. This is frequently exceeded, however, for the reasons stated above, and amounts to the muscles needlessly wearing themselves out by fighting each other for no good cause. Attention should be directed occasionally during performance to the problem of making the necessary movements with the greatest amount of relaxation possible. If this is done consistently, normal and necessary tension will become a matter of habit and a big source of needless fatigue will have been eliminated.

CONCLUSION

It is hoped that a careful studying of this paper will awaken the reader to many of the physical, psychological and physiological principles as they contribute to the proper performance of percussion instruments. Even though the number of concrete illustrations of actual practical application of the principles brought forth have been kept to a minimum, it is hoped that the reader will here acquire a background that will enable him to properly and intelligently evaluate methods and procedures in the performance and teaching of the percussion instruments.

THE AUTHOR

Lt. Donald W. Stauffer is the Third Leader of the United States Navy Band, Washington, D.C. During his military career he has served as a member of the Navy Band, as leader of the New York Naval Base Band, and as head of the Academic Training Department of the U.S. Naval School of Music.

He earned his Bachelors and Masters degrees and the Performers Certificate from the Eastman School of Music; the Doctor of Philosophy in Music Education degree from Catholic University; and has taught on the staff of both institutions. Prior to entering military service in 1942 he was a member of the Rochester Philharmonic Orchestra.

He is the author of a widely quoted book, "Intonation Deficiencies of Wind Instruments." His professional memberships include the Acoustical Society of America, the American Institute to Physics, and the Phi Mu Alpha Fraternity.

In the next issue, P. N. will continue its series of articles on percussion departments of colleges and universities with a writeup of the percussion department of Indiana State College, Terre Haute, Indiana.

We would like to write up as many percussion departments as possible and we welcome information concerning your programs. - The Editors.