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THE UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

THE DEVELOPMENT OF A MANUAL FOR THE INCIPIENT SCHOOL ORCHESTRA DIRECTOR

A DISSERTATION

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BY

DONALD WARD DILLON

1970

THE DEVELOPMENT OF A MANUAL FOR THE INCIPIENT SCHOOL ORCHESTRA DIRECTOR

APPROVED BY

DISSERTATION COMMITTEE

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THE DEVELOPMENT OF A MANUAL FOR THE INCIPIENT SCHOOL ORCHESTRA DIRECTOR

CHAPTER I

THE PROBLEM

Introduction

In the early 1930's interest in school stringed instrument programs in the United States began a gradual decline, reaching its lowest ebb near the end of World War II.[1] This decline of interest is often attributed to the changing socio-economic climate of those years and the rising popularity of the rapidly growing school band movement.[2]

During the mid 1950's music educators became alarmed at the neglected state of the school orchestra, and as a result of their concern there was a national resurgence of interest in stringed instrument instruction. Organizations such as the American String Teachers Association, Music Teachers National Association, American Symphony Orchestra League, and others concentrated efforts to spark renewed interest in the

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[1]"The Strings Enjoy New Life," Music Journal, XXIV (May, 1966), 32.

[2]Henri Temianka, "The String Problem," Instrumentalist, XXII (September, 1967), 62-3.

existing school stringed instrument programs, encouraged communities to implement new programs, and helped to establish community orchestras and chamber groups to increase adult participation in orchestra and string ensemble performance as a recreational activity.[1] With the introduction in the United States in the late 1950's of Suzuki's Talent Education Program, a rapid awakening to the feasibility of innovative pedagogical practices occurred among music educators. Such concentration of interest on the part of those personally and professionally involved with orchestral music helped to foster a growing interest in stringed instrument and orchestral participation at the school level.

The signs of an expanding interest in stringed instrument participation became increasingly apparent when, according to the American Music Conference, during 1966 more than 130,000 young musicians were enrolled in 300 summer camps in America; stringed instrument ensemble instruction was provided by 91 per cent of those camps and orchestral instruction by 26 per cent. The availability of string instruction is claimed by the American Music Conference to have played a major part in the 900 per cent increase in summer music camp enrollment since 1950. An increase in youth symphonies has also proven an encouraging sign of growth. Now more than 350 youth

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[1]"Strings Enjoy New Life," 76.

orchestras are active in the United States, with two-thirds of them established since 1960.[1] These trends may do much to alleviate the shortage of qualified stringed instrument players felt during the past few years by the major symphony orchestras in America.[2]

The American Music Conference also estimated that in 1966 more than 400,000 school age children were learning to play stringed instruments and more than 1,500,000 Americans of all ages were playing stringed instruments on an amateur basis.[3] Involvement in orchestral music is not limited to, nor does it stop at, school level. Stringed instrument performance also provides exceptional opportunity for continued participation in adult life. An organization called the Amateur Chamber Music Players had 6,500 members listed in 1966; more than five times their membership of 1949. The American Symphony Orchestra League reported a listing of 1,400 orchestras with 88 per cent of their total membership made up of amateur players. This shows an increase of 750 orchestras in only ten years.[4]

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[1] Ibid.

[2] Louis Krasner, chairman, "String Problems: Players and Paucity," The Tanglewood String Symposia, Syracuse, N. Y.: Berkshire Music Center, 1965, p. 1.

[3] "Strings Enjoy New Life," 76.

[4] Ibid.

Need for the Study

One result of the expanding interest in stringed instrument participation over the past decade has been an increasing shortage of qualified teachers.[1] To alleviate the growing demand by schools for qualified stringed instrument specialists to organize and instruct stringed instrument classes and orchestras, band directors on the secondary level are being asked to add the school orchestra to their directing responsibilities. In many cases these persons may have had only limited training on stringed instruments through a college methods course and/or limited association with orchestras from concert attendance or possible wind or percussion instrument participation. As good musicians, they are able to assume the duties by applying the skills developed from their band experience, but soon realize the necessity of knowledgeable assistance if the orchestral program is to grow and develop as they desire.

There are many excellent reference materials and books published relating to stringed instrument performance, but the majority are geared to the studio stringed instrument specialist. For these publications to be of practical value it is often necessary for the inexperienced orchestra director to seek further explanation from a specialist who can assist him in gaining a more complete understanding of the detailed

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[1] Gerald M. Doty, "The Present Status of String Teaching," American String Teacher, XII (May-June, 1962), 5.

technical involvements of stringed instrument performance. Should no specialist be available, the band director-turned-orchestra consultant may be understandably confused. Such a situation makes confident application of the information gleaned from reference books difficult if not impracticable.

The incipient school orchestra director is in need of a source of practical, concise information to which he can refer in problems of stringed instrument technique and orchestral routine. This information must be simply explained and applicable to the school orchestra program, yet authoritative.

Statement of Purpose

This project has as its purpose the development of a manual designed to aid the inexperienced orchestra director in better fulfilling his duties with the public, private, or parochial school orchestra program. The manual is an attempt to describe clearly and simply some of the more involved technical aspects of stringed instrument playing and to present practical and usable information in regard to orchestral development and stringed instrument technique.

Delimitations

The delimitation of this project centers on the audience to which it is directed. The manual is geared to the school band director who, though lacking in extensive orchestral background or experience, finds it necessary or opportune to accept the responsibility of a junior or senior high

school orchestra. In an attempt to make the text both readable by, and useful to, one with a peripheral knowledge of orchestral technique, simplicity and clarity were principal stylistic goals. The information contained within the manual is limited to those techniques of stringed instrument playing and orchestral routine that will prove most useful to the director of a school orchestra. Reference to advanced professional techniques of stringed instrument performance has been omitted--except for those applicable to the most advanced school orchestras.

Procedures

The experience and knowledge of the author was fundamental in the procedural organization of this project. The author has a personal knowledge of the difficulties faced by the inexperienced orchestra director, having confronted the same problems early in his career. In addition to the experiences of developing an orchestral program on the secondary level, the author has observed at close hand the problems faced by other band directors given the opportunity of school orchestra directorship. This observation and personal experience are the basis for the development of this manual.

A survey of all available written materials relating to orchestral development and stringed-instrument technique was made in order to compile and collate the knowledge and experience of others. Consultation with successful school

orchestra directors, stringed instrument specialists, repairmen, and professional stringed-instrument players helped to refine and clarify much of the information.

CHAPTER II

IMPLEMENTATION OF THE STUDY

The primary concern during the implementation of the study was to produce a valuable reference tool to which the orchestra director could refer for expedient and practicable information regarding stringed instrument performance and orchestral routine applicable to the junior or senior high school student. To provide such a tool it was necessary to survey the literature related to the subject written by seasoned teachers and proficient performers in order to acquire their knowledge and ideas. The bibliographical listings at the end of this paper confirm that vast quantities of relevant material on stringed instrument technique are contained in trade journals that are probably unfamiliar or even inaccessible to the non-stringed instrument player. Access to these journals soon proved to be a difficult problem because of the lack of complete holdings by any one library. Appreciation should be directed to the libraries of North Texas State University, Denton, Texas, and Wichita State University, Wichita, Kansas, for their aid in locating specific serial publications.

The vast amount of detail collected in such an undertaking soon signaled the need for some basic criterion upon

which the material could be measured if it were to be applicable to the needs of the school orchestra director. There was an abundance of material containing too wide an application of techniques for the somewhat restricted needs of an inexperienced director, or overlappings of opinion and theory that would prove confusing to distinguish and separate, and therefore difficult to apply. It was felt the most satisfactory criterion for evaluation of the pedagogical techniques delineated in the related literature was the personal judgment of teachers already proven successful as school orchestra directors. When selective judgments were necessary, they were guided by informal consultation with stringed instrument players and orchestra directors who had achieved the successful development of orchestras and stringed instrument programs. With few exceptions, consultative responses were in general agreement with the author's experiences.

Most authorities agree that the primary factor in the development of a successful school orchestra program is, as noted by Stulberg,[1] the desire for the program. A desire on the part of the director serves as the fundamental assumption upon which the manual is designed, for without it no stringed instrument or orchestral program can hope to sustain itself. Once the desire has been established it is mandatory to beget

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[1]Julius Stulberg, "Orchestras in the Schools of Michigan," School Musician, XXXII (November, 1960), 48.

an auspicious and exciting orchestral program if the interest of the student is to be earned and maintained.

The tonal and visual attributes of an orchestra can fully develop only if the director has a basic understanding of correct playing position for each of the stringed instruments. There may exist many subtle variations in playing positions; however, those described in the manual are presented in their most fundamental aspect, providing a correct foundation for adjunct qualification by the string specialist or private instructor. Some of the more common faults of young stringed instrument players are mentioned and corrective measures enumerated to guide the director in establishing correct playing position.

Brief and simple statements of the basic fingering patterns for each stringed instrument are presented only in the lowest position to avoid the complex and oppressive fingering diagrams often accompanying stringed instrument methods or texts. In general, the same principles will apply in higher positions so the director may apply these principles as necessary. Such simple, easily understood explanations will prove of more value to the inexperienced director than the inextricably detailed charts of complete fingering patterns sometimes perplexing even to stringed instrument players themselves. A brief introduction to cello extensions was presented since it is most important that young cellists be correctly taught to use extensions as soon as required by the interval or key signature.

The student's ability to shift smoothly and accurately from one position to another will not only increase the note range and make various tone colors possible, but will facilitate the performance of more difficult music. Although Matesky and Rush[1] suggest as many as five shifting procedures, the three shifting principles normally applicable to younger students will be the shift from an open string, the shift using the same finger, and the shift requiring a change of finger. The director who understands the three functional actions described in this manual will be able to guide his students in the development of smooth shifting movements.

The use of vibrato throughout the stringed instrument sections of an orchestra will help sustain a quality of mature warmth of orchestral sound. A controversy does exist on the correct form of vibrato to be used by the stringed instrument player, and on this subject Galamian has stated:

> The schools are, at present, divided on the question of what is the right form of vibrato. Should it be performed by the arm, the hand, or the fingers? Each of these three types has its characteristics, and I feel that because of their different color possibilities all three should be developed and used. The variety resulting from the combination of these three types gives the performer a far wider range of coloring and expressiveness and a more personal tone quality. . . . The developed vibrato may be centered either in the arm, the hand, or the finger, and that particular type will then predominate, but, if there is no stiffness to prevent it, each vibrato type will normally bring about an

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[1] Ralph Matesky and Ralph E. Rush, Playing and Teaching Stringed Instruments, II (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1964), 47.

> interplay of the neighboring muscles and therewith introduce elements of the other two types.[1]

Brief explanations of the kinaesthetic movements involved in the production of vibrato are included in the manual to provide the director with a mental picture of the correct fundamental motions. At the secondary level the director will find it more necessary to encourage the use of vibrato rather than to implement its instruction, for the student of high school age should have already received, from his private instructor, a knowledge of the basic techniques of vibrato.

A brief discussion of the French and German string bass bow has been included to acquaint the director with the relative merits of each. Even though there exists a running controversy over which bow is "best," excellent players are continually being developed by both schools.[2] With practice, a conscientious, talented student will develop successfully regardless of the type of string bass bow he chooses for his own use.

A student with good bow control and a variety of bow strokes will be a valuable asset to the director. An orchestra capable of producing a variety of bow strokes, each applicable to the correct musical style, will show its superiority in performance. The director should first be able to determine

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[1]Ivan Galamian, Principles of Violin Playing and Teaching (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1962), 37.

[2]Murray Grodner, "French Bow vs. German Bow," American String Teacher, XV (Summer, 1965), 19.

the correct hand position on the bow and then the correct movements of the arm and wrist during the bow stroke.

The director, to achieve the desired quality of sound and execution of music in the correct style, must understand the types of bow strokes within the technical limits of the school-age stringed instrument player. Selective judgment was necessary in determining the types of bow strokes to be included in the manual. The technical or artist bowings as described by Galamian[1] are not normally applicable to the school orchestra level and for this reason were excluded from the manual. It should be unnecessary to burden the director with descriptions that will not be utilized by the students with whom he works.

The two basic types of attacks or methods of starting the tone on a stringed instrument are explained so that they may be characteristically produced by the average school orchestra member. The adult stringed instrument player with a high degree of bow control will have the ability to produce a satisfactory attack in various ways, while the young player will normally need to be able to produce the soft, legato attack on-the-string and the louder, accented attack off-the-string.

A major problem for the orchestra director will be the selection and marking of bowings in the music to create

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[1]Galamian, Principles of Violin Playing and Teaching, 64-84.

the stylistically correct sound and yet remain within the capabilities of the players. This activity can be quite complex, as several bowings might be possible for the same passage, dependent upon the style, volume, and tone quality desired by the director. The director will need to determine which bowing is best for his group. The set of bowing principles as outlined by Elizabeth A. H. Green[1] are included in paraphrase for clear understanding by the director. It should be noted that these principles can only serve as basic guides to the young stringed instrument player, and exceptions are always acceptable if they are musically correct and fit the natural phrase of the music or are used to create a special effect of tone or dynamics.

A discussion of special string effects is included in the manual to explain the variegated techniques used occasionally in orchestral music to widen a group's spectrum of tone color. Relatively common techniques, such as double-stops, chords, muting, and pizzicato, are briefly explained to insure their accurate production by the student. Less frequently used effects such as glissando, ponticello, and col legno are also briefly noted.

Since the correct methods of performing harmonics can often be extremely confusing to the director and student alike, the simple explanation of the harmonic series on a

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[1]Elizabeth A. H. Green, Orchestral Bowings and Routines, 2nd, ed. rev. (Ann Arbor, Michigan: Campus Publishers, 1966), 6-41.

stringed instrument and the techniques of producing natural and artificial harmonics included in the manual should prove more than adequate for the relatively infrequent use of harmonics in school orchestra music.

Once an understanding of the foundations of technical ability has been established, the director must be concerned with making the organization sound like an orchestra. The achievement of balance between stringed and wind instruments characteristic of the orchestra must be a product of the conceptual attitudes nurtured by the director. It is necessary to understand how the bow affects tone quality and dynamic level when speed, pressure, and point of contact are applied in varying combinations, and how the functions of the left hand can alter tone quality through finger pressure and choice of fingerings. An understanding of how to achieve dynamic variation from the orchestra and modify the tone quality for the stringed instrument sections will prove a profitable tool in the development of a successful orchestra program.

A most important aspect of any musical performance is that of intonation. Developing good intonation is basically a matter of careful tuning coupled with equally careful listening. Suggestions are included in the manual to aid the inexperienced orchestra director in improving orchestra intonation; however, there is no real secret to good intonation. From the beginning each student must be trained to develop good listening habits.

The careful selection of a seating arrangement can be an important factor in achieving a resonant and balanced orchestra sound. The manual contains suggestions to accommodate the weaker sections of the orchestra as well as to balance the stronger sections. Guidelines are established to aid in acquiring a balanced instrumentation in the school orchestra.

Traditional aspects of orchestral performance and routine are included to aid the director in maintaining the true character of the orchestra. Organizational functions utilizing student consultation are outlined in the manual as well as procedural suggestions. A meticulous organization of the rehearsal procedure will immensely aid the director in a smoothly moving orchestra rehearsal.

Of significant importance to the inexperienced director will be the selection of music suitable for the school orchestra. Information on the selection of school orchestra music has been included in the manual as well as suggestions on the editing of stringed instrument parts, explaining fingerings and bowings.

Selection of good quality instruments and equipment will be an important concern for the director as well as their care and maintenance. Guidelines are included in the manual for purchasing of stringed instruments and accessories.

Once the proper instruments are purchased, any director with a brief knowledge of band instrument repair can

easily make minor repairs and adjustments when necessary. Instructions are included regarding the manner in which strings should be replaced, soundposts reset, bridges straightened, tail guts replaced, as well as the correct maintenance of the bow and bow hair. Repairs which should be handled by the expert repairman are noted.

The preventive acts of cleaning and daily care of the stringed instruments are of utmost importance to the tone of the instrument and appearance of the orchestra and are consequently discussed in detail. To save costly repair bills, suggestions are given for storing stringed instruments over long periods of time.

For the manual to be of practical value to the director, its development must have been controlled by a strict selectivity of the most relevant materials, the result being a concentration of available knowledge presented on an understandable level. Such goals were established early in the study and have consistently guided the inclusion and interpretation of material in the manual.

CHAPTER III

PRESENTATION OF THE MANUAL

The groundwork for preparation of the manual for the inexperienced school orchestra director was lain as a result of cumulative research based on personal experience, and encompassing volumes of related periodical reference material. The manual is presented in this chapter in its complete form, with the exception of some bibliographical listings which would be transferred to the manual if published.

A MANUAL FOR THE INCIPIENT SCHOOL ORCHESTRA DIRECTOR

by

Donald Ward Dillon

University of Oklahoma
Norman, Oklahoma
1970

To my wife, Jacquelyn

FOREWORD

The junior or senior high school band director, finding himself presently--or soon to be--shouldering the responsibilities of a flowering orchestra program, will quickly come to the realization that a band and an orchestra differ in many respects. Although some general educational techniques of rehearsal and performance are applicable to both groups, many techniques--such as those of stringed instrument performance--are unique to the orchestra.

A band director, whose training and experience has been predominantly band related, will ultimately face moments of concern and doubt in his quest for a successful orchestra program, unless he quickly broadens his knowledge of orchestral and stringed instrument techniques. It is primarily for the new orchestra director that this manual is written.

The manual will attempt to clarify in simple terms some of the more involved technical aspects of stringed instrument playing and to present valuable information on orchestral development and stringed instrument technique. Only the most relevant detail has been selected for the director's examination in order to save countless hours of searching through volumes of material.

It is a most sincere wish that the information contained within these pages will assist the new orchestra director in the development of a superior orchestra program as well as provide the insight and inspiration necessary to develop a lasting comradeship with the orchestra. It is principally to the education and enlightenment of the inexperienced school orchestra director that this manual is dedicated.

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A MANUAL FOR THE INCIPIENT SCHOOL ORCHESTRA DIRECTOR

CHAPTER I

DEVELOPMENT OF A SUCCESSFUL PROGRAM FOR SCHOOL ORCHESTRA

The ultimate success or failure of the orchestra program lies in the hands of the orchestra director, for without an active and sincere desire on his part for a superior program, operating as an integral part of the school's total spectrum of musical studies, no such program can exist. The director's desire will manifest itself in the enthusiasm with which he approaches the task of teaching the students and developing the orchestra. He must believe emphatically and communicate to all that the orchestral program is mandatory in a curriculum that is intended to offer a complete education for its students.

An overt enthusiasm toward the orchestral program by a director steeped in band experience and training is not easily accomplished. The band director must be adamant in his desire for a successful orchestral program if he hopes to

garner the full support of the community and administration. There are no short cuts to success.

An enthusiastic spirit and driving desire on the part of the director will be paramount in developing in the school administration a positive attitude toward the orchestra program. The director must be able to prove unquestionably the merits and values derived from the orchestra program by the students before he can expect the maximum support of the school administration, a support that is vital to the development of an outstanding program.

Imperative to the building of an outstanding orchestra is the administration's willingness to allot the director the necessary monies to finance adequately the needs of the group, to make possible the purchase of music, instruments, and other needed equipment. The administration must also be receptive to alloting sufficient funds for salaries to procure the most highly qualified stringed instrument teachers available.

Another important factor in the ultimate success of the orchestra is that the school administration place the stringed instrument program on an equal level with all other music and academic programs. In fact, the orchestra program may require some preferential treatment in priority of scheduling, budgetary allotments, and other administrative action until it is firmly established.

Since the initial step toward the development of an outstanding orchestral program must be a carefully conceived

and planned course of instruction, beginning in the elementary grades and continuing through the junior and senior high schools, the program can draw into it, at least marginally, a large number of students and therefore a large amount of community attention. Community support will come automatically as the orchestra program grows and parents of participating students become aware of the value of its activities. Parents of stringed instrument students will do much to inform others in the community of the merits of studying a stringed instrument.

One commonly hears the excuse that the community or school is too small to support adequately an orchestra in addition to the band and choir. Closer examination would reveal that a relatively low percentage of students enrolled in the schools actually participate in any form of instrumental music activity. In a recent survey of beginning band programs in the United States it was found that no more than 25% of fifth grade students started a band instrument.[1] This would leave 75% of the fifth grade students uncommitted and available for stringed instrument class or other music. From this it would appear that even a small community could provide enough students for a stringed instrument program if the desire existed. Additional string players could also be acquired from the more talented band members who might be

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[1]J. Frederick Müller, Stringed Instrument Clinic Lecture, Louisiana Music Educator's Association Convention, New Orleans, November 26, 1968.

interested in learning one of the strings as a second instrument. The knowledge of a minor instrument plus the experience gained from participation in both orchestra and band might lead the versatile student into a career as a musical educator or performer.

The procurement of the most talented stringed instrument specialist should be a major goal of a school system desiring a superior orchestra program. Without the services of a superior stringed instrument teacher at the elementary level, it is virtually impossible to develop fine stringed instrument players. Even the superior teacher at the secondary level would have difficulty in overcoming and correcting poor training and bad habits caused by the lack of adequate beginning instruction by a qualified stringed instrument specialist.

The stringed instrument specialist should be a consultant for the wind instrument teachers working with orchestras on the secondary level as well as the instructor of all beginning stringed instrument players. The stringed instrument specialist could more adequately introduce and correctly establish the foundations of playing position, bow position and stroke, left-hand facility, and, most difficult to teach and develop, coordination between the two hands.

An orchestra cannot exist without players. With an adequate feeder system in operation, it is left to the director to maintain student participation by providing an orchestral program that is exciting, challenging, and of a musical

standard that will encourage a sense of pride and feeling of prestige among its members. Failure to accomplish these goals may result in loss of interest on the part of the students and a subsequent reduction in orchestra enrollment.

Fundamental in maintaining the students' interest is the development of a feeling of pride and sense of accomplishment in his school orchestra membership. Students are quick to respond to the aura of prestige that surrounds an attractive, well-disciplined and successful musical organization. A neat, uniform appearance and mature stage deportment will help to create this feeling of pride in the orchestra, but the true measure of success lies in the quality of the musical performance.

Achievement of the most technically precise and musically perfect performance possible for a school orchestra must build on the musical tastes of the director and his shaping of the attitudes, tastes, and abilities of the orchestra members. The firm discipline and critical attitude necessary to achieve a fine performance are well worthwhile when measured against the sense of pride felt by the orchestra members, but the director should be careful that his criticisms are always of a positive nature. Once negative attitudes are established it is very difficult to break the pattern.

A wide variety of activities must be provided for students if an exciting, vital orchestral program is to exist. Activities that might be utilized during the school year

include: concerts with full and string orchestras; presentation of musicals and major works with the vocal department; incidental music for school activities such as plays, dinners, assemblies, P. T. A., etc.; participation in contests, clinics and festivals; guest appearances at other schools; all-city instrumental festivals.

The above-mentioned activities are those in which every member of the organization may participate. The most talented, intelligent students will definitely need to be offered activities with additional challenge. Competition from academic areas for the top students is so keen that the director must be certain that these activities provide both a technical and aesthetic adventure for the student. The advanced student should be encouraged to audition for select groups such as youth orchestras, all-state organizations, or urban, community and/or college symphonies. Attending summer music camps can also provide a great deal of additional incentive and enthusiasm.

The most capable students should be encouraged to appear as soloists with the school orchestra or in recital. Opportunities for small ensemble participation should be provided and programs prepared for presentation to civic organizations, churches, school assemblies, dinners, receptions, and other community activities.

Continued interest in playing for both the average and talented students is maintained in large degree by their

technical and musical progress through private study. Ideally, every stringed instrument student should be studying privately. Private lessons are advantageous to the more talented student in helping to give him the additional challenge needed for progress and development on his instrument and to the slower student in serving to keep him at the technical level of the whole orchestra.

The orchestra director should continually urge and help students to locate qualified private teachers. Located in relatively close proximity to most communities is a college or university orchestra or a symphony orchestra where qualified teachers might be found. College music students are usually willing to drive a short distance on Saturday or after school to teach privately if the director so requests.

Student interest almost always increases when a break in daily routine is created. An impressive guest rehearsing or conducting the school orchestra nearly always raises morale besides imparting to both students and director valuable suggestions for improving musicianship and playing technique.

Local symphony musicians, private teachers, or outstanding college students might be invited to appear as guest soloists with the school orchestra, or when possible even to sit in with the group during a rehearsal. For some students this activity might provide the first real opportunity to hear their instrument played at close hand by a professional,

and it will aid them in forming an idea of how their instrument should sound.

Members of the orchestra should be made aware of recitals by stringed instrument soloists and concerts by other orchestras or ensembles. The director should encourage students to attend concerts whenever possible. He might arrange group transportation for special concerts. For added convenience to the students and parents, the director might even schedule the appearance of a symphony orchestra or string ensemble for a community concert.

To understand better the problems and peculiarities of the stringed instruments, the director should begin immediately to develop a complete familiarity with at least one of the instruments through private study and a working knowledge of the others through workshops, clinics, or additional study. Only then will the director be able to handle with confidence the daily problems of orchestral routine and adequately guide the stringed instrument students in the advancement of their orchestral techniques. Until such time as the director is able to achieve his goal of adequate personal knowledge, the information contained in this manual will, it is hoped, prove a valuable aid.

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CHAPTER II

PLAYING POSITION

The development of proper playing position for each of the stringed instruments must have had its foundation in the beginning class taught by a well-trained and experienced string specialist. Incorrect habits, ingrained through years of faulty or insufficient instruction, can be extremely difficult to break, especially by a teacher who is not himself a stringed instrument player. If correct playing position is to be maintained once it has been properly established, it is important for the director to be familiar with each of the stringed instruments, preferably through private study.

The information contained in this chapter should provide the fundamental knowledge that will allow the director to guide the students properly in maintaining correct playing position. Proper playing position is worth the constant attention it requires, for it can help to improve tone quality, create a springboard for further technical development, make habitual a mature professional appearance, instill a sense of pride in the individual student, and improve the total appearance of the orchestra.

Playing positions for the violin and viola are for all practical purposes identical. The student should be seated well forward in the chair with both feet squarely on the floor. The left foot is usually placed slightly ahead of the right. When in playing position, the instrument should be approximately parallel to the floor with the scroll about the height of the student's nose. The instrument is held between the left collar bone and jaw, usually supported by a shoulder pad. The left jaw rests on the chinrest, with the tail button placed at approximately the center of the player's neck. The instrument is held in front or slightly to the left of the body, depending upon the size of the student. The head is turned toward the scroll, with the nose pointed down the fingerboard. The left elbow is tucked under the instrument, and the neck rests lightly between the ball of the left thumb and the lower joint of the index finger.

There are some relatively common faults found in violin and viola playing position to which the director should be alerted. When the heel of the left hand collapses against the neck of the instrument a cramped hand results, hindering shifting and virtually eliminating vibrato. In correct position a straight line should extend from the point of the elbow up through the back of the hand. Another fault is to allow the neck of the instrument to drop into the curve of the thumb, again cramping the hand and limiting movement. If the elbow does not remain under the instrument the hand is pulled

out of position, and it is extremely difficult to use third or fourth finger. Slumping or lowering the neck of the instrument will make correct bowing impossible because the bow tends to slide over the fingerboard.

The cellist should sit well forward in a straight chair with both feet squarely on the floor, one slightly ahead of the other. The endpin should be adjusted to allow the shoulder of the cello to rest against the breastbone and the knees to touch at the sides just below the cut-out, holding the instrument securely. If the endpin is adjusted to the correct height, the lowest tuning peg will be near the bottom of the left ear. The scroll should never rest on the shoulder.

A string bass may be played from either a standing or sitting position, but a standing position is recommended until the left-hand position is well established. Standing, the player should place the left foot forward and the right foot slightly back with the weight of the body on the right foot. The right side of the instrument should lean back against the left side of the player's groin and touch the inside of the left knee. The endpin should be adjusted so that the lowest tuning gear is opposite the student's left ear. The left hand and arm assume a position similar to that of the cello.

Some cases of poor playing position may stem from an incorrectly fitted instrument, especially on the junior high

school level. Students may still be playing on three-quarter-sized instruments long after outgrowing them. Most violin, viola, and cello players are ready for full-sized instruments by the end of the seventh grade. The director should encourage these students to acquire quality instruments of the correct size as soon as possible.

One of the best methods of developing an awareness of the importance and effect of correct playing position for both students and director alike is to observe professional stringed instrument players in action. Encourage members to attend many concerts to become aware of the overwhelming effect (both visual and aural) that can be created by an orchestra. The students will soon develop a desire, conscious or subconscious, to emulate the professional performers, and it will not be long before improvement in the school orchestra is evident.

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CHAPTER III

LEFT-HAND TECHNIQUE

This chapter will attempt to provide the director with enough basic knowledge of the left-hand functions to assist his students in establishing and maintaining correct position, in applying shifting principles, and in utilizing vibrato. This material is not meant to serve the purpose of a manual for beginning instruction, but rather to present the inexperienced orchestra director with a formulative introduction to the techniques of correct stringed instrument performance. Without an understanding of basic techniques the director will find it difficult to guide his students in their development. A full understanding of the left-hand complexities, as well as all technical aspects of performance on each of the stringed instruments, can best be assimilated through private study, and the director who is serious in his concern for the orchestral program will seek this necessary training.

Basically, the left hand has two responsibilities: fingering the notes and enhancing the tone through the use of vibrato. In practical application, however, the left-hand functions of primary concern to the stringed instrument

student are sounding the correct note, maintaining overall intonation, choosing the best fingering and position according to the musical passage and technical capabilities, and eliminating unnecessary shifts or string crossings.

Left-Hand Position

The left-hand positions to be discussed should serve as general guides and should aid the director in analyzing weaknesses, since many problems of left-hand technique among school-aged stringed instrument players stem from faulty position of the left hand, fingers, and arm. Some common faults have been included with suggested solutions to guide the director in correcting bad habits that might otherwise limit the level of orchestral performance. Correct position is necessary on any level for even the fluency of shifting and flexibility of vibrato needed in more advanced playing is dependent upon the subtle details of left-hand position.

The position descriptions that follow are the ones recommended for maximum playing efficiency and steady technical development. Occasionally the position considered most correct on each instrument may prove uncomfortable to some students because of their physical structure and slight adjustments may be necessary.

The Violin and Viola

The left hand will form basically the same position on both the violin and viola. The index finger should touch

the A or E string side of the neck almost at the large base knuckle. A common fault is for the hand to slump, causing the neck of the instrument to approach the second knuckle, which severely affects intonation. The thumb should fall naturally on the low string side of, and at a right angle to, the neck and across from, or slightly ahead of, the first finger.

When the thumb points backward toward the scroll and is no longer at a right angle to the neck, or is bent at the knuckle, the palm of the hand collapses against the neck. In this position the hand is incapable of performing its function adequately. Straightening the thumb will usually solve this problem.

The fingers should fall down upon the string from above with the fingertips generally angled toward the bridge. When in correct position, the hand and fingers will be relaxed and flexible. Any tension or tightness will defeat the functions of the left hand and significantly limit the performance capabilities of the student by making it virtually impossible to shift or to vibrate the string. The fingers should not be raised too high off the fingerboard as exaggerated movements can perceptively reduce technical facility.

The normal finger pattern on violin and viola will be whole-steps played with a space of approximately one inch between two fingers and half-steps with fingers touching or no space between fingers, as illustrated in Figure 1. A good rule to remember is that each finger is responsible for a

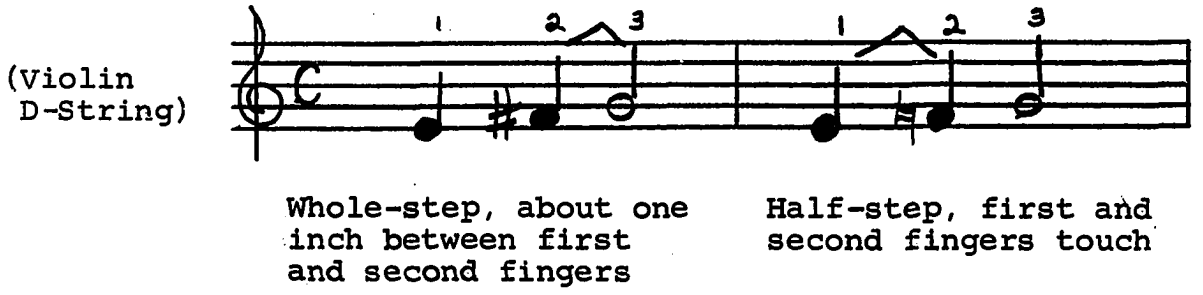


Fig. 1.--Violin and viola finger patterns

note, referred to by a letter name, and each finger can flat, natural, or sharp its particular note. In other words, the finger does not change until the letter name of the note changes. To sharp a note the finger moves toward the bridge, and to flat a note toward the scroll, the distance depending upon the size of the instrument.

The first finger in first position normally will play a whole-step above each open string, making possible an interval of a perfect fourth within the normal student hand span. The fourth finger will play the same note as the next highest open string. Students should be encouraged to use fourth finger as soon as possible since its use will eliminate the twangy, open string sound and help to maintain good hand position.

The Cello

The left hand should rest on the cello in a very natural-looking position, with the arm held up forming a straight line from the elbow to the level wrist, and with

curved fingers placed downward at right angles to the strings. A straight line should exist from elbow to fingers at any position on the fingerboard. Even with such a natural-seeming hand position there exist a number of relatively common faults of which the director must be constantly wary. The most obvious fault will be a slumping of the elbow, which causes a downward curve in the wrist and cramps the hand and fingers, making good intonation impossible. Slumping makes it difficult to play on the finger tips, and as a result the student will never have the strong fingers necessary for good tone, shifting, and vibrato.

Another common fault that develops easily from playing only open and first finger is the rotation of the wrist and hand back toward the scroll. Backward rotation will cause incorrect intonation, especially the faulty sound caused by a flat fourth finger. The problem can be avoided easily by having the beginning cellist put down all four fingers immediately and lean the hand and wrist toward the fourth finger.

Unlike the hand position for violin or viola, cello position places the ball of the left-hand thumb on the back of the instrument's neck directly opposite the second finger in order to allow the hand space enough for correct intonation. This placement provides support for the arch of the hand and allows the fingers to obtain a good striking action.

The natural finger position for the cello will be with a half-step between each finger, as shown in Figure 2,

with the four fingers evenly spaced approximately one inch apart.

(Cello
D String)



Equal spacing between all fingers

Fig. 2.--Normal cello hand

In first position the first finger is normally placed a whole-step above the open string, making possible an interval of a minor third from first to fourth fingers. First finger reaches back toward the scroll to produce its flat, and fourth finger stretches toward the bridge to reach its sharp. In the extended position illustrated in Figure 3, the hand span from the first to fourth finger is a Major third instead of a minor third. The second finger stretches to a whole-step to aid the fourth finger in reaching the Major third.

(Cello
D String)



Second finger must stretch to third finger position to allow fourth finger to stretch a half-step higher for G#. (Do not use third finger.)

Fig. 3.--Extended cello hand

The String Bass

The left-hand position on string bass is fundamentally the same as for cello, but because of the bass's size many common faults, such as sagging elbow, bent wrist, and cramped hand, are much more prevalent in the playing of the string bass than of the cello, especially with younger students. A flat wrist and the straight line from elbow to fingers are as important with string bass as with cello. Due to the size of the neck, the fingers should contact the strings more on the balls of the fingers than, as with cello, on the tips, and care must be taken to avoid collapsing fingers.

A bass player must develop early the relaxed and flexible left hand necessary for shifting. In order for such agility to exist the instrument must be securely supported and the player must be able to balance it without the aid of the hands. The left hand cannot function properly if it is also trying to support the weight of the instrument. Therefore, the manner and position in which the string bass is held may cause a cramped position and a loss of flexibility.

The natural finger position for the string bass, as illustrated in Figure 4, will be a half-step between the first and second fingers and another half-step between the second and fourth. The third finger is not used separately in the lower positions, but works as a unit with the fourth finger. The interval possible between the first and fourth finger is

only a whole-step, and the first finger in its lowest position, usually called half, will be placed a half-step above the open string. The half position is generally used in flat key signatures, and first position is generally used when the key signature is in sharps. It is necessary to move back and forth between half and first position when three or more sharps, or three or more flats appear in the key signature.



Half Position First Position

Fig. 4.--String bass half and first positions

Shifting

It will probably become necessary for the director to guide his stringed instrument players in the techniques of shifting to enable the junior high school orchestra (and the less experienced high school orchestra) to play the higher notes found in more advanced orchestra music, to eliminate the immature sound of open strings, and to minimize difficult string crossings. The ability to guide intelligently necessitates an understanding of the fundamental purpose and technique of shifting. The goals in shifting from one position to another are the execution of the shift with accuracy and the production of a smooth change.

On all four stringed instruments there are seven basic positions, as shown in Figure 5, that are numbered consecutively upward on any string. For example, on the A string, first position places first finger on B, second position puts first finger on C, third position on D, and so on. The string bass has a half position occurring between each whole step.

(Violin A String)



First Position Second Position Third Position



Fourth Position Fifth Position Sixth Position Seventh Position

The above principle will work on any stringed instrument and on any string

Fig. 5.--The seven basic positions

On violin and viola the shift between the four lowest positions is performed by moving the forearm--pulling the hand up the fingerboard toward the bridge and then pushing it back toward first position. Violinists and violists usually learn

third position after first position since third position makes more notes available and is found most easily on the fingerboard. In the third position on any string, the first finger would be placed where the third finger had been playing in first position. The shift is illustrated in Figure 6.

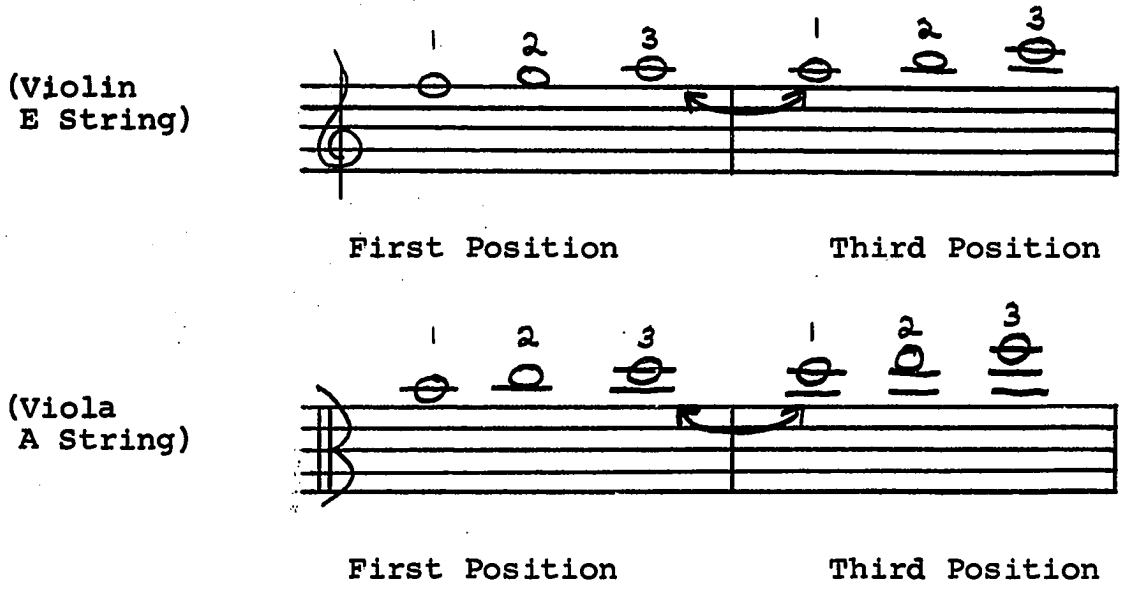


Fig. 6.--Violin and Viola third position

The cello and string bass shift by sliding the hand downward on the fingerboard or raising the hand again through action of the upper arm. Cellists usually learn fourth position immediately after learning first position, because of the added notes and the greater ease with which fourth position is found on the fingerboard. Fourth position for cello is illustrated in Figure 7. Since all of the positions for string bass shifting are of almost equal importance, the

novice orchestra director would be advised to consult an authoritative work concerned solely with string bass technique.[1]

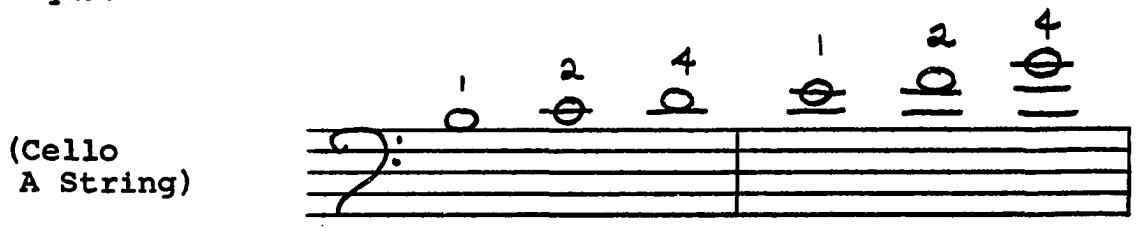


Fig. 7.--Cello fourth position

General Principles

The movements involved in shifting from one position to another can be executed in several different ways, and variations do exist among authorities regarding the manner in which shifting should be executed. This section will cover the three simplest and most used types of shifting principles as these will be the ones of prime importance and necessity to school orchestra playing. All the shifting principles discussed may be executed by any finger.

Shifting from an open string to a note in a higher position is the least difficult position change as it is not necessary to slide on a finger. The hand simply moves to the

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[1]A recommended source of information on shifting and other techniques of string bass performance would be F. Simandl's New Method for the Double Bass, Book I (New York: Carl Fischer, Inc., 1904).

position desired while playing the open string as shown in Figure 8.

(Violin
A String)

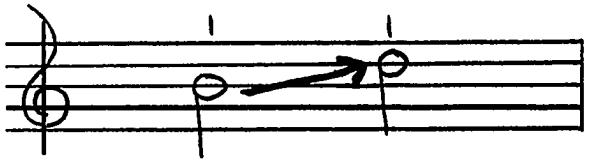


Shift to third position

Fig. 8.--Shifting from an open string

Shifting with the same finger to a higher position is a movement that is used extensively and will almost always be executed on the same string, as illustrated in Figure 9. The finger is kept in contact with the string throughout the shift to the desired higher position.

(Violin
A String)



Shift on first finger to third position

Fig. 9.--Shifting with the same finger

The third and most difficult of the slides mentioned here is the one requiring a change of finger in the higher position, as shown in Figure 10. In such a shift it is vital that the slide commence with the last finger used in the lower position and continue on this finger until the desired position is reached before putting down the new finger.

(Violin
A String)



Slide on first finger to third position

Slide on second finger to first position

Fig. 10.--Shifting with a change of finger

Descending, the last finger used in the higher position should begin and maintain the slide, the change to the new finger occurring after the lower position is reached. Until this technique is well developed, a "grace note" will be heard, but it can be eliminated as the student becomes more proficient at fingering the correct new position.

The director should carefully observe the students as they first learn to shift and encourage them to avoid habits that will hinder free movement. It is most important to remember that the entire hand and thumb move as a unit, maintaining correct left-hand position. Students will try moving just the hand, leaving the thumb behind. They need to also understand that stretching the fingers to a new position is not a change of position.

Musically, a slide sounds much better if the finger pressure is lightened while executing the slide. Movement is greatly facilitated if the left hand and thumb grip lightly and then move together at a constant rate of speed. Students typically slide too quickly and unevenly, causing a jerk in

the tone. Elimination of the mentioned common faults will quickly improve the stringed instrument player's technical development.

Vibrato

The orchestra director will probably not be concerned with starting students on vibrato, as the actual teaching of vibrato should properly take place in the hands of a private teacher or the school string specialist. However, the director will need to understand enough of the techniques of vibrato to recognize faults and weaknesses in the student's performance and to guide him back to correct habits.

Most authorities today agree that a good vibrato is a combination of three movements--arm, wrist, and finger. An attempt will be made to give the director a concept of the correct total motion for violin and viola, then cello and string bass vibrato. The violin and viola vibrato generally is produced by a rocking-back-and-forth motion of the wrist toward the bridge and back, with the finger acting as a pivot or fulcrum for the motion. The director should watch carefully to see that the motion is primarily in the wrist. The vibrato motion on the cello and string bass is mainly from the elbow and involves movement of the entire lower arm as a unit. The movement is an up and down motion towards the bridge and back toward the scroll. The author supports the point of view that the up and down motion creates a better vibrato than the sometimes used rolling motion around a lengthwise axis.

The director working with younger orchestras should watch to see that students keep the vibrato slow, even, and rhythmic until the correct motion is established and control is developed. A too fast, too narrow vibrato played too soon will not enhance but hinder the tone. A relaxed, slowly vibrating sound should be the goal of early attempts at vibrato.

Students must be reminded to use vibrato daily, for when they first learn to vibrate the action has not yet become the almost automatic function it will someday be. This mnemonic activity will often be necessary for even the older high school students. Only through constant and correct use will vibrato become habitually established in the technical repertoire of the stringed instrument player.

Once a pure, fundamental tone quality has been established it can be greatly enhanced and intensified by the addition of vibrato. An orchestra will never sound mature until the majority of string players can use vibrato. Most string authorities agree that vibrato can be started once the student has mastered first position, established correct intonation, and started learning to shift to higher positions. It is also very important that each finger be strong enough to work independently since the vibrato movement is usually done with only one finger at a time.

Students usually exhibit an interest in learning vibrato fairly early in their development, and the wise

teacher encourages this interest as it arises. Great damage can be done to the student trying to develop vibrato without guidance, and few problems in stringed instrument playing are more difficult to correct than a faulty vibrato. For this reason--among many others--the director should encourage the student to study privately.

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CHAPTER IV

BOW TECHNIQUE

While the left-hand finger placement determines the pitch, it is the movement of the bow and the action of the right hand that create the sound. Developing an understanding of the principles of correct orchestral bowing technique and procedure will be of primary importance to the director with little familiarity with stringed instrument performance. For this reason, detailed analyses of right-hand positions, bow strokes, basic bowing principles, and special effects with the bow are presented in this chapter to provide the director a basic understanding of stringed instrument performance so that he might accurately guide his students in the development of correct playing techniques.

Right-Hand Position

As with most elements of stringed instrument performance, correct position plays a large part in the fluency and technical achievement attained by the student. For each stringed instrument there are general characteristics of bow grip that can serve as important guides to the director in

assuring the development of strong, flexible bow arms within the stringed instrument section.

Violin and Viola

On the violin and viola bow the thumb and middle finger form the shape of a circle as the wrist slants slightly toward the tip of the bow. The tip of the thumb is placed on the lower side of the bow stick, slightly ahead of the frog, and the middle finger is curved over the stick and placed opposite the thumb, contacting the stick at about the first joint. In correct bow position, it is important that a circle or slight outward bend at the joint of the thumb be maintained. The index finger falls into a natural position, contacting the stick at about the first knuckle. The ring finger curves well over the stick and comes to rest on or near the pearl dot, while the little finger falls in a natural curve with the tip landing on top of the stick.

Cello and String Bass

There are significant differences between the right-hand position of the cello and French string bass bow and that of the violin and viola, the most conspicuous being the perpendicular or straight up and down angle at which the fingers approach and contact the bow stick. The right thumb is placed on the lower side of the bow stick just ahead of the frog and maintains the outward bend or curve essential to correct position. The little finger is placed on or near the pearl dot

in the center of the frog, and the remaining three fingers fall naturally over the frog with the middle finger usually touching the ferrule or hair of the cello bow. The index finger may be extended downward slightly for control or additional tone, especially on the French string bass bow.

The German (Butler)[1] string bass bow is characterized by its wide frog as compared to the narrow width of the French bow frog. The German bow grip therefore differs from that used with any of the other stringed instrument bows. The ball of the thumb is placed on top and at a right angle to the bow stick while the index finger wraps around the back of the frog and touches the tip of the thumb. The little finger is placed directly under the frog for balance while the tips of the first and second fingers contact the stick on the far side of the frog. The ring finger is inserted slightly into the cut-out of the frog.

In a general sense, the German string bass bow can be said to be capable of producing a heavier, more solid and sustained tone, with more power on attacks. It can be held with greater ease for pizzicato playing, and many claim it can be learned more quickly.

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[1]The German string bass bow is sometimes referred to as the "Butler" model, a designation acquired by its acceptance and use by the great bassist, H. J. Butler, principal bassist of the Boston Symphony Orchestra at the time of its organization in 1881. The French string bass bow is less frequently referred to as the "Bottesini" model after the great Italian bassist, Giovanni Bottesini (1822-1889).

The French string bass bow is generally capable of producing a lighter, more delicate tone, and technical facility may be developed more rapidly. Elementary stringed instrument specialists usually prefer the French bow because it is more easily taught in heterogeneous classes.

The advantages of each type of string bass bow have been argued for years, and will continue to be argued as long as both types are in use, with the professional player generally expounding the merits of the bow type he personally uses. With practice, a conscientious, talented student will develop successfully regardless of the type of string bass bow he chooses for his own use.

Bow Stroke

Each bow stroke must move parallel to the bridge for the complete length of the bow if full tonal capacities are to be realized. This movement may cause misunderstanding among younger students until they realize that to accomplish a straight bow stroke on the higher strings they must have the feeling of bowing away from their bodies as they approach the tip of the bow and the feeling of moving the hand toward the body on the up-bow stroke. The tendency will be to pull their hands toward the body on the down-bow stroke because visually the bow appears to them to be moving in a straight line. This creates a semicircular bow stroke, which hampers

tone quality and bow control because the string cannot vibrate completely and freely.

Bow stroke direction is indicated in the music by musical shorthand signs marked above the note. A down-bow stroke is indicated by ⊓, while the up-bow indication is V. It is not necessary, however, to mark the bow direction on every note. From his elementary school experience, the stringed instrument player will know that he should automatically start a passage down-bow and alternate bow strokes on each successive note or slurred group of notes unless otherwise notated by bow markings.

The Full Bow

Depending upon the limits of the music, students should be encouraged to use the full length of the bow whenever possible for a bigger, more singing tone as well as for an improved appearance. They should understand the importance of extending the lower arm to its full length on the down-bow stroke, thereby allowing the bow to travel to its very tip. The exact arm extension will naturally depend upon the length of the student's arm and the particular instrument he is playing.

Many players will confine the majority of their bow motion to the upper arm, keeping the lower arm and wrist rigid and inflexible. The student should realize that a whole-bow also implies an up-stroke completely to the frog.

A whole-bow stroke that fails to utilize three inches of hair at either end of the bow has lost six good inches of vital tone.

Obviously it is not feasible to use the full bow all the time. Reiterated short or fast notes would not allow sufficient time for use of the entire length of bow hair and would normally be played in the middle third of the bow. As a general rule softer, more delicate passages are played in the upper half of the bow (nearer the tip), and louder, more biting figures are played in the lower half of the bow (nearer the frog).

Starting the Tone

Much has been said about the bow stroke in action but little about actually starting the tone. The first type of attack the director need be concerned about is that which starts the tone with the bow on the string. Students who have been correctly taught in the elementary class will have learned that the bow must be placed on the string before it is drawn. The natural character of the on-the-string attack is generally suited better to the soft or smooth opening desired for legato passages and quiet attacks.

The second, and more difficult, type of attack for school-aged stringed instrument players is starting the tone off-the-string. The off-the-string attack is normally produced by making a counter-clockwise circular motion with the

hand, allowing the bow to contact the string near the frog while at the bottom of the circle, and moving directly into a down-bow stroke. With younger students this type of attack generally will create more accent on the note and is better suited for loud, punctuated openings or chords.

It should be noted that more advanced players do use this type of attack as a preparation to starting a legato, smooth tone, but with younger students the off-the-string attack is difficult to control and will take a great deal of practice to develop adequately in this manner.

Types of Bow Strokes

The director should be aware of the existence of a number of different types of bow strokes, each productive of a characteristic sound suitable to a specific musical style or figure. The bowings to be discussed will be those normally needed in an average school orchestra. The subtle variations in bowing used by the more advanced artist are in most cases beyond the technical development of the average school-aged stringed instrument player.

Bowings tend to fall into one of two general categories, depending upon their action at the point of bow change. They may be either on-the-string, where contact between the bow and string is constantly maintained, or off-the-string, where the bow leaves the string as it changes direction.

Outline of Bow Strokes

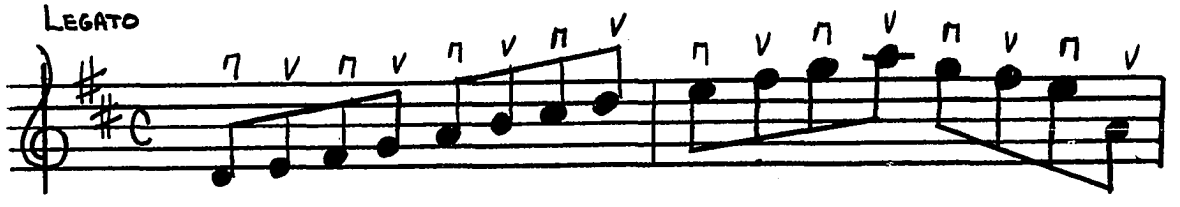
I. On-the-String Bowings
   A. Legato
      1. Détaché
      2. Portato or Louré
      3. Tremolo
   B. Staccato
      1. Staccato
      2. Martelé or Marcato
      3. Slurred Staccato

II. Off-the-String Bowings
   A. Spiccato
   B. Sautillé

Legato On-the-String Bowings

Some of the most common bowings used by the school orchestra will be the legato, on-the-string types. Most characteristic of this type will be the slurred bow. Slurs occur when two or more notes connected by a curved line are played with the same legato bow stroke. It is necessary to divide the bow evenly between slurred notes, allowing an equal length of bow for each note. Slurs may be added to the music by the director to achieve a smoother, more legato sound or to facilitate the playing of rapid, unmarked runs, but this liberty should be used judiciously and only when it fits the character of the music.

Détaché.--The détaché stroke is often misunderstood by the inexperienced stringed instrument player because of the connotations inherent in the name. The word means "detached" only in the sense of designation that the notes are not slurred. The détaché bowing as shown in Figure 11 is characterized by a smooth change of bow direction for each successive note and may be played in any portion of the bow and at a variety of speeds.

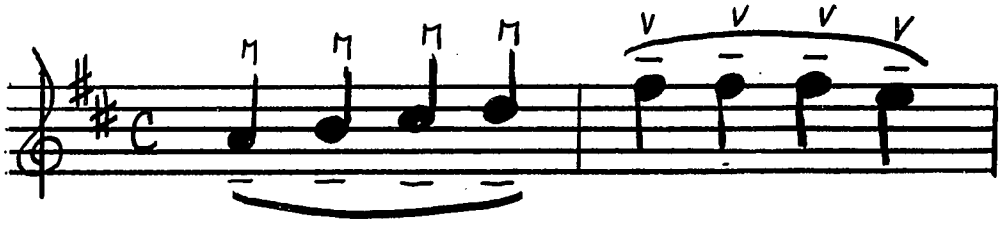


Smooth change of bow on each note

Fig. 11.--Détaché bowing

Portato or Louré.--The portato or louré bowing, as illustrated in Figure 12, is a series of notes performed slightly detached, but with no change of bow direction as is a slur. The detached-legato sound is created by slightly releasing the bow pressure between each note. It is most often found in very expressive passages or slow movements. This bowing is fairly difficult to execute and will not be found too commonly in school orchestra music.

Tremolo.--The exciting effect of the tremolo is obtained by an extremely rapid alternation of up and down strokes usually in the upper half or near the tip of the bow.



Slightly detached without changing bow direction

Fig. 12.--Portato or Louré bowing

Its use is commonly indicated by abbreviation lines through the stem or above the note in question, as shown in Figure 13. This bowing should not be confused with rapid, even sixteenth notes.



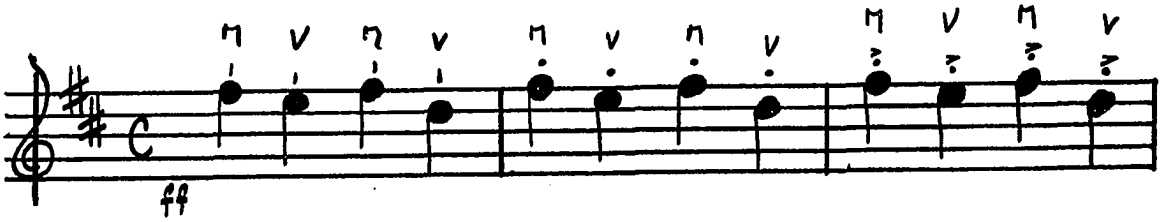
Rapid alternation of up and down strokes

Fig. 13.--Tremolo bowing

Staccato On-the-String Bowings

Several other bowings are executed with the bow remaining on the string but fall into the category of non-legato, such as the basic staccato bowing. The fundamental staccato bowing would include any notes marked with dots and demanding a space on either side while the bow remains on the string. There exist many varieties of staccato bowings, each given a name to designate its specific character and function.

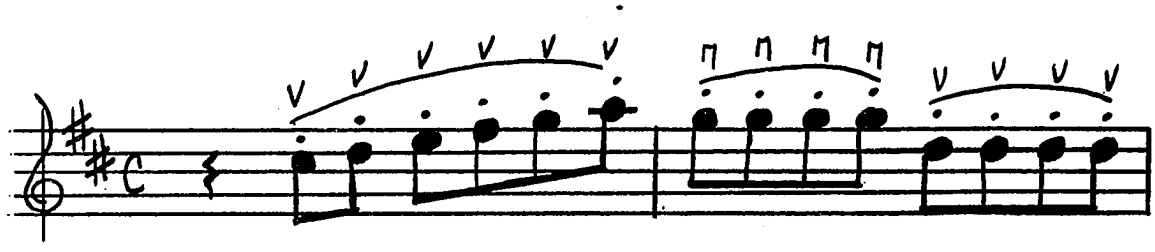
Martelé or Marcato.--The martelé or marcato bowing is characterized by short, separate strokes with a heavy accent on each stroke, as shown in Figure 14. This accent is achieved by increasing the bow pressure just before each on-the-string attack and releasing the pressure at the moment of the attack. Any portion or amount of the bow can be used, depending upon the style, tempo, and dynamic marking of the music.



Short, separate bow strokes, often with heavy accent. (Note different ways of indicating Martelé.)

Fig. 14.--Martelé or Marcato bowing

Slurred Staccato.--The slurred staccato bowing is simply a series of unaccented martelé strokes all played with one bow and usually utilizing an up-stroke of the bow as indicated in Figure 15. Many performers and teachers may refer to this type of bowing simply as staccato, but this designation tends to confuse young stringed instrument players, so the more clearly stated "slurred staccato" reference is recommended.



A series of unaccented Martelé strokes all played in one bow

Fig. 15.--Slurred staccato bowing

Off-the-String Bowings

There are only two off-the-string bowings that would generally be within the technical grasp of the average school-aged stringed instrument player: the spiccato and the sautillé. The director will doubtless find it necessary to drill carefully many of the less experienced players if they are to achieve any degree of success with the off-the-string bowings. These bowings first require the development of a reasonable degree of bow control and even then must be practiced if they are to develop to a functional stage. Correct right-hand position is essential to the successful development of off-the-string bowings. In a very broad sense, off-the-string bowings will generally be played in the middle or lower half of the bow in order to utilize most advantageously its natural bow resiliency.

Spiccato.--The fundamental off-the-string bowing, and the one most demanded in school orchestra music, is spiccato. A spiccato bowing, shown in Figure 16, results when the bow

is allowed to drop onto the string from above and rebound back into the air again after every note.

In this process the bow movement takes the shape of a small downward arc with the bow hair touching the string at the lowest point. The flatter the arc-like movement, the broader and softer is the tone, and, conversely, when the arc is more pointed, the spiccato will be sharper and more accented.

The spiccato bowing is usually associated with fast tempo passages, and is most easily controlled when bounced at the most resilient point of the bow, between the middle and frog. The director should be aware that "bouncing bow" and "off-the-string" are both terms used interchangeably with spiccato.



Off-the-string or bouncing bow

Fig. 16.--Spiccato bowing

Sautillé.--When spiccato is increased in speed to the point that it becomes uncontrollable it is known as sautillé bowing, illustrated in Figure 17. The technical demands for bow manipulation in sautillé may well be beyond the practical capabilities of the average school orchestra member. Other

extremely rapid off-the-string bowings exist, such as saltando or ricochet, but will not find normal use in school orchestras.



An uncontrolled Spiccato

Fig. 17.--Sautillé bowing

Selection of Bowings

Of major concern to the orchestra director, concertmaster, and principal players will be the intelligent selection of correct and uniform bowings suitable to the overall capabilities of the stringed instrument sections. The uniformity of sound and professional appearance created when all players in a string section are moving their bows in the same direction at the same time and playing in the same portion of the bow will greatly enhance any school orchestra performance. The director should constantly strive for uniform bowing in the orchestra unless an effect of continual tone, which is created by staggered bowing, is desired.

Many of the recent publications in the growing field of school orchestra music have been carefully edited to include bowings and fingerings suitable for the level of technical development for which the music was intended. There

exists, however, a large stock of music that either has no bowings indicated or includes bowings intended for an orchestra of professional calibre. In any case, the director may desire to make some changes to accommodate a weak or strong section in the orchestra and should for this reason be aware of some of the basic principles of bowing and their application to orchestral literature.

Bowing Principles

Elizabeth A. H. Green, Professor of Music at the University of Michigan, has carefully defined fourteen basic bowing procedures applicable to the school orchestra. These principles have been included in this manual because they provide the most carefully researched and well defined set of rules for bow direction presently available to the school orchestra director. It should be understood that the following rules are meant to serve only as guides in developing what is musically correct for the particular composition in question.

Fourteen Basic Principles of Bowing

No. 1. The note on the first beat of the measure is down-bow.
No. 2. The unslurred note before the bar-line is up-bow.
No. 3. If the note before the bar-line is slurred across the bar-line, play it down-bow.
No. 4. An odd number of notes before a bar-line (unslurred) starts up-bow.
No. 5. An even number of notes before a bar-line (unslurred) starts down-bow.
No. 6. Alternate the bows, down, up, on after-beats. If rhythmic figures between rests have an even number of notes, chance a down-bow on

the first note; if an odd number of notes, try an up-bow on the first note.

No. 7. In groups of four notes, starting on the beat, play the first one down-bow.

No. 8. Link the dotted-eighth and sixteenth.

No. 9. The dotted-eighth-with-sixteenth is not linked under the following circumstances: (a) when the execution of the figure is too fast to permit the stopping of the bow which the link requires, (b) when soft passages require extreme neatness and clarity of sound, and (c) when extremely loud, choppy effects are desired.

No. 10. Link the quarter and eighth in six-eight time.

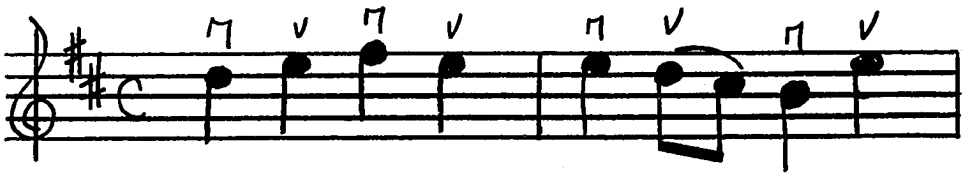
No. 11. Chords are played down-bow.

No. 12. If the closing chord (or note) has a little short note before, play the little note up-bow near the frog.

No. 13. In four-four time, an accented half-note on the second beat of the measure is taken down-bow.

No. 14. In continuous string crossings (unslurred), take the upper note up-bow on violin and viola, and down-bow on cello and bass.[1]

The first principle indicates that the first note of every measure should be played down-bow as noted in Figure 18. This is the most fundamental of statements in regard to bow direction. It is saying in effect that the player's down-bow corresponds with the down-beat of the conductor.



First note of every measure should be down-bow

Fig. 18.--First Bowing Principle

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[1]Elizabeth A. H. Green, Orchestral Bowings and Routines, 2nd. ed., rev. (Ann Arbor, Michigan: Campus Publishers, 1966), 81-82.

This leads directly to the second principle, illustrated in Figure 19, which states that when unslurred notes appear before the bar-line, they should be played up-bow. It should be noted that if a bowing pattern does not meet these first two principles in every measure, but does naturally readjust itself within the span of two or four measures, no change in the basic bowing need be made. The student should simply take each bow as it comes.



Unslurred notes before the bar-line should be up-bow

Fig. 19.--Second bowing principle

The third principle states that any note or small group of notes that is slurred across the bar-line should be played down-bow. The next two principles also have to do with figures just preceeding the bar-line. Rule four states that if an odd number of unslurred notes occurs before a bar-line, the group should be started with an up-bow motion, and principle five indicates that if the notes before the bar-line are even in number, they should be started with a down-bow. These procedures each cause the first note of the measure to come out down-bow, thereby fulfilling the basic premise of rule one: that the player's down-bow corresponds with

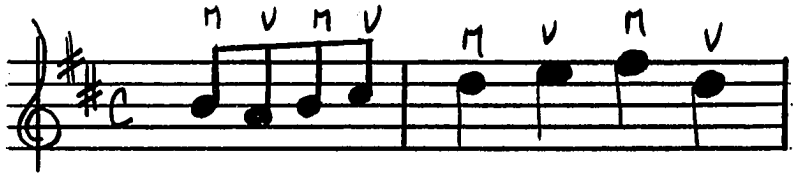
the down-beat of the conductor. These three principles are illustrated in Figure 20.



Notes slurred across the bar-line should be played down-bow



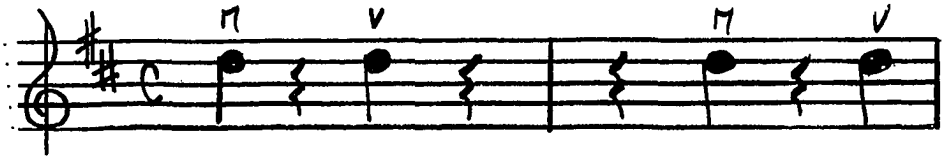
Odd numbers of notes unslurred before a bar-line start up-bow



Even numbers of notes before a bar-line start down-bow

Fig. 20.--Third, fourth, and fifth bowing principles

For afterbeats or simple rhythmic accompaniments, principle six suggests the alternation of bow-strokes, with the note receiving the greatest natural accent being taken down-bow. An example of this rule of alternation is displayed in Figure 21.



Alternate bows on rhythmic accompaniments. Notes with greater natural accent are taken down-bow

Fig. 21.--Sixth bowing principle

As shown in Figure 22, rule seven indicates that groups of even-numbered notes that start on the beat and are without slurs should be started down-bow. Each group of two or four notes will come out with a down-bow. Odd-numbered groups of notes may also be started down-bow, for they will automatically adjust their bowing within a few measures.

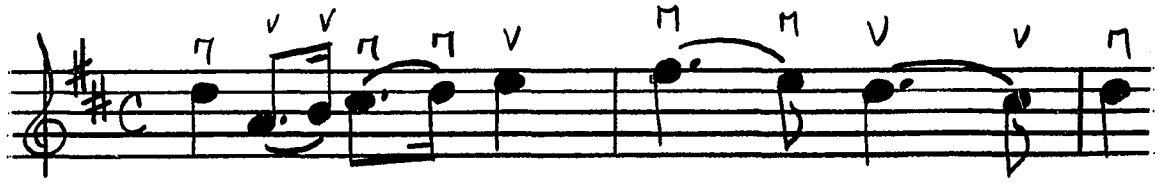


Unslurred, even-numbered notes starting on the beat should be started down-bow

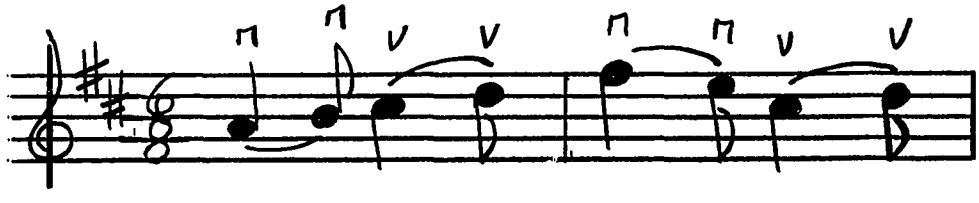
Fig. 22.--Seventh bowing principle

The common dotted-eighth-and-sixteenth or dotted-quarter-and-eighth note patterns should be played in a "linked" or "hooked" manner according to principle eight. Illustrated in Figure 23, the "linked" bowing is accomplished by using the same bow direction for both notes, with a slight

stop of the bow between the notes. Principle nine recommends the use of the "linked" bowing for the patterns previously mentioned unless the tempo is too brisk or extreme dynamic levels are indicated. The same "linked" bowing is generally used with standard six-eight rhythmic patterns, as indicated in principle ten and illustrated in Figure 23.



Linked or hooked bowings are used on these patterns unless the tempo is too brisk or extreme dynamic levels are indicated



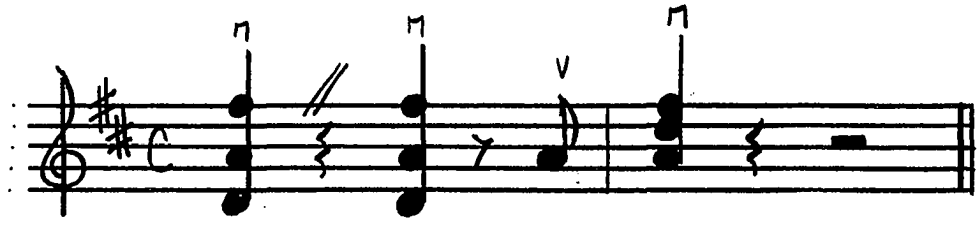
Linked bowing is used with standard six-eight rhythm in this line

Fig. 23.--Eighth, ninth, and tenth bowing principles

Rule eleven notes that most chords are played down-bow, especially if they are separated by rests. This principle is generally followed regardless of whether the chord is on the beat or not.

Rule twelve is that the final chord or note of a composition should be played down-bow; consequently, any short

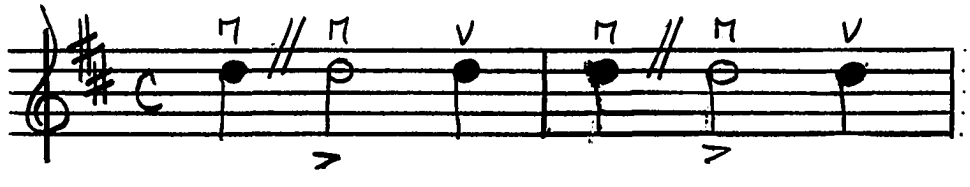
note preceding the final chord should be played up-bow. Principles eleven and twelve are illustrated in Figure 24.



Most chords are played down-bow, especially when separated by rests. Final chords should be played down-bow, with note preceding played an up-bow

Fig. 24.--Eleventh and twelfth bowing principles

If a forte syncopated passage occurs with a half-note appearing on the second beat of a measure, rule thirteen states that the half-note should be played down-bow to achieve the necessary accent, as illustrated in Figure 25.



Accented half-note on the second beat should be played down-bow

Fig. 25.--Thirteenth bowing principle

Because of the playing positions of the different instruments, principle fourteen indicates that different bowings should be used when unslurred, continuous string-crossing patterns appear. The violin and viola should start the top

note up-bow, while cello and string bass should begin the top note down-bow as shown in Figure 26.



With unslurred, continuous string-crossing, violin and viola start up-bow



With unslurred, continuous string-crossing, cello and string bass start down-bow

Fig. 26.--Fourteenth bowing principle

Special Effects

There are numerous special effects or sounds indigenous to stringed instruments that the director should understand in order to achieve the various tone colors possible to the orchestra. Although not all are techniques of the bow in the most direct sense, most of the special effects discussed below depend indirectly upon the bow to give them substance.

Double-Stops

The term "double-stop," in its strict sense, means fingering and bowing two adjoining strings at the same time,

but the term is commonly used simply to mean playing any two notes simultaneously even if one or both are on open strings. To insure the best possible intonation, the director may choose to divide the notes between players rather than having each player execute both notes. A poor tone quality on double-stops is usually caused when the angle of the bow is not correct and one string is getting more pressure from the bow than is the other. Students need to concentrate on starting both notes together and maintaining even sound throughout the stroke.

Chords

There are two fundamental methods of playing chords in orchestral music: the rolled or broken chord and the unbroken chord. The method chosen will depend upon the style of the composition and the musical taste of the director.

In the broken chord manner of execution, the lower notes are played slightly before the beat, much like grace notes, and the top notes are sounded directly on the beat.

In the unbroken manner, all of the notes of the chord should be played simultaneously. As this is more difficult, it may be necessary to divide the chord between the inside and outside players on each stand. In general, chords should be started down-bow near the frog, with the lower note being sounded first when applicable.

Mute

The term "to mute" refers to the act of dampening or softening the tone of a stringed instrument by placing an implement called a mute on top of the bridge. Use of the mute is indicated in the music by the terms dampfer, sourdine, or con sordino. When the composer wants to return to a natural tone the change is indicated by the term senza sordino. School orchestra students should own mutes for their instruments and always have them available at rehearsals and performances.

Glissando

Glissando is to a stringed instrument player the art of sliding from one note to another, usually on the same string. The glissando is generally executed on a single finger, and it can be slurred or separately bowed. Students must be careful to slide evenly, rhythmically and accurately, not oversliding the terminal pitch.

Ponticello

The term used in orchestra music for producing a glassy, eerie sound is ponticello. To produce ponticello the bow must be pulled very close to the bridge, almost touching it. This special effect is usually combined in the music with a tremolo stroke.

Col legno

Col legno is a term meaning to play with the wood of the bow. To create this effect, the bow is slanted so that the bow stick, instead of the hair, will make contact with the string. The bow stick is then dropped onto the string in the desired rhythm. Usually col legno is used to give a rhythmic, clicking sound. It is very rarely that the player ever actually draws the bow stick across the string.

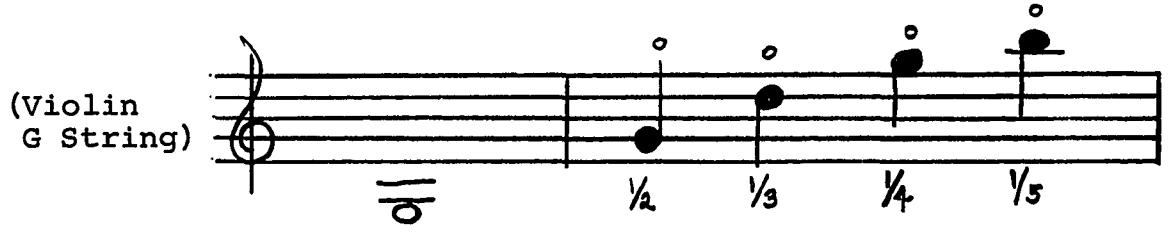
Harmonics

Harmonics for stringed instruments are high tones of a flute-like timbre which are produced by lightly touching the string at a fractional point instead of pressing it down as is done in ordinary stopping. This action prevents the free vibration of the whole string but does allow vibration of the fractional parts. Stringed instrument harmonics are of two types--natural harmonics, which are produced on an open string, and artificial harmonics, which are produced on a stopped string.

Natural harmonics are used most commonly in school orchestra music and, therefore, those the school orchestra director will need to understand. Natural harmonics are achieved by gently laying the finger on top of the open string at the appropriate fractional portion of its length. Harmonics are notated either as a regular note with an open-string sign above it () or as a diamond-shaped note (). In either

case the finger touches the string at the exact spot indicated by the harmonic note. The slightest deviation from the exact spot on the string will cause a squeak or fail to produce a clean sound.

The harmonic series on any vibrating string, determining the fractional divisions necessary to the production of natural harmonics, is as follows: placing the finger one half the length of the string sounds an octave above the open string; one third the length of the string sounds a fifth above the octave; one fourth the length of the string sounds two octaves above the open string; and one fifth the length of the string sounds a third above the major octave. This principle is illustrated in Figure 27.

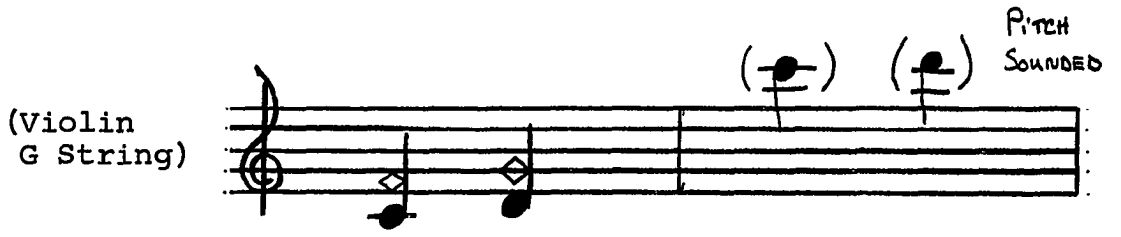


Lightly touching the open string at the indicated fractions will produce the notated pitches

Fig. 27.--Natural harmonics

Artificial harmonics are more difficult to understand and produce, but are less frequently encountered in school orchestra music. They are achieved by firmly stopping the string with one finger (or thumb on cello and string bass) while lightly touching the string with another finger at a specified distance above the stopped note. The stopped note

is indicated by normal musical notation while the harmonic is notated as a diamond-shaped note. The most-used artificial harmonic is placed at the interval of a fourth above the stopped note, as illustrated in Figure 28.



Press first finger down solid on lower note. Fourth finger reaches interval of Perfect fourth above, lightly. Pitch sounded will be two octaves above first finger note. Cellists usually use thumb on lower note and third finger on top

Fig. 28.--Artificial harmonics

Pizzicato

Pizzicato refers to the plucking of the string with the finger. The correct hand position for pizzicato is with the right thumb braced against the side of the fingerboard and the index finger extended to render the pluck just past the end of the fingerboard. The director should be sure that for a good sound the string is plucked with the tip of the finger and not with the fingernail.

For short pizzicato passages the bow remains in the hand, but for very lengthy sections it may be placed in the player's lap. Arco is the term used when the composer wants to return to bowing.

Vibrato is very important to a resonant pizzicato tone and should be used whenever the tempo allows. Left-hand pizzicato is sometimes used when an open string must be plucked and there is not sufficient time to change from bow to pizzicato. When the music calls for pizzicato of two or more notes at the same time, the instrument may actually be strummed with the thumb or index finger, starting with the bottom note. A fast motion across the strings produces the best effect for pizzicato chords.

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CHAPTER V

ORCHESTRA SOUND CONCEPTS

Since the school orchestra will reflect the musical tastes of the director, it is important that clearly defined goals of orchestra sound be established at the outset. From his college experience and past concert attendance, it is to be hoped, the beginning orchestra director will already have formed a fundamental concept upon which he may build.

To be of full value, this concept must constantly be sharpened through continued exposure to orchestral performances of all types. Attending professional symphony orchestra concerts will strengthen the director's concept of good orchestral sound, but much can also be gained by hearing performances and rehearsals of college and other school orchestras. By hearing much orchestra music, the director may discover solutions to problems faced in his school organization.

Members of the school orchestra must also establish a clear mental image of the sound produced by a good orchestra if they, too, are to fully comprehend the concept of sound desired by the director. Equally important for the stringed instrument player is a concept of the tonal capabilities of his own instrument in the hands of a professional. Young

players will be easily satisfied with the sound they produce if they are unaware of the quality of tone that is possible from their instruments. Each student should be encouraged to attend symphony orchestra performances, chamber music concerts, and solo recitals whenever possible. If concerts are not readily available, the student should be encouraged to listen to good recordings by top professional orchestras and soloists.

All the while the director can be guiding the student's awareness of, and ability to distinguish, tone quality by a thorough questioning of the student on what was heard. Tape recording rehearsals and performances of the orchestra, as well as individual students, will enhance their comprehension. Such critical study and analysis will make the student more aware of his own sound as well as that of the full orchestra. Once the concept of a good sound is developed and a definite goal established, progress will be more satisfactorily achieved.

Stringed Instrument Tone

There are many factors in the production of stringed instrument tone that can be varied and controlled by the student as he plays, just as there are elements over which he has little control. These controllable factors will be examined in the paragraphs that follow, and practical suggestions will be made for their application and use in the school orchestra.

Instrument Quality

The quality of the instrument and bow is one of the most important elements controlling the student's tonal capability. The instrument forms the basis upon which tone quality is obtained, and an instrument is capable of producing a tone only equal to the workmanship and quality built into it by its maker. Therefore, it is of singular importance for the director to encourage his students to equip themselves with the best possible quality of stringed instruments and bows. Band directors, who insist upon high quality equipment in their bands, will find this concept only too familiar.

The tonal response of even the best instruments can be severely hampered if they are needing repair or adjustment. The director should periodically check each instrument and make the necessary repair when possible, or utilize the services of an expert repairman. The strings and bow hair should be replaced periodically and the bow kept well rosined. With equipment capable of producing a good tone, the director is then ready to apply the factors that will effect the tonal quality and dynamic level of the stringed instrument sound.

Influence of the Bow

The bow and its variety of techniques exert the strongest influence on stringed instrument tone since it actually initiates sound from the string. There are numerous tonal adjustments and shadings possible with only slight adjustments

in the control of each bow stroke. The three most influential factors of bow control affecting tone and dynamic level are the speed of the bow stroke, the pressure of the bow upon the string, and the point at which the bow makes contact with the string. The tone produced by each bow stroke is basically a combination of these three factors, and alteration of any one of them will produce a change in the dynamic level or color of the tone. Before discussing the manner in which these three factors can be applied to the school orchestra tone, their functions should be thoroughly made clear.

Bow Speed.--The speed at which each stroke of the bow travels across the string is referred to as the "bow speed." Any change in the bow speed will cause a change in the dynamic level, providing all the other factors remain constant. Consequently, the faster the bow stroke or bow speed, the louder the sound, and conversely, the slower the bow speed, the softer the sound. For this reason, it is essential that a constant bow speed be maintained when no dynamic change is desired, and that equal time values be given equal divisions of the bow. Less experienced students may have some difficulty in planning the bow stroke. There is usually a tendency to use too much bow at the beginning of the stroke, making it necessary to reduce the speed in order to complete the phrase within the bow stroke, or resulting in a failure to complete the phrase because of lack of bow. With careful planning and experience, the student will learn to gauge the time values

to be covered per bow and adjust his bow stroke to achieve the correct speed throughout.

The director should encourage the students to use a full bow stroke on each note wherever possible. In order to utilize the full length of the bow on each stroke, the students should pull the bow more slowly on notes of longer value and more rapidly on notes of less value.

Bow Pressure.--The pressure or weight of the bow on the string can also effect a change in dynamic level. With all other factors remaining constant, the more bow pressure or weight applied to the string, the louder the resultant sound, while the sound produced will be softer if less bow pressure or weight is applied. Changes in the bow pressure will cause changes in the quality of the tone as well unless corresponding changes are made in other factors. If the other factors remain unchanged, a heavy pressure from the bow will cause the tone to be coarse, harsh, and rough sounding. If the bow pressure is very light, the tone will be rather thin and lacking in substance.

The bow pressure exerted upon the string is caused by the natural weight of the bow stick, the right hand, wrist, and arm. The greatest pressure will be exerted when all the elements of natural weight and pressure occur. If action is not taken to maintain a constant bow pressure throughout the stroke, the result will be a dimenuendo on each down-bow stroke and a crescendo on each upward stroke of the bow. To

counteract this natural phenomenon a controlled pressure from the right hand must be increased proportionately as the point of the bow is approached, thus counterbalancing the loss of natural weight.

The index finger of the right hand is most important in controlling the amount of pressure applied throughout the bow stroke. Often students will incorrectly exert pressure from the upper arm and shoulder with a stiffening of the fingers and wrist. This fault is a primary cause of the scratchy sound often associated with younger string players. The student will find it necessary to gradually increase the pressure applied by the index finger on a down-bow stroke to compensate for the lighter natural weight of the bow near the tip.

Point of Contact.--The third factor of primary importance in producing and varying the tone is the point in relation to the bridge or fingerboard at which the bow contacts the string. This is referred to as the "point of contact."

Generally speaking, with all factors remaining constant, the nearer to the bridge the bow is drawn, the stronger and fuller will be the tone, while bowing nearer the fingerboard will cause a softer and more gentle sound. Normally, the point of contact will be located at a point midway between the bridge and fingerboard. Tone color is also affected by a shift in point of contact, and the director may, therefore, wish to experiment with variations in the contact point.

The most effective application of the point-of-contact principle is based on a straight bow stroke. Each string produces its best tone quality when vibrating most freely. To achieve the freest vibration of the string throughout the stroke, the bow must move parallel with the bridge. When the bow crosses the string at an angle not parallel with the bridge, the string resonance and tone quality is minimized.

Other factors.--The speed of the bow, the bow pressure, and the point of contact are by no means the only factors affecting tone production and dynamic change, but since they are most significant in their application to younger students and can be somewhat confusing, they have been dealt with at length. Other less confusing but very important elements in bow usage should be briefly examined, as they may prove extremely valuable to the director in working with the orchestra.

The amount of bow hair coming in contact with the string can cause a change in the dynamic level and, to a lesser degree, the tone quality. The bow stick generally tilts slightly toward the fingerboard when held correctly, causing each bow stroke to ride on only a portion of the bow hair. By increasing the amount of hair in contact with the string, one obtains a larger gripping surface and consequently a louder sound. Conversely, a lesser amount of hair contacting the string will cause a softer sound. For young groups, playing with the bow hair flat will increase the amount of sound they can produce. Cello and string bass students should

generally play on the flat of the hair except in pianissimo passages because of larger, thicker strings.

To balance the sound throughout the length of the bow stroke, it may be advisable to encourage slightly more bow tilt near the frog, and less tilting of the bow near the point. Such a motion will allow more bow hair to contact the string in the normally weaker upper-half of the bow, and less hair to contact the string in the more weighty, lower-half of the bow. This slight rotary motion of the bow should be a natural result of a smooth bow stroke combined with a flexible wrist motion, and conducive to correct bowing technique.

Of significant importance in the achievement of a beautiful tone quality is the technique of smoothly changing the direction of the bow stroke. This technique, though of singular importance, is one of the more difficult aspects of tone production for the stringed instrument player to develop. The key to smooth bow change is that at the very instant the bow direction changes, there must not be the slightest disturbance in any of the other factors of bow technique. Young string players have a tendency to create a rest or a staccato sound at the end of each stroke either by releasing the pressure or making the change too quickly. This can be eliminated by careful listening and a slow, even change of bow direction. The development of this technique requires slow and diligent practice on the part of the student, with careful guidance by a good private teacher.

Tonal Variation.--Tone production and variation is based on differing combinations of the basic factors discussed above. For the professional stringed instrument performer there exist a myriad of subtle variations in tone quality, tone color, and dynamic level possible through minute adjustments in combinations of bow techniques. For the average school-aged stringed instrument player it is sufficient that he have a basic understanding of how the bow affects the string tone and what adjustments are necessary to create specific major changes in the tonal and dynamic level.

The most important general rule to remember is: The bow speed and pressure always must balance each other in relation to the point of contact or distance from the bridge.

When the bow is drawn near the bridge it will be necessary to use slightly more pressure and a slower bow speed if the tone quality is to remain constant. This action will generally create a louder volume of sound.

When the bow is drawn near the fingerboard the student should use less pressure and a faster bow stroke for a good tone. The tone will generally have a softer quality near the fingerboard.

It is important to understand that, as a general rule, when the point of contact moves toward the bridge, the pressure increases and bow speed increases. From these statements can come valuable information for the director in regard to dynamic change in the stringed instrument sections of the

orchestra: to increase the dynamic level, bow nearer the bridge, and to decrease the dynamic level, bow nearer the fingerboard.

The various effects created by the possible combinations of the above factors can be both complex and confusing to the non-stringed instrument player. However, if the basic principles are clearly understood, the director should be able to improve the tone production of the stringed instrument sections of the school orchestra and effectively achieve the dynamic contrast so important to a successful performance.

Influence of the Left Hand

Finger Pressure.--Since the left hand completely controls the melodic and pitch aspects of playing, mastery of correct finger action of the left hand is of utmost importance to all stringed instrument players. Crucial to a good tone are strong, curved fingers, able to depress the string firmly at all times. The fingers should be placed on the string at the tip of the finger, not laid flat or collapsed.

If the left-hand fingers do not stop the string with complete firmness, a thin, dull, raspy tone quality results. This is a common result of weak left hand fingers, and exercises to strengthen such fingers should be used daily. If the student would spend five minutes each day raising the fingers high above the fingerboard and pounding them down into the string and fingerboard like a hammer pounding a nail

into a board, a significant strengthening of the left-hand fingers and improvement in tone quality would be the result. This exercise should be done with all four fingers while maintaining correct left-hand position, with the goal being to produce a recognizable pitch or "clicking" sound as each finger strikes the string.

Choice of Fingerings.--For the more advanced students in the school orchestra who have some knowledge of positions, the director may want to suggest a change of fingering to give different tonal color. Generally, playing the same notes on a lower string in a higher position will give a softer, more melodic sound.

Early in a violin or viola player's development, the fourth finger's function is introduced with the playing of the same note as the next highest open string. The open string tone is more blatant than a stopped note and not always acceptable to the musical effect desired. A fairly young cellist can be taught to move to fourth position and avoid the open strings fairly easily. Stringed instrument students should be encouraged early to learn to play open strings only where absolutely necessary.

Vibrato.--Necessary, of course, to a mature string tone is vibrato. Once a good bow sound and strong left-hand fingers have been developed, the tone will be greatly enhanced by the addition of a correct vibrato. Since most agree that the teaching of vibrato should be left mainly to the private

teacher, the orchestra director's duty will be to encourage its use.

Vibrato can be executed in various speeds, widths, etc., and the director should guide the students as to what fits the musical style wanted. A nervous, tight, too fast, uneven vibrato will never produce a good tone. Young students should be encouraged to keep the vibrato slow and even, and learn gradually to vary the speed as necessary to achieve the desired musical effect.

Orchestral Balance

The characteristic sound of an orchestra is produced by the careful balance of stringed and wind instruments. Since stringed instruments form the majority of the orchestra membership and carry the bulk of the musical and melodic burden, they must be established as the predominant sound in the orchestral balance--a simple statement; yet a difficult task. To achieve a satisfactory blend and balance of sound, the stringed instruments must each produce a mature, resonant tone quality. The bow techniques and suggestions for the left hand mentioned above will aid in achieving this desired sound.

When the director selects the wind instrument and percussion players for the orchestra he should choose the best performers available on each of the instruments. The orchestral wind instrument player must be able to produce a rich,

mature tone quality and must have a well developed sense of intonation. Technical facility is equally important because of the sometimes difficult soloistic passages and less familiar key signatures.

The wind instruments must be able to control their sound to create a satisfactory blend and balance with the stringed instruments and still be able to project their tone above the orchestra for a melodic or solo passage. The ability to project the tone is seldom the problem for brass players that it is for woodwind instruments. A resonant stringed instrument can easily cover the sound of a young woodwind instrument player until the art of projecting tone quality is developed.

Some directors may experience difficulty in achieving a satisfactory balance of sound from the orchestra. This difficulty can usually be traced to two fundamental problems: (1) the stringed instruments are not producing the full, resonant tone quality of which they are capable, or (2) the wind instruments, especially the brass, are overblowing the remainder of the orchestra.

Solutions to the first of the above problems of orchestral imbalance should be forthcoming through the application of the suggestions outlined in the preceding material. A proper orchestral balance will be almost impossible to achieve without the production of a full, resonant tone quality from the stringed instrument sections.

The solution for the second problem of balance lies entirely in the hands of the director. The musical taste and concept of orchestral sound held by the director will ultimately dictate the resultant balance of sound. If the balance is such that the wind or brass instruments are consistently the predominant sound, the characteristics of an orchestra are lost and there exists nothing more than a band with stringed instruments added. To be an orchestra, the organization must sound like an orchestra, with the sound of stringed instruments as the predominant and characteristic quality.

The band director, of course, is familiar with the idea of hearing his groups occasionally from a distance to check blend and balance. This should also prove quite valuable to the director who is working with an orchestra for the first time. By listening from the perspective of the audience, the director is better able to pass critical judgment on the balance of sound between woodwind, brass, and stringed instruments. Once the director has some idea of the quality and balance of sound being received by the audience, he will be in a better position to pass judgment on the orchestral sonority during daily rehearsals.

Another technique, proven valuable by band directors, is to tape record rehearsals for study at a later time. The tape recorder can prove a useful tool for recognizing problems of balance and sonority, as well as analyzing imperfections in

technical passages. The tape often captures sounds not readily apparent to the director while on the podium, and may provide him with a more objective and realistic view of the rehearsal than otherwise available. The inexperienced, as well as the seasoned, orchestra director has much to gain from the use of tape recorder in both rehearsal and performance.

In summary, the following important points should be emphasized in the development of a quality orchestral sound. Through experience the director will soon learn which combination of factors produces the most effective result for the desired musical effect.

(1) The very foundation of good tone quality lies in the establishment of a clear concept of a superior sound for each of the stringed instruments and for the orchestra as a whole.

(2) The capacity for a good tone emanates from a top quality instrument and bow, in good repair and adjustment, with live strings and a well-rosined bow.

(3) To develop a richer, more resonant tone quality each bow stroke should move parallel to the bridge, with a bow pressure and bow speed consistent with the point of contact.

(4) To increase the volume, the stringed instrument player should use one or a combination of the following bow techniques: bow nearer the bridge, use more pressure, use

more bow, increase the speed of the bow, play nearer the frog, or use more bow hair in contact with the string.

(5) To decrease the volume, the student should use one or a combination of any of the following techniques: bow nearer the fingerboard, decrease the bow pressure, decrease the bow speed, use less bow, play at the tip of the bow, or use less bow hair.

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CHAPTER VI

TUNING AND INTONATION

Intonation is probably the most significant factor in the evaluation of a school musical organization, for the degree of success or failure within the ensemble is often measured by the listener in relation to the accuracy of intonation. A group may display uncanny technical ability or a mature, stylistic interpretation, yet have their performance marred by faulty intonation.

The development of accurate pitch in the school orchestra required the constant attention of both director and student. The production of correct intonation must be a sine qua non ingredient of each rehearsal.

While good intonation in the final analysis is dependent upon the aural sensitivity of the performer and on his ability to make immediate and accurate adjustment, there are also physical factors indigenous to stringed instruments that effect and influence correct intonation. Such physical factors are discussed in the paragraphs that follow.

String Tuning

The first step in good stringed instrument intonation is to tune each string accurately. It is suggested that tuning be accomplished with the instrument in playing position and with the bow sounding the strings rather than with the use of pizzicato. Besides creating a sustained tone, utilizing the bow will provide a more consistent, precise tone and will make double-stop tuning simpler.

When a string is found to be badly out of tune, the adjustment should be made with the pegs located in the scroll of the instrument. Each peg should be turned first to lower the pitch of the string and then raised slowly to the desired tone. The peg will hold better if the pitch is approached from below rather than above, and if the peg is pushed inward as the pitch is raised. The machine pegs used on string bass require no inward pressure since they work on a principle of low-gear ratio, and therefore hold the pitch to which they are turned.

The use of tailpiece tuners or adjusters will prove valuable for refined and easy tuning, especially on the upper strings. It is recommended that tuners be used only with steel or steel-wound strings. When gut or gut-wound strings are attached to a tailpiece tuner the fabric winding at the knot-end of the string may extend over the bridge, leading to a distorted string tone, as well as cause frequent string breakage.

Refined tuning may be obtained on gut or gut-wound strings without altering the position of the scroll pegs if the necessary adjustment is minimal. Pulling the string gently away from the fingerboard will lower a sharp string, and a downward pressure on the string in the scroll peg-box, just above the nut, will raise a flat string. These are quick and effective adjustments that will produce only small deviations of pitch. If the necessary pitch change is large, the only recourse is a peg adjustment.

The actual process of tuning should start with the A string. First, sound the A on a tuning fork, tuning bar, piano, electronic device, or some other instrument capable of maintaining a constant pitch. Accurately tune the pitch of the A string via the scroll peg or tailpiece tuner. Repeat this process with the D string and G string respectively, using a stable pitch as a reference tone. Viola and cello players should then tune their C strings by matching a fixed reference tone. Finally, violin and string bass players should match their E strings with the accurate pitch being sounded by the tuning source. It may be necessary to recheck the individual strings if any major adjustments have been necessary, for the tightening of a loose string will upset the balance of tension on the entire set of four strings and any previous efforts at tuning refinements will be lost.

Each string should then be checked by use of double-stops. The A and D strings should be sounded together, using

the upper-half of the bow, with any necessary adjustments made in the D string pitch until the beatless sound of the perfect fifth is achieved. Repeat this process with the D-G and G-C double-stops, always using the accurately tuned string as the reference tone of the double-stop. The violin E should be checked with the A string serving as the lower member of the double-stop. With practice, the student will be able to sustain the double-stop sound with the bow, while making the necessary pitch adjustments with the left hand.

The string bass presents a unique tuning problem because it is tuned in fourths rather than fifths, making double-stop tuning impractical. The most accurate method of tuning string bass is through the use of harmonics, since the low pitch of the bass makes open string tuning difficult.

With the left hand in third position, lightly touch the D string (at one third of its length) with the fourth finger, and sound the harmonic A. Tune this harmonic A with the accurate reference pitch. Then, with the first finger, reach directly across to the A string, touch it lightly (at one-fourth of its length), and tune the resultant harmonic A with the harmonic A that was produced on the D string. The left hand, still in third position, is then moved across to the A and E strings. The harmonic E, produced by the fourth finger on the A string, is used to tune the harmonic E played with the first finger on the E string. The hand is then placed over the G and D strings, the process reversed, and

the G string tuned to the harmonic D produced on the D string. The left hand must remain in third position throughout the entire tuning process.

At the completion of the harmonic tuning, the string bassist should check his open strings to assure accuracy of pitch. "False" or "dead" strings may cause inaccurate harmonics, resulting in an instrument not precisely in tune.

Students should be encouraged to tune their own instruments in daily rehearsals, as constant reliance upon the director for tuning can seriously handicap the normal rate of aural development. Students are able to learn to discriminate between pitches but will never do so as long as the director tells them what is wrong with each note. To progress in tuning, the students must decide for themselves what is wrong, make the necessary adjustment, and then correct where necessary. Since developing an "ear" for intonation is not an instantaneous process, the students' improvement may seem slow, but self-reliance in tuning will be worth the extra time expended on its achievement.

By the time the students reach the high school orchestra, accurate and rapid tuning should be expected of every player. For an actual performance the director may wish to check more carefully each individual instrument or to ask assistance of local adult string players in insuring that each instrument is correctly tuned.

Orchestra Tuning

Tradition in professional orchestras dictates the use of the first oboe[1] as the source of the A or tuning note,[2] but this is not always recommended for school orchestras. A fixed pitch of some type (piano, tuning bar, tuning fork, electronic tuning device, etc.) would prove more satisfactory than the less stable oboe A in providing an accurate, consistent basis for school stringed instrument and orchestra tuning. The daily use of a consistent pitch aids the development of accurate pitch recognition in the young stringed instrument player.

In tuning the orchestra, the stringed instruments should be tuned first while the wind instrumentalists listen quietly. The tuning note should be sounded singly, allowing

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[1]The practice of tuning the orchestra to the oboe is said to have originated with Handel. This subject would constitute an interesting study, since accurate documentary evidence is practically negligible.

[2]The traditional use of an A pitch for purposes of tuning presents another subject worthy of detailed research. In available resource materials, reference to the "tuning-A" appears as an assumed quantity, without further explanation. Perhaps the earliest record of an attempt to establish and standardize a tuning pitch, however, may be found in a work by Michael Praetorius, Syntagma Musicum (1619), in which he prepared a dimensioned drawing of the pipes of the Halberstadt organ (1361). Praetorius specified a "suitable pitch" for tuning church organs that corresponds to A (measured by A. J. Ellis as A 424 c.p.s.). It would appear that the use of an A pitch then became the traditionally accepted standard for purposes of tuning all instruments. Our present standard tuning pitch of A-440 c.p.s. was officially adopted by the British Standards Institution in December, 1939, although this pitch had already been in use for a number of years by American instrument manufacturers.

the pitch to become established in the students' minds. The general pattern of tuning the stringed instruments would be A string, D string, and G string, followed by viola and cello C strings, and finally violin and string bass E strings. The director may wish to check individual players or hear open strings by section or as a group, requesting adjustment as necessary.

Once the stringed instruments have been satisfactorily tuned, the A should be re-sounded for the wind instrumentalists. The director may wish to hear woodwind instruments first and brass instruments following, hearing them individually, by section, or as a whole, depending upon his pre-established band tuning routine.

In any case, it is usually well advised near the end of the tuning session to sound a B^{b} for the trombones to insure their accurate tuning. This is especially true with younger players whose ears and familiarity with exact slide positions are not fully developed.

At the completion of the tuning process, a comparison should be made of the tuning pitch between the stringed and wind instrument sections. The dichotomy of intonation between the wind and stringed instrument sections may prove one of the most troublesome intonation worries for the director.

Frequent tunings and careful attention to intonation by the director will assist the students to become more

constantly aware of their pitch and will guide them in making the necessary adjustments.

Intonation

Establishing and maintaining good orchestral intonation will be a constant and major concern for the orchestra director. Although accurate intonation is dependent basically upon good listening habits, the correct physical factors also enhance its development.

Correct playing position and a firm, relaxed left-hand pressure are needed to insure the accessibility of accurate intonation. Too little pressure produces a faulty, wheezy tone, and too much pressure tenses the left hand, limiting the ability to make adjustments. Correct use of the bow can also aid intonation; the student should be encouraged to keep a firm, even bow pressure while maintaining an adequate bow speed throughout each bow stroke. Too much pressure coupled with a slowly moving bow will usually lower the pitch.

Imperative to good intonation on stringed instruments is the awareness and understanding of whole and half-steps. The student must be conscious of what a change of key does to the fingering pattern of his hand on every string. To the violinist and violist it is essential to consciously play the whole-steps large enough and the half-steps small enough.

Being aware of the key is essential to the cellist in knowing whether to play second or third finger on each string. The cellist must also watch for intervals of a Major third to know when to use extensions.

The string bass player must realize that half-steps will either be between first and second or second and fourth fingers. Whole-steps will be between first and fourth fingers.

There is no secret of good intonation. From the beginning the student must be trained to develop good listening habits. The director must teach each student individually to recognize what is wrong with a pitch and encourage him to make the necessary adjustment quickly, even if it is sometimes necessary at first to encourage the student in an almost experimental exploration of his instrument's capabilities.

For example, if the student realizes that the pitch is wrong but is unable to tell whether it is flat or sharp, the director should, instead of making himself available as arbiter, instruct the student to adjust in one direction, then the other, until the pitch improves. Eventually the student will be able to discriminate quickly and accurately.

Reliance upon the director for hearing will never develop the aural sensitivity and pitch discrimination required for accurate, sensitive intonation. In the final analysis the ear must be the guide, but the physical factors discussed in this chapter can help to establish an atmosphere conducive to good intonation.

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CHAPTER VII

ORCHESTRA SEATING AND INSTRUMENTATION

Over the years seating arrangements for orchestras, both amateur and professional, have become relatively standardized when compared with the diversity of seating arrangements found in concert bands. This is not to say that the orchestra director is completely limited in his choice of seating arrangements. Many adjustments may be made to accommodate individual situations, but to produce adequately the characteristic orchestral sound, certain traditional seating arrangements should be considered basic for school orchestras.

In all stringed instruments the sound is produced by the vibration of the string amplified within the body of the instrument and emanating through the "f" holes in the top of the instrument. Consequently, the sound produced by the stringed instruments will be much stronger if the "f" holes are pointed in the direction of the audience, and, conversely, more muffled if pointed inward toward the orchestra. It is for this reason that the first violins are always placed on the outside to the left of the director. Their sound must be

predominant within the orchestra since they carry the primary melodic responsibility.

The most widely used seating arrangement for school stringed instrument sections places the first and second violins to the left of the director, the violas to the inside right of the director, the cellos on the outside right, and the string basses behind the cellos as illustrated in Figure 29.

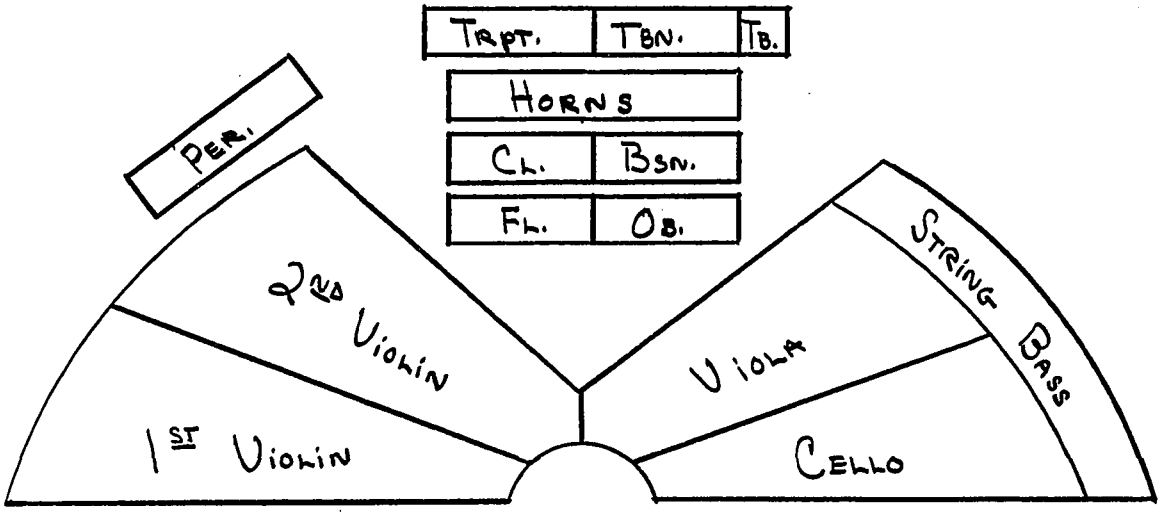


Fig. 29.--Recommended orchestra seating

Arranging the string section in this manner provides many advantages for younger orchestras. Placed together, the first and second violins tend to balance, support, and blend with each other, as well as to provide the weaker, less experienced members of both sections with a greater sense of security.

An extremely strong and independent second violin section may be placed to the right of the director as illustrated in Figure 30. This placement is not recommended unless the second violin section is very large in number and exceptionally strong, and the viola and cello sections relatively weak. A much more satisfactory result can almost always be achieved with all violins placed on the left side of the conductor.

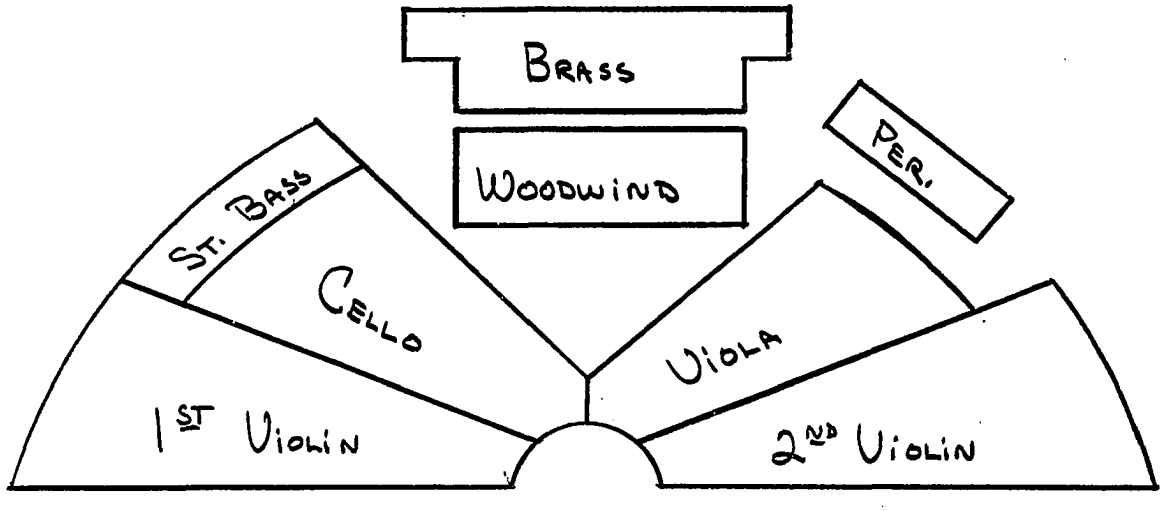


Fig. 30.--Orchestra seating with large or advanced violin section

A strong cello section is best placed to the outside right as illustrated in Figure 29, so that their sound will pass across the orchestra. In this arrangement, the violas are in a position to be more clearly heard and to blend more easily with the violins.

With a weak cello section a better balance might be achieved by placement on the inside right as shown in Figure 31, so that their sound would be directed outward. This arrangement, however, would place the viola section on the outside right, further muffling the normally weaker viola sound. For this reason, the seating arrangement illustrated in Figure 29 is recommended as the most advantageous for use in school orchestras.

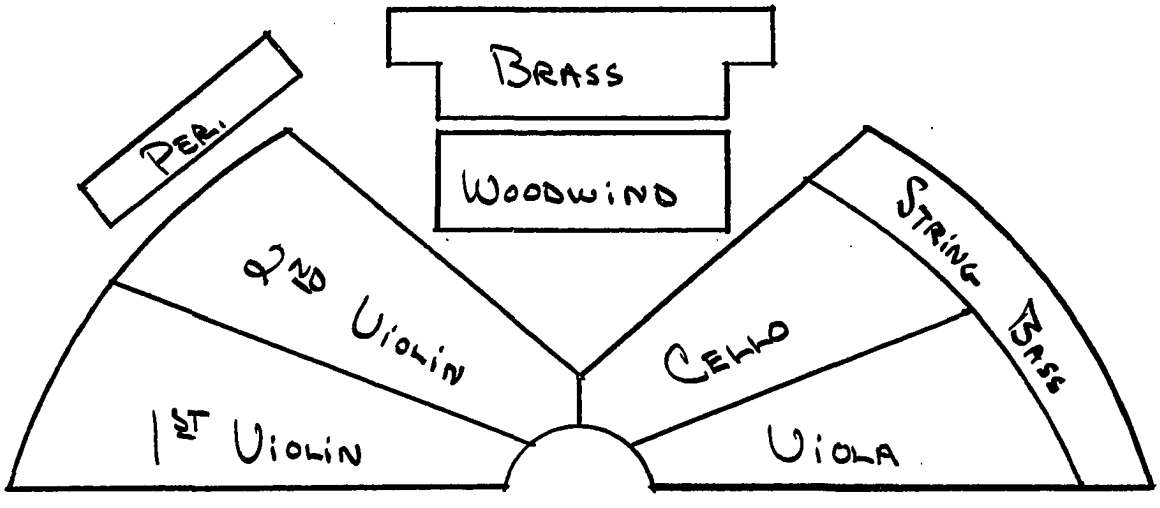


Fig. 31.--Orchestra seating with weak cello and strong viola sections

The string bass section should always be placed directly behind or in close proximity to the cello section, since their parts often double the cello line. Accurate string bass intonation will be much more easily maintained if bass players are able to hear the cello part being correctly

played. This arrangement will provide like advantages for the cello section.

For balance and intonation the woodwind instruments are best placed in two rows near the center of the orchestra as shown in Figure 29. The flutes are seated on the left and oboes on the right of the first row. The clarinets will be placed on the left, directly behind the flutes, and on the right, directly behind the oboes, will be the bassoons. The first chair players of each section should be seated next to each other in the center.

Since the horns are often musically treated as woodwinds, they should be seated on the third row directly behind the clarinets and bassoons. The first chair horn will normally be seated on the right end.

Trumpets, trombones, and tuba are placed on the back row, directly behind the horns, with trumpets on the left. First chair trumpet and trombone should be located next to each other in the center.

Percussion instruments may be stationed on either side of the orchestra at the back, depending upon where space is available. For a balanced appearance, the percussion section is often placed on the side opposite the string bass section.

The visual aspects of a seating arrangement are almost as important as the musical aspects. The more advanced violin and cello players with good playing position can create an effective appearance as well as improved sound if

placed on the outside of the orchestra near the audience. This arrangement will also allow younger players the opportunity of learning from the experience of more advanced musicians, since the better players will be spread throughout the section rather than bunched together at the front.

The string bass section stands out in the total visual effect of the orchestra because of the height of the instruments. A slumping left arm or poor posture on the part of a string bass player is most obvious to an audience and detrimental to the effectiveness of a performance.

With careful attention to the seating arrangement, the director can greatly enhance the visual and musical qualities of a performance and solve many problems of balance and intonation that might otherwise be prevalent through indiscriminate placement of instruments.

Instrumentation

The opportunity to conduct a fully instrumented and perfectly balanced orchestra is more the exception than the rule for the school orchestra director. Orchestra enrollment will usually consist of all the stringed instruments available, with the addition of wind and percussion instruments to cover the necessary parts and still maintain a balanced sound. Some sections of the orchestra, though adequate in number, may produce a weak, immature sound, while others may produce sound disproportionate to their size. This inconsistency

makes it difficult to establish standardized instrumentation lists to insure a balanced orchestra sound.

There are some general guidelines for balancing instrumentation of the stringed instrument sections that should prove valuable to the director in establishing goals for orchestra enrollment. To maintain an instrumentation conducive to a balanced sound, the stringed instrument section should ideally contain one viola for every three violins. An orchestra with twelve violins should, therefore, ideally have at least four violas to produce a balanced sound.

The same ratio of three to one would apply to cello and string bass sections as well. Twelve violins would require four cellos and four string basses to balance--although in practice the string bass section often numbers less because of a shortage of players. It will be noted that using the three to one ratio will always produce a violin section equal in number to the total viola, cello, and string bass sections.

Wind instrument parts should not be doubled unless the director has specific reasons for doing so, and then only if the orchestral balance of sound can be maintained. The opportunity of solo experience for the wind instruments should be retained if at all possible, since that is one of the important values of orchestral experience to the wind instrument player.

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CHAPTER VIII

REHEARSAL AND PERFORMANCE PROCEDURES

Planning the Rehearsal

Most band directors have, of course, developed well-defined procedures for organizing and conducting rehearsals to minimize wasted time, achieve specific goals, and maintain the interests of the students. Careful organization of rehearsal time is equally important when working with the school orchestra if the rehearsal is to be musically exciting and productive. Fundamental to achievement of a profitable rehearsal period is careful pre-planning, which should extend from the arrangement of the chairs through the conscientious editing of the music. As with any musical organization, the more thoroughly planned the procedures and goals of the orchestra, the more successful the rehearsal.

One of the most bothersome but most important of the pre-planning details, particularly for the non-stringed instrument player conducting an orchestra, is the editing and marking of bowing and fingerings in the stringed instrument parts. The director should utilize the knowledge and experience, limited though it may be, of the concertmaster and principal stringed instrument players, for, in addition to

relieving some of the pressure of work upon the director, such assistance may develop in the involved students an understanding of the total orchestral picture that will be valuable in their future musical activities.

The students assigned to the responsible positions of stringed instrument section leaders or principals should be selected not only through audition for their superior playing ability but also for their maturity, sense of responsibility, and qualities of leadership. Students with such qualities can be of immeasurable value to the director and the orchestra in guiding their sections and providing the spark of enthusiasm necessary for a successful performing organization.

The principal players in the orchestra should be responsible for the musical performance of their sections. In a meeting of the principal players, concertmaster, and director prior to, or shortly after, the first rehearsal of a piece of music, it should be the duty of the principal players to aid the establishment of bowings and fingerings within the capabilities of their sections and productive of the desired sound. The principal players should be encouraged to consult with their private teachers for aid with bowings and fingerings when needed. After the total editing has been completed and marked in the first desk music, the principal players must see that the information is transferred to all members of their sections and clearly marked in each piece of music. During full or sectional rehearsals, these same

principal players should be conscious of the problems of the younger and less experienced members of their sections and be available to assist them with difficult passages or to call the problem to the attention of the director.

The concertmaster, who is the first-chair violinist, fills a very special role in the school orchestra and accepts a unique set of responsibilities. It is the duty of the concertmaster to work closely with the director not only in selecting bowings, fingerings, and editing, but also to help determine the distribution of divisi parts, to play all violin solos, to aid in tuning the orchestra, and to serve as student leader of the orchestra, responsible to and for all its members. For the non-stringed instrument playing director a good concertmaster is indispensible, since he serves practically in the capacity of confidant and consultant, at least to the extent of his capability, in all problems of playing a stringed instrument.

In planning the rehearsal, the physical arrangement of the chairs is worthy of some consideration. Unlike the members of a band, the stringed instrument players require enough space between each chair to allow freedom of bow arm movement for maximum tonal effectiveness. It will be nearly impossible for stringed instrument players to develop correct playing habits if the seating space they are allowed creates unnatural playing positions by curtailing the freedom of the bow-arm movement. Cellos and string basses need even more space since

they bow horizontally rather than with a vertically slanted motion as do violins and violas.

Cello and string bass players also require adequate chairs or stools if they are to be placed in a comfortable playing position conducive to the development of correct playing habits. Cellos should be provided with substantial straight chairs with seats parallel to the floor and on a level with, or slightly higher, than the players' knees. Folding chairs generally prove unsatisfactory, as they are too low and slope backward, creating an unnatural playing position. Young string bass players should be encouraged to stand until correct playing position is well established. The more advanced string bass players should be provided with standard draftsmen's stools, approximately thirty inches tall for large students and correspondingly shorter for smaller players.

The Rehearsal

With the necessary editing of music accomplished, music distributed, chairs arranged, and scores thoroughly prepared, the director is ready for the rehearsal. A planned routine of tuning and warm-up will prepare the orchestra members for the primary rehearsal function: to read and rehearse good music.

After a careful tuning of the instruments[1] a short period of time should be spent in warm-up activity to prepare the players physically and mentally for the rehearsal. Most band directors have already established rather well-defined warm-up procedures, which, in most cases, may be transferred to orchestral routine. Some directors prefer the use of scales and chords in varying patterns as a warm-up, while others utilize chorales or easy works in this capacity. Any warm-up procedure which satisfactorily prepares the students for a productive rehearsal is acceptable.

The order of the music to be rehearsed should be chosen with the wind and percussion instruments in mind. Orchestral music often displays a wide range of instrumentation, and some selections will utilize fewer wind and percussion players than will others. The director will want to arrange the rehearsal order so that the music utilizing full orchestra is scheduled together while the wind instrument players are warmed-up and reliably in tune. The lightly scored or string orchestra music might then be scheduled near the beginning or end of the class period to facilitate any necessary reseating.

Most band directors realize the importance of a continual sight-reading experience for their organizations. An opportunity to establish the confidence and flexibility

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[1]Suggestions and techniques for tuning the orchestra are discussed in Chapter IV.

developed through sight-reading experience is equally important, if not more so, to the school orchestra because of the intangible difficulties of the stringed instruments. Accurate sight-reading may prove somewhat more difficult for the school orchestra than for the school band unless the orchestra is given ample opportunity to sight-read and is encouraged by the director to develop this important technique. Sight-reading is an ability well worth the effort necessary for its development, but only through constant opportunities for the experience can the desired result be achieved. In addition to increasing the skill and confidence of the students, sight-reading can serve to maintain interest, for students usually find sight-reading an enjoyable, challenging activity and one that they look forward to when done on a regular basis.

The Performance

The concert performance will show the result of a series of carefully planned and thoroughly conducted rehearsals and display the technical advancement, musical development, and educational achievements of the students. A well-planned orchestra performance will differ little from a good band concert, except in a few procedural details which the director should consider.

At professional orchestra performances, tradition dictates that the concertmaster precede the conductor, ask

for the sounding of the A, and direct the tuning of the orchestra. For the school orchestra this is a tradition suitable to the responsibilities of the concertmaster and one well worth preserving because of the attitude of responsibility it can instill in the student concertmaster and the feeling of professional pride it can create within the orchestra.

In addition to the sounding of the A at the beginning of the concert, the director may find it necessary occasionally to tune between numbers. Such practice is perfectly acceptable and, in fact, encouraged when it will benefit the intonation of the orchestra and help to produce a better performance.

The use of uniform bowing throughout the stringed instrument section is the sign of a well-rehearsed orchestra. Not only does uniform bowing create a unity of phrasing in the string section, but it also greatly enhances the visual aspect of an orchestral performance. The audience may not be aware of uniform bowing when it is well done, but will quickly notice the orchestra lacking in uniformity of bow-arm movement.

The physical appearance of an orchestra can be quite influential in the value judgments of an audience. The importance of an attractive orchestra dress for a concert performance is equal with uniform bowing, correct posture and playing position, and mature stage deportment in the visual effect upon the audience. The necessity of having some carefully planned uniform dress for school orchestra is important,

not only for the sake of an attractive and impressive stage appearance, but also for the excitement and interest it can create in the students. The use of uniform blazers, matching dresses, and even tuxedos and formal wear or long black dresses will help to present an attractively attired organization with an air of pride in their performance. The appearance of the orchestra in every way, musically and physically, must radiate to the audience the character of a mature, confident, yet relaxed professional organization, creating an atmosphere of complete assurance.

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CHAPTER IX

SELECTION AND EDITING OF MUSIC

Selecting the Music

The search for good music is probably one of the most time-consuming of all the activities necessary to the orchestra director. Careful selection of music, however, is well worth the time, as it is actually through the music itself that technique is advanced, interest maintained, and the various styles introduced to the students. Reading clinics, workshops, conventions, concerts, trade journals, music stores, conversations with colleagues, etc., may all provide important sources in the quest for new and exciting music. The director must be constantly sensitive to the available opportunities if he is to increase his familiarity with, and knowledge of, literature for the school orchestra.

Since it is through the actual music that students will develop and extend their technical facility, it is the wise director who chooses music that offers the students new challenges and encourages their music development. At the same time he must select music that will, after adequate rehearsal, be within the technical limitations and musical comprehension of the majority of students. Music too difficult

for the level of the group can be discouraging, while music that is too easy can cause a decline in the enthusiasm and interest of the students. The needs of the students, not the personal desires and tastes of the director, should be the primary consideration in music selection.

In choosing music for rehearsal and performance, certain guidelines can be established to serve as a basis for the selection. Above all, the director should have a knowledge of the group's level of technical ability. The music should ideally challenge every member of the orchestra without totally surpassing the technical ability of the less experienced members.

This balance is not always easily accomplished when there is a wide range of technical ability within the group. In such cases, the director must consider the weakest member and make his selections partially with him in mind. This is not to say that more difficult music cannot be used, but rather that it should be reserved for special use and not regarded as a norm for concert performance.

A constant diet of music well beyond the abilities of the less experienced players does little to improve their technical development and even less to sustain their interest in orchestra. In fact, it sometimes causes students to give up attempting to play difficult sections, and they become complete fakers, dangerous to any group.

A large amount of music is available with less difficult and demanding parts for second violins and violas. This type of graduated material may prove quite beneficial with young orchestras or where a wide range of skills exist. The less advanced violinists may be placed on parts which are technically less demanding, allowing a more secure development of their abilities, while the more advanced players are provided a challenge with the more difficult first violin parts.

For concert or festival performances it would be wise to choose music that favors the strengths of the organization. A strong cello section would sound excellent in a work with open cello parts, or a good violin section could be exhibited with a composition that especially displays their talents.

Caution should be used in avoiding solos in the wind parts if those individual players are weak. With stronger winds, choose music that is thickly scored for winds and does not expose the possibly weaker string sections such as second violins or violas. However, the director should keep in mind that, with the proper motivation, students are capable of achieving levels much beyond their normal capabilities.

In selecting music the director must consider the stringed instrument players' knowledge of positions, especially at the junior high school level. If the first violins know only first or third positions, music that requires the use of other positions should be avoided until the players

have had the opportunity to study and practice some exercises in higher positions.

Because of the larger sized instruments, cello and string bass players are often required to execute left-hand shifts which cover more distance on the fingerboard than would be required on the smaller violin or viola. For this reason, a fast passage which might be easily produced on violin becomes progressively more difficult as the instrument increases in size, requiring longer and more frequent shifts to execute the same passage. The director should be cognizant of this fact when selecting more difficult music.

Key signatures are also an important consideration in selecting music. Young string players are much more at ease in sharp keys because they usually learn these first and consequently play them more accurately and with better intonation. It is wise in performance to avoid keys containing more than three flats until training material in these keys has been sufficiently covered in rehearsal. Flats are more difficult for stringed instruments because flats eliminate use of the open strings.

More advanced players, such as those studying privately, should have developed some degree of facility in all key signatures. However, most school-aged stringed instrument players will still read and perform with greater fluency, accuracy, and confidence in the more familiar keys. This

knowledge may prove advantageous to the director when selecting music, especially if rehearsal time is limited.

Difficult bowing techniques, such as fast spiccato, hooked bowings, etc., may cause difficulty in the performance of a composition. In many cases, however, difficult bowing patterns may be adequately rebowed or changed, but, still, bowing should be considered carefully before purchasing music.

A variety of orchestra music is available from all historical periods, and it is the director's responsibility to develop the ability of all students to recognize, understand, and play various styles. If students play only one style, their musical education will be seriously uneven. Students should be aware of the differences in Baroque, Classical, Romantic, and Contemporary styles, both in playing and in listening. For example, they should be taught that eighth notes are typically played staccato, on-the-string in a fast movement in Baroque style; that eighth notes in the Classical style will probably be off-the-string, spiccato; that a warmth of tone and vibrato and a variety of tone color are needed to express the emotional content of the Romantic style; and that rhythmic and aural accuracy must be paramount if the Contemporary style is to be correctly performed.

Editing the Music

Careful and intelligent editing of parts can save much valuable rehearsal time. Although most recent

publications for school orchestra contain bowing and fingering indications, it may be necessary to simplify or change them to fit the needs of the group. The director will soon learn which composers and arrangers can be depended upon for the consistent production of music playable by his orchestra, and for bowings and fingerings accurately meeting the needs and abilities of his students.

When possible, bowings and fingerings should be marked before the first rehearsal with the aid of the concertmaster and principal players. Except for special effects, uniform bowing within a section is a necessity, as is a uniform bowing among all collective stringed instrument sections whenever passages are similar within the music. Bowing uniformly gives a more musical and stylistic interpretation of phrasing, with accents falling together and a continuity of dynamic expression.

Uniform fingerings present a different problem for the director. The younger the group, the more carefully fingerings should be indicated in difficult passages. Marking the parts not only provides a uniformity of fingerings within a section, but also serves the purpose of aiding technical development. Prescribed fingerings will help the student to feel more secure in his performance of faster passages, as he need not ponder the selection of fingers himself. The director may want to ask the section to try a passage several

different ways and after listening decide which way works best for the entire group.

With more experienced groups, the use of uniform fingerings may not always be desired. For a characteristic sound effect, the director may wish a passage played in a particular position and on a specific string, but in general the more advanced students should be allowed the freedom to choose the fingering which they can perform most accurately.

With groups at any level it may be necessary to mark fingerings for more difficult passages or to indicate fingerings for less familiar accidentals for ease and accuracy of performance. Even professional symphony orchestras find it necessary to mark fingerings for difficult and awkward passages in the music.

The professional stringed instrument player can be of invaluable assistance to the inexperienced orchestra director in deciding on ways to bow or finger any specific passage, but a degree of caution should be maintained when seeking professional help for fingerings and bowings in school orchestra music. The professional may mark a passage in the manner that seems obvious to him but that may prove impossible for a student to execute successfully. All fingerings and bowings should relate directly to the level of technical and physical development of the entire stringed instrument section in question and not to the capabilities of the highly advanced or professional player.

In the final analysis it is the educational welfare of the students that must guide the director in his careful selection of music, for it is through the music that the students develop their interest in, and love for, good music--attitudes which will be carried with them through their entire lives. To develop and maintain interest, each rehearsal and concert should contain some music that "speaks to" every student.

Students will in time learn to appreciate and understand most composers and musical styles. This transformation, however, is not immediate nor in any way magical. Such musical enlightenment requires the careful tutelage and guidance of an understanding educator, who is cognizant of the student's interest in a variety of musical forms and styles; including the over-romantic, novelty, or popular types, in addition to the more standard literature. Each composition, well presented in rehearsal, can serve to transport the student one step closer to a fuller appreciation of good music.

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CHAPTER X

SELECTION AND CARE OF STRINGED INSTRUMENTS

The careful selection and care of the stringed instruments can be one of the easiest ways to improve the tone quality and technique of the school orchestra. Even with excellent teaching, the most advanced group can sound bad on poor instruments. It should be realized also that poor or faulty equipment is a handicap to the technical development and the interest level of the group. Even the most talented students can make only limited progress on poor equipment.

Selecting Quality Stringed Instruments

Band directors have long recognized the necessity of selecting professional quality instruments for their organization to give the tone quality and sonority demanded by the high standards of modern performing groups. The director must accept the responsibility for establishing and maintaining strict specifications for the quality of equipment being purchased by the school and the students.

The task of recognizing quality stringed instruments does not present as many difficulties as the non-stringed instrument player might expect. As with wind instruments, most

large manufacturers of stringed instruments have well-established reputations for the quality and dependability of their merchandise and usually provide suitable instruments in a wide spectrum of quality and price. It is well to recognize that within reason the return in quality usually coincides with the investment. This does not mean that every student should pay an exorbitant price for his instrument; rather that a stringed instrument is capable of producing a tone commensurate with the quality of workmanship and materials used in its making. It is impossible to make an inferior instrument sound like an expensive one, even in the hands of a professional.

Judging the tone quality of a stringed instrument requires no special knowledge or abilities except the pre-established concept of a good violin, viola, cello, and string bass tone, which the well-founded musician hopefully has developed early in his education through exposure to college and professional orchestras and string soloists.

The best method of judging tone quality is to compare the sound of two or more like instruments. The director would want to listen for an instrument with a tone quality which might be referred to as alive, dark, mellow, resonant, or brilliant, and choose the type of sound he prefers.

A good instrument should play easily and yet have a strong carrying power without a nasal or forced tone quality in forte passages. Stringed instruments will differ somewhat,

even in the same model and price range, because of factors such as the age and quality of the wood used, the mixture and thickness of the varnish, and the quality of workmanship that went into the construction of the instrument. Better quality and best-toned instruments will be usually hand-made from maple and spruce woods, while inexpensive instruments are often machine-made from plywood.

A word should be said about the old violin found hidden in the attic and thought to be priceless. The possibilities of discovering an instrument of great value are minimal. The vast majority of old instruments are of little value and through continued neglect are often warped, or permanently damaged, making them incapable of staying in tune or producing a tone much above the weak quality of a beginning instrument. It is true that some of the deficiencies of old violins can be corrected, but the rebuilding into an acceptable instrument may often involve a greater investment than the purchase of a well-constructed new instrument.

It is a misconception that all stringed instruments will improve in quality or become more valuable with age. The inherent qualities established during the original construction constitute the fundamental acoustical limits and tonal capabilities of any given stringed instrument. Age will never improve a cheap instrument.

Minimum Standards

In an effort to advance the standard of quality for stringed instruments and stringed instrument supplies being purchased for use in school orchestras, the Music Educators National Conference assigned the task of developing a set of minimum standards for stringed instruments to be used in schools to the Music in American Education Committee on Stringed Instruction, Gilbert R. Waller, National Chairman, and in turn to the Subcommittee on Minimum Standards, Frank W. Hill, Chairman. A set of minimum standards for stringed instruments and related supplies was adopted in March of 1952 and revised in March of 1954. Being the most thorough and best listing of its type known to the author, the "Minimum Standards for Stringed Instruments in the Schools" has been included in the appendix with the permission of Charles L. Gary, Executive Secretary to the Music Educators National Conference. The information contained in the appended listing will hopefully aid the orchestra director in selecting quality instruments and serve as a purchase guide to the music supervisor or business manager.

Stringed Instrument Care

The best insurance against costly or annoying repairs is preventive maintenance--the care and protection necessary to maintain the original quality of the stringed instrument. To prevent permanent damage, the more fragile stringed

instruments require special consideration both in storage and in handling.

Accumulated rosin on the fingerboard and top of the instrument can perceptibly dull the tone by reducing the ability of the wood to vibrate, as well as mar the general appearance. If a heavy coating of old rosin and dirt has collected on the instrument, it would be wise to consult an expert repairman about how to attempt its removal. Harsh cleaning agents or rough treatment in the hands of a novice can quickly damage the wood or ruin the varnish. Students should be encouraged to carry a clean flannel cloth in their cases to wipe off excessive rosin dust, dirt, perspiration, etc., from the surface of the instrument, strings, and bow stick immediately following each playing session. A few seconds' effort will help to preserve the tonal attributes as well as enhance the appearance of the instrument.

A good grade of violin polish or pure lemon oil will clean and enhance the beauty of the instrument and provide a protective coating to repel minor scratches. Commercial polishes should be avoided, especially those in aerosol cans, because of a chemical additive used in their preparation that can be harmful to stringed instrument varnish.

Extreme care must be taken to avoid touching the strings, bridge, fingerboard, and other ebony parts with any wax or oil cleaners. The occasional cleaning of accumulated rosin from the strings and ebony parts, such as the

fingerboard, can be accomplished with a soft cloth and pure alcohol. The alcohol should be used very sparingly on the cloth as an excessive amount will deaden and weaken gut strings. It will also destroy the finish if dropped on the varnish.

Storage

Proper storage of stringed instruments and bows will help to maintain the original quality of the instruments and save on repair expenses. Storage cabinets or racks should be located conveniently for student use, yet out of the main flow of traffic to avoid accidental damage, especially with cello and string basses, since their cases are constructed of a lightweight canvas material. The larger instruments should be adequately cushioned in a securely fitted rack or cabinet, with the bows hung on hooks to avoid warping.

Stringed instruments are quite sensitive to the moisture content in the air. Humidity of forty to sixty per cent should be maintained at all times in the storage area or cabinet to avoid cracking or seams opening. Failure to maintain a constant humidity level may also be the cause of broken strings, frequent replacing of bow hair, or the necessity of continual changing of bridge heights.

The wood in a stringed instrument absorbs moisture during hot and humid weather, causing the body to swell, the bridge to rise, and the glue to soften, usually resulting in

an open seam. In very dry climates or during the winter, the low humidity dries and shrinks the wood, causing the bridge to sink, the glue to dry and crack, and open seams usually to appear. High humidity may also cause the bow hair to stretch and make it difficult to correctly achieve bow tension.

If the humidity and temperature of the storage area cannot be maintained through the use of air-conditioning, a humidifier or dehumidifier may be necessary to allow for proper storage of instruments. This is especially important when one is storing the instruments over a long period of time, such as vacations, or even holidays, from school.

Before storing the stringed instruments for summer they should be carefully inspected and all necessary repairs should be completed. The director should see that the instruments and strings have been cleaned, a light coat of polish applied to the body, and the case cleaned and brushed out. All bridges should be straightened, the tension on the bow hair relaxed slightly, and the strings on the instruments loosened about a half-step to eliminate some of the pressure on the bridge.

Stringed Instrument Repair

An ill-fitting bridge, a soundpost out of adjustment, dead strings, cracks, a sagging fingerboard, open seams, worn or dirty bow hair, and numerous other seemingly small items of repair can significantly reduce the tone quality of even

the finest of stringed instruments, as well as cause annoying squeaks and rattles while the instruments are being played. Major repair work on any stringed instrument should always be handled by an expert stringed instrument repairman. However, there are many items of minor repair or adjustment that can be handled by the director with a minimal use of special tools or equipment and with a little practice.

Replacing Strings

The most common item of repair for the director or the student will be the replacement of broken, frayed, or dead strings. Students should be encouraged to have extra strings in their possession at all times, especially the two highest, which break most easily.

The life expectancy of a string with normal school use is approximately one year. However, the economic standard of most school budgets encourages a somewhat less frequent replacement schedule, especially for the larger stringed instruments. Usually by the end of a year the tone quality of a string will be dead or lifeless with very little vibrancy, resonance, and accoustical dependability, no matter how little it has been played. The stress placed on a string through constant stretching on the instrument weakens its fibers, causing a loss of elasticity and tends to, in effect, pull it apart. A string will grow old and sound dead without ever being placed upon an instrument, although not as quickly. It

is advisable to purchase strings from a reliable dealer carrying a full stock of new, fresh strings.

In selecting new strings for school instruments it is not always imperative to purchase the most expensive ones available, nor is it wise to choose the least expensive ones. Medium-priced, good quality strings from a well-established manufacturer, meeting the requirements set forth in the "Minimum Standards for Stringed Instruments in the Schools," should provide the desired tone quality and still exhibit the necessary characteristics of durability and dependability.

When selecting new strings it is important to remember that metal or metal-core strings should be attached only to tailpiece tuners and gut or gut-wound strings attached directly to the tailpiece, not a tuner. Using a tuner with a gut string does little for refined tuning and may cause string breakage. Metal strings will not respond to the tuning pegs as accurately as gut, and therefore require the fine adjustment provided by a tuner.

When placing a metal or a metal-wound string on the instrument, first attach the butt-end of the string to the tailpiece tuner. The metal or metal-wound string has a small washer on the butt-end which should be hooked in the spread opening at the top of the tuner L-bar as shown in Figure 32. A metal string should never be mounted directly onto the tailpiece because it will place the center of pull slightly lower on the bridge, causing added pressure and the

possibility of the string being too short to wind sufficiently on the scroll pegs.

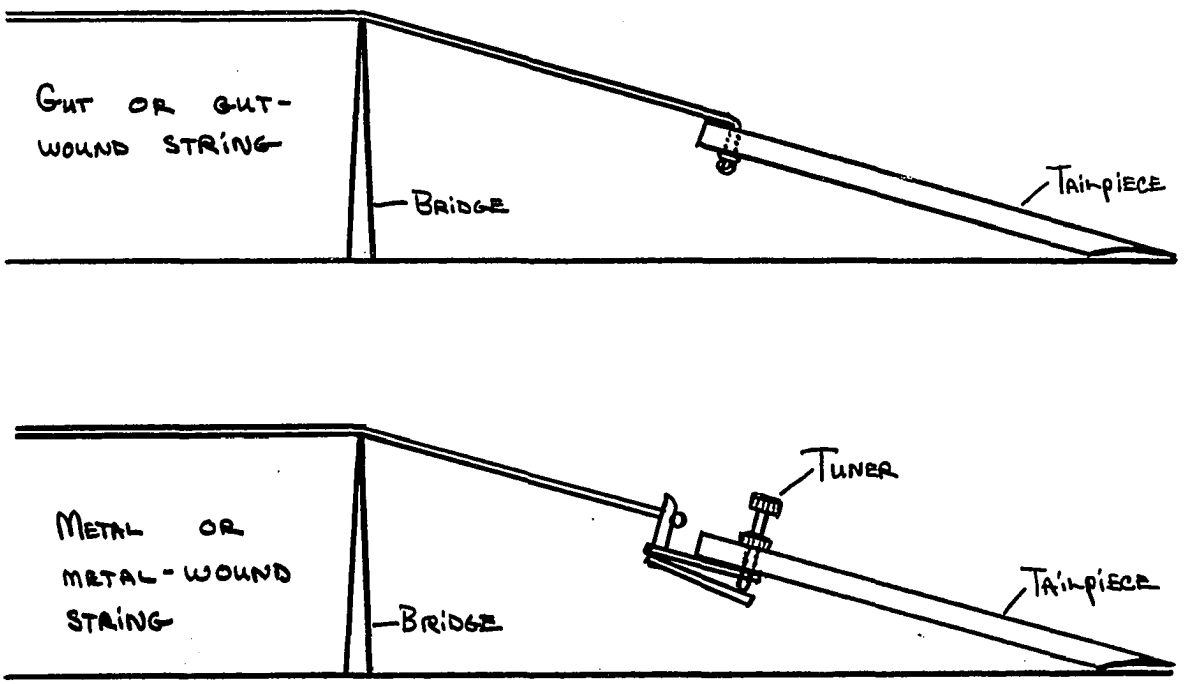


Fig. 32.--String attachment to tailpiece and tailpiece tuner

The gut or gut-wound string has a small loop in the butt-end, tied securely with a small knot. To mount the gut or gut-wound string, the loop and knot are inserted downward through the hole in the tailpiece, as illustrated in Figure 32, then pulled forward and upward into the slot towards the bridge.

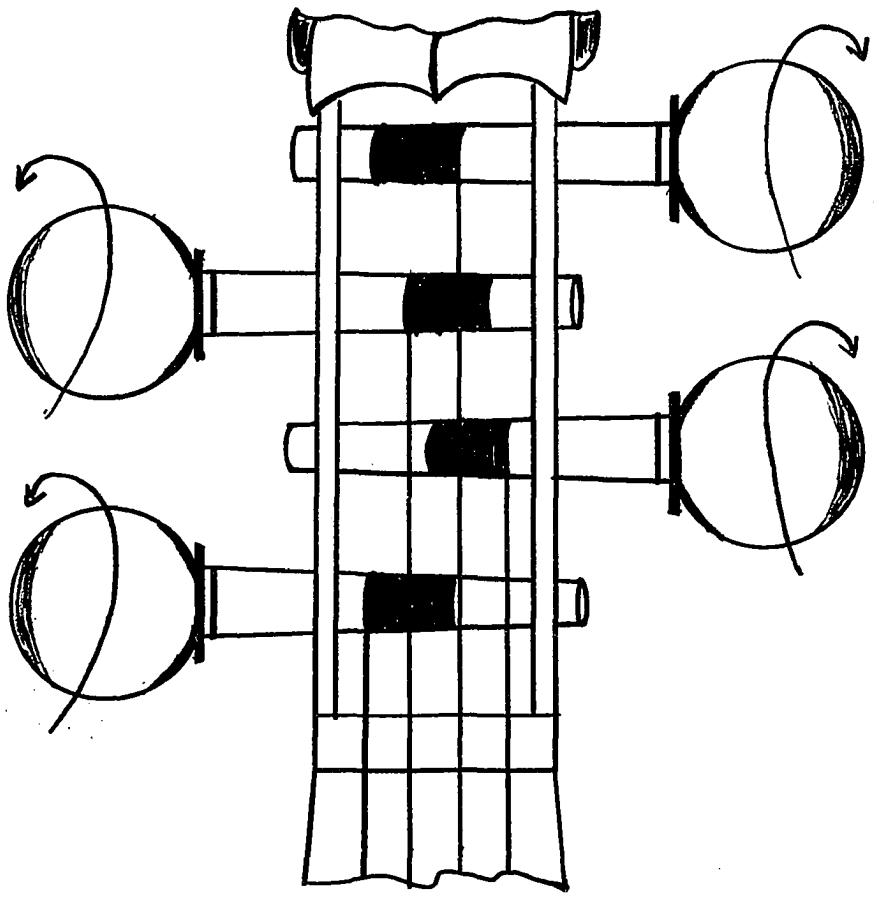


Fig. 33.--Most commonly used attachment of strings to pegs

It is incorrect to thread the string through the loop, forming a lasso-like connection with the tailpiece. This type of installation will cause undue additional pressure on the bridge and disrupt the accurate string length measurements needed for each instrument.

The attachment of strings to the pegs used most commonly is with the highest pitched string wound onto the lower right-hand peg and each successively lower-pitched string wound onto the next consecutive peg in a

counter-clockwise motion, until the lowest pitched string is wound onto the lower left-hand peg as illustrated in Figure 33. There is some disagreement among violin makers and repairmen in the stringing of the lower two strings. Some argue in favor of reversing the stringing the D and G pegs on violin, and the G and C pegs on viola and cello, because they feel that the lower string should be wound on the higher peg to give it more tension and thus a more resonant tone quality.

To wind the string onto the peg, slightly loosen it and insert the end of the string through the hole in the peg until it projects slightly on the other side. Then gently turn the peg forward so the string winds on top of the peg in a smooth, even, but tight spiral winding. Be sure to plan the winding to align each string in the proper slot on the bridge and fingerboard nut, forming a straight line onto the peg when fully wound. After all pegs have been wound the appearance should resemble the illustration in Figure 33.

Scroll Pegs

It is important to the ease of tuning and pitch maintenance that the pegs be accurately fitted to the instrument. Badly worn or ill-fitting pegs should be adjusted or replaced by an expert repairman to insure perfect fit. Emergency and temporary repair for a peg that does not hold because it is too small can be accomplished by rubbing the shank with a piece of chalk or crumbled rosin. If it is necessary to

replace pegs it should be remembered that ebony pegs will provide the longest use. If pegs tend to stick slightly or do not turn smoothly, the application of peg dope, peg soap, or graphite to the peg shaft will allow easier tuning.

The caspari peg may be tightened or loosened by adjusting the screw in the end of the peg with a small screw driver. A small drop of oil on string bass machine pegs will loosen them if they are difficult to turn.

Soundpost

The soundpost is the round piece of wood placed inside the body of the instrument and held in place by pressure from the belly and back of the instrument. The main function of the soundpost is to support the belly of the instrument, and its exact position strongly influences the tone quality of the instrument. Complete loosening of the strings or severe jarring may result in a fallen soundpost, destroying the resonance of the instrument.

A fallen soundpost may be re-set by the director with the use of specialized tools and sufficient practice. The tools needed will include varying sized soundpost setters for violin, viola, cello, and string bass, a scissor soundpost setter, and possibly a small soundpost mirror for checking the alignment.

To set a fallen soundpost, the strings should first be tuned down a whole-step to lighten the pressure on the top

of the instrument. The small knife-end of the curved soundpost-setter is then inserted through the f-hole on the high-string side, penetrating the soundpost at the slit or hole on the side of the post. Next, the soundpost is brought to an upright position directly below and slightly behind the right, or high-string foot of the bridge. The exact position of the soundpost is centered behind the right foot of the bridge at a distance one half the diameter of the soundpost and perpendicular to the top and back of the instrument with the grain of the soundpost at right angles to the grain of the top.

The slit in the soundpost should be near the top of the instrument and facing directly out toward the f-hole. The soundpost may then be grasped and held in place with the scissor soundpost setter.

The reverse end of the curved soundpost setter is then used carefully to push, pull, or tap the soundpost into its correct position, while the placement is checked with the soundpost mirror. Once the post is in the correct position and wedged firmly between the top and back of the instrument, the strings may be tightened slowly to pitch.

After the soundpost is in place, it may be necessary to make a slight adjustment in its position to achieve the complete tonal capacities inherent in the instrument. As a general rule, the closer the soundpost is to the bridge, the

stronger and more brilliant the tone, and the farther from the bridge, the darker and more mellow the tone.

The resonance of all four strings should be balanced with the tone color blending and matching. If the desired sound is not obtained, a slight left or right movement of the soundpost may bring out the desired tone colors. The director can become quite adept at adjusting school and student quality stringed instruments, but it is recommended that an expert repairman be consulted for the setting and adjustment of soundposts on old, expensive, and more sensitive stringed instruments.

Bridge Adjustment

A director can avoid many potential problems with stringed instrument bridges through frequent instrument inspections. Certain adjustments must be constantly maintained to avoid fallen or broken bridges. The back or flat side of the bridge should be kept vertical, or at right angles to the purfling (See Appendix A). The bridge will gradually be pulled forward toward the scroll from constant string tuning. Over a period of time, the larger strings will exert more pull than the smaller strings, resulting in a twisted bridge that may fall or break at the point of stress.

Care should be taken when straightening a misaligned bridge to avoid pushing it over in the opposite direction. Grasp the bridge in both hands with the thumbs on the forward

or curved side, then exert a gentle but firm pressure until the bridge is again vertical. It may be necessary to loosen the strings slightly when adjusting the bridge, but care should be taken to avoid a fallen soundpost by exerting a firm downward pressure on the top of the instrument.

The bridge should be aligned so that it is perpendicular to the end of the fingerboard with the high and low strings equidistant from the outside edges at the point of intersection. Most stringed instruments have clearly marked outlines for the positioning of the bridge feet on a level with the inner f-hole notch and centered between the two top f-hole wings.

The installation or fitting of a new bridge should always be handled by an expert repairman. Though not an overly difficult task, the cutting of the blank bridge, sanding and shaping of the thickness and taper of the body, shaping the curves, cutting the string notches, and shaping the feet all demand a thorough knowledge of the vibrational characteristics of stringed instruments and the resultant tonal attributes.

A bridge with incorrectly balanced feet--either too high or too low--and incorrect curvature--too thick or too thin--can cause numerous problems for the student and may result in a poor tone quality from the instrument. The director who wishes to pursue the technique of fitting bridges should seek training from a master violin maker.

Tailpiece Gut

A broken tailpiece gut can be quickly replaced in an emergency by using a Sacconi tailpiece adjuster, which is available at most music stores. Simply insert the ends of the adjuster through the holes in the tailpiece, replace and tighten the nuts. The small end of the tailpiece should be even with the ridge of the saddle, and the nuts should be tightened exactly the same distance to insure equal pull.

Extreme care should be taken to insure the proper alignment and balance of the tailpiece gut. An improperly fitted tailpiece gut may create an imbalance of string pressure on the bridge, thus impairing the entire operation of the instrument. Tailpiece gut replacement utilizing true gut is best left to the experienced repairman for the reasons mentioned.

Tailpiece Tuners

Tuners are often a source of annoying rattles or vibrations, which may be caused by a loose nut on the tailpiece connection. The nut should be tightened with a pair of long-nosed pliers to prevent its working loose again as it might when tightened with the fingers.

A rattle may also be caused by the adjuster screw being turned too far out, allowing it to vibrate as the instrument is played. Tightening the adjuster too far down may cause it to make contact with the top of the instrument,

thereby scarring the varnish. This is usually more of a problem with violins and violas than with cellos or basses, because of the lower bridge. Both of the above problems may be corrected by simply turning the adjuster screw to its midpoint, tuning the string to near pitch, and making the necessary fine adjustment with the tuner.

Chin Rests

Loose chin rests on violins and violas can easily be tightened by adjusting the circular nuts on the bottom rib side of the chin rest clamp; however, they should not be so tight as to damage the instrument. A special tool is necessary to insert into the small holes of the chin rest clamp. Even though these tools normally come with the chin rest, the director should keep at least two differing sizes of them in his repair kit at all times.

Chin rests are available in varying sizes and shapes, and should be carefully fitted to the individual student to provide comfort and support. Usually the most satisfactory chin rest is the type with a bridge-like projection over the tailpiece.

End Pins

Cello and string bass end pins will cause very little difficulty if they are kept sharpened and in smooth working condition, free of rust. The point may periodically be

sharpened, checked for alignment, and straightened if necessary in the school machine shop.

A sharp end pin is a necessity to the cellist and bassist for a secure playing position. To avoid damage to floors and insure minimal chance of end pin slippage, it would be wise to secure one of the numerous commercial floor boards or rubber stops manufactured for this purpose. Some experimentation may be necessary to discover which end pin stop works most adequately on the type of floors normally used for rehearsal and performances.

Bow

It is important to treat the bow with the same meticulous care as the instrument. The bow stick should never be cleaned with alcohol, but simply wiped daily with a dry cloth. However, a cloth dampened slightly with alcohol may be used to clean the ebony frog and the ivory portions of the bow.

Care should be taken not to touch the bow hair with the fingers as the natural oil from the hands can cause the hair to lose its ability to grip the string, necessitating rehairing. After playing, the bow tension should be lessened slightly to prevent stretching and breaking of hairs.

Students should be encouraged to rosin their bows before each use with a good grade of rosin, applying enough to allow the bow hair to grip the string smoothly. Usually it is best to rosin with an up-and-down motion the entire length

of the bow hair, much like drawing the bow across the string, but with a possible addition of heavier rosining at the tip and frog. String bass bows may be rosined in the same manner or, as many players prefer, using only a downward motion to distribute the rosin more evenly, creating a greater pull on the string.

The important point is to encourage the students to apply rosin to the bow hair each day. Any good grade of hard rosin will work for all stringed instruments with the exception of string bass, which usually uses a slightly softer, stickier rosin.

The amount of tension on the bow hair is important to good tone production, and is an important factor in bow control. With the correct amount of tension the bow stick should still maintain a slightly downward curve. Young students tend to over-tighten the bow, to make the stick almost straight, causing the loss of its natural resiliency. However, if the bow hair tension is too loose, it will not grip the string properly and will be difficult to control.

When the rosined bow hair will no longer grip the string nor make contact instantly, it is necessary to have the bow rehaired by a qualified repairman. The bow is of such importance to the performer that only the best rehairing job will suffice. A poorly rehaired bow will often lose its hair in a short time because the hair was not tightly wedged

at the tip or was too short to allow sufficient anchoring in the frog.

Single strands of bow hair will occasionally break during use. They should be carefully clipped or broken off at both the tip and frog.

With the increasing difficulty and expense of securing good horsehair for use in bow rehairing, many repairmen have turned to the recently developed artificial hair. While many professional stringed instrument players do not as yet fully accept the artificial hair, it is gaining wider use in school groups.

Major Repair

There are many major repairs that need to be handled by a specialist. The most common are mentioned here, as they will be those most often occurring with school-aged stringed instrument players.

One of the most common repairs is the open or broken seam. As glue hardens with age, it will occasionally break loose and fall away, opening a small portion of the seam. It would seem a relatively simple procedure to administer glue and apply a clamp until dry, but without the correct type of animal glue and clamps of the correct size and shape, irreparable damage to the instrument may be done. Re-glueing open seams, as well as repairing small cracks in the top, back or ribs, is best left to the expert.

Any necessary refinishing should also be done by a repairman. Students should understand that they can do permanent damage to their instruments if they try to refinish or remove the varnish. The type and thickness of varnish can greatly affect the tone quality of the instrument, so that varnishes should be applied only by the specialist.

The fingerboard will need occasional relining if the intervals across strings are to be accurate. The pounding of the left-hand fingers will wear small grooves in the fingerboard, grooves which must be smoothed out every few years.

If the director should notice the fingerboard gradually getting lower, it might be caused by a loosening and pulling away of the neck heel. This may be a gradual process, or, in the larger instruments, it may happen quickly, resulting in a broken neck. Both of these repairs must be undertaken by a knowledgeable and qualified repairman.

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AFTERWORD

For this manual to be of practical value to the reader, it must have of necessity maintained a strict selectivity of the most relevant materials. Each chapter could of itself support a complete work, but the main concern here has been to select practical and usable information on stringed instrument technique and orchestral development, and to clarify in simple terms some of the more involved technical aspects of stringed instrument playing.

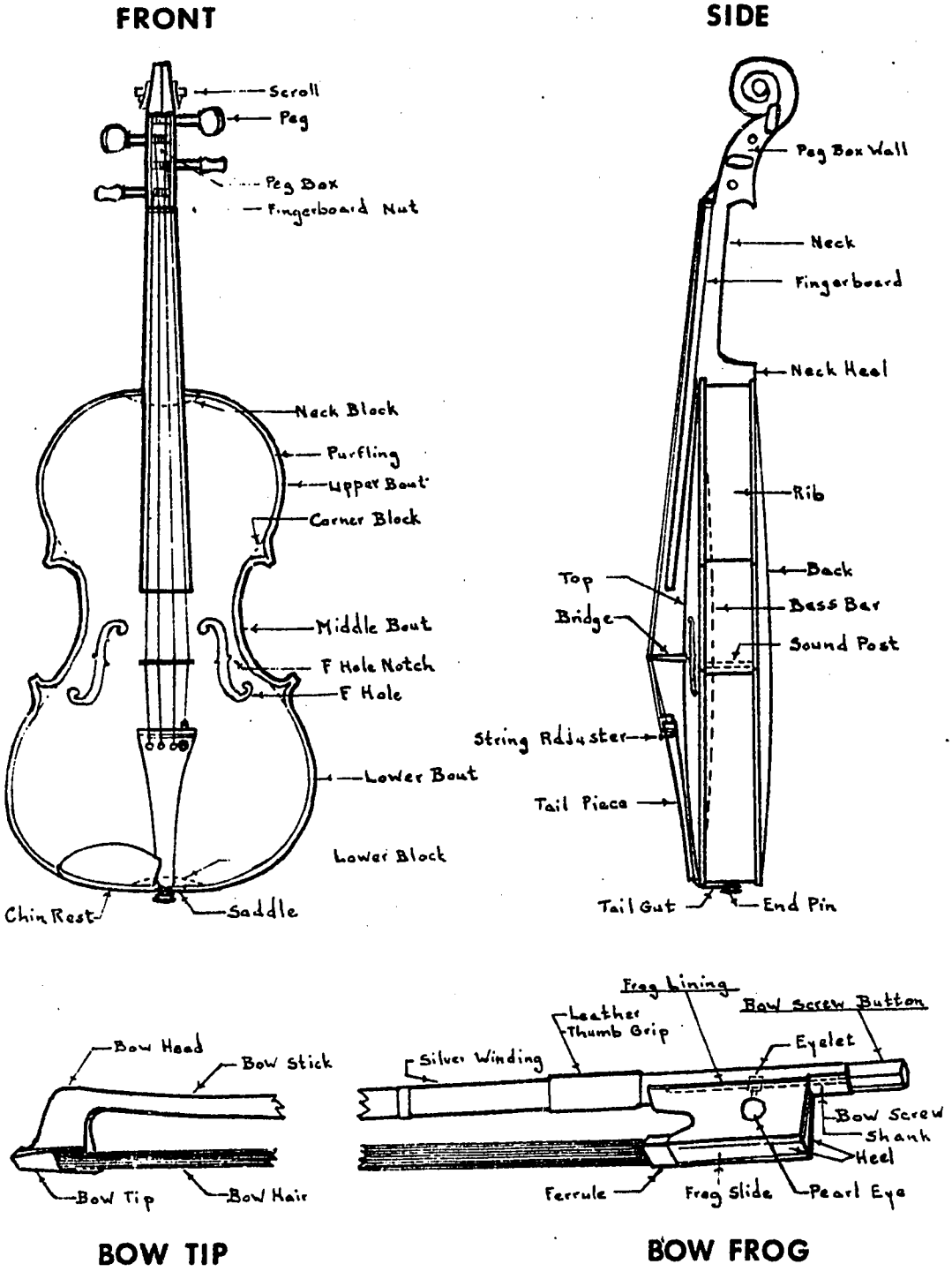
Those areas that to the string specialist have appeared limited in scope have in most cases been so structured to allow the inexperienced director to make immediate application of his growing stockpile of information without faltering under the weight of verbose explanation. The director desiring more complete information on any of the particular subjects is encouraged to consult the works listed at the end of each chapter.

The most detailed information in the manual will be applicable to the more advanced group, and the director will thoroughly grasp these concepts gradually as he involves himself in private study and grows in experience and confidence from working with the school orchestra.

The true educational functions of musical pursuits should be to increase knowledge and enjoyment for both the student and the teacher. A good orchestra is one in which all participants, on all levels, are constantly learning and enjoying. May this manual assist in this labor and aid in enhancing pleasure as well.

APPENDIX A

NOMENCLATURE OF VIOLIN PARTS



from
You Fix Them, Heinrich Roth, comp., (Cleveland: Scherl and Roth, Inc., 1959), 3. Used by permission.

APPENDIX B

GLOSSARY

GLOSSARY

Arco.--The term used to indicate a return to the use of the bow following a pizzicato passage.

A Una Corda.--Indicates a passage is to be played on one string. The precise string is noted by a Roman numeral: I--highest string; II--second string; III--third string; IV--lowest string. May also be noted by "sul" (meaning "upon"), such as "Sul G" (upon the G string).

Bass Bar.--A strip of wood glued on the inside belly of stringed instruments; used to strengthen the top and equalize tone quality.

Belly.--The top of a stringed instrument.

Bow Pressure.--The pressure or weight of the bow on the string during each bow stroke.

Bow Speed.--Speed at which each stroke of the bow travels across the string.

Bratsche.--The German term for "viola," derived from "viola da braccia," meaning "viola held on the arm."

Bridge.--The main function of the bridge relative to tone production is to transmit the vibrations of the strings down into the body of the instrument. For the best possible tone, the bridge should be fitted to each instrument by an expert repairman.

Col Legno.--Indicates the string is to be struck "with the wood" or bow stick, creating a "clicking" sound.

Con Sordine or Con Sordino.--Terms meaning "with the mute."

Damper or Dampfer.--The German terms for "mute."

Dead String.--See "False."

Détaché.--A bow stroke characterized by a smooth change of bow direction for each successive note or group of slurred notes. It may be played in any portion of the bow and at a variety of speeds.

Div.--Abbreviation for "divisi."

Divisi or Divide.--Indicates the division of a chord or passage between two or more persons. The usual procedure is for the outside person on a stand to play the top note or part, and the inside person to play the bottom note or part. "Divisi" may also be accomplished by stands, especially when three or more notes or parts are involved.

Double-Stop.--The simultaneous sounding of any two adjacent strings, used normally in solo work. Unless indicated as "non divisi," most school orchestras should divide "double-stop" pitches for more accurate intonation.

Down-Bow.--A bow stroke moving from the frog to the tip, indicated by a down bow sign (⊓) placed above the note.

Duo Corde.--The double-stop sounding of a unison pitch, utilizing an open string and the same pitch fingered on the next lowest string. Used to add strength to the volume of a given pitch.

Extensions.--The stretching backward or forward of the left-hand fingers while the hand remains in position. Used to facilitate fingering and reduce the necessity of shifting.

False.--The defective pitch of any string as characterized by a vacillation of the pitch when the open string is bowed with even pressure. Sometimes referred to as a "dead" string.

Ferrule.--The silver ring used to flatten and secure the bow hair as it enters the frog.

F-Hole.--The apertures cut into the top of stringed instrument bodies to amplify and reinforce the tone by allowing freer vibration of the top and serving as a release for sound waves.

Frog.--The movable base of the bow held in the right hand, from which the bow hair is tightened by means of a screw.

Glissando.--The audible slide between two notes, normally using a single finger.

Grip or Bow Grip.--The winding applied to the bow stick near the frog to cushion the thumb and help eliminate the possibility of slipping. May also refer to the manner in which the bow is grasped or held.

Hammered Stroke.--See "martelé."

Harmonics.--High tones of a flute-like timbre which are produced by lightly touching the string at a fractional point, and are of two types--"natural" and "artificial." Natural harmonics are produced on open strings and are notated by a zero above the note () or as a diamond-shaped note (). Artificial harmonics are produced by firmly stopping the string with one finger (or thumb) while lightly touching the string with another finger at a specified interval above the stopped note. The stopped note is indicated by normal notation while the harmonic is notated above it as a diamond-shaped note.

Heel.--Another name for "frog."

Hooked or Linked Bowing.--A "hooked" bowing results when two notes, linked by a slur, are played in the same bow with a slight stop of the bow between each note. Usually found in common dotted-eighth-sixteenth or six-eight rhythm patterns of long-short, and where slurred notes require separation.

Legato.--Indicates the music is to be performed without any perceptible interruption between notes--achieved by using "détaché" bow strokes with as little emphasis on direction change as possible.

Lift Sign.--A "lift sign" () is notated in the music to indicate a lifting of the bow and a repetition of the bow stroke, usually when two or more down-bows in succession are desired.

Linked Bowing.--Same as "hooked" bowing.

Louré.--Same as "portato."

Lourre.--Same as "legato."

Marcato.--Same as "martelé."

Martelé.--A bowing characterized by short, separate strokes of the bow (on-the-string) with a heavy accent on each stroke. Sometimes referred to as "marcato" or "hammered stroke."

Mute.--A device for softening or muffling the tone of a musical instrument. For stringed instruments the mute is a three-pronged clamp or roller device (Sihon) which is placed on the bridge to veil the tone. Use of the mute is indicated by the terms "mute," "dampfer," "sourdine," or "con sordino." Return to natural tone is indicated by the terms "otez," "senza sordino," or "mutes off."

Natural or Normal Tone.--The direction "normal tone" (or "au natural") is given following harmonics, ponticello, col legno, or any other variance from normal, unaltered arco tone production.

O.--A letter "o" or zero placed above a note is used to indicate the use of an open string or harmonic.

Off-the-String.--An action of the bow whereby the bow leaves the string as it changes direction.

On-the-String.--An action of the bow where contact between the bow and the string is constantly maintained.

Open String.--A string not stopped or altered in pitch by the application of finger pressure. Their specific use is sometimes indicated by a zero ("o") placed over the note in question.

Otez.--Indicates the mute is to be removed from the bridge.

Pizz.--Abbreviation for "pizzicato."

Pizzicato.--Indicates the string is to be plucked with the finger. For pizzicato to be executed by a finger or fingers of the right hand, the direction is the abbreviation "pizz." Left-hand pizzicato is indicated by a plus sign ("+") over the note.

Plus Sign.--A plus sign ("+") indicates a left-hand pizzicato.

Point of Contact.--The point, in relation to the bridge or fingerboard, at which the bow contacts the string.

Ponticello.--A glassy sounding, ghost-like tone produced by bowing almost on top of the bridge. Usually combined with a tremolo stroke.

Portamento.--Denotes a sliding of the left-hand fingers producing a planned, intentionally sounded, sliding tonal effect. Usually indicated by a dash between notes to be joined by the sliding sound.

Portato.--A semi-detached series of tones without changing bow direction. Indicated by a dash over each note plus a connecting slur or tie.

Positions.--The different places on the fingerboard occupied by the left hand. There are seven basic positions numbering from the scroll up the fingerboard (I, II, III, etc.).

Purfling.--The overlying border of stringed instrument tops and backs; often inlaid for ornamental purposes as well as to prevent chipping of the edges.

Ricochet.--Same as "saltando."

Roman Numerals.--Roman numerals may indicate two designations to the stringed instrument player: (1) the left-hand position to be utilized, and (2) the specific string to be used (see "A Una Corda").

Saltato or Saltando.--A form of "thrown staccato," performed at the upper half of the bow by a down-bow stroke. Also called "ricochet" or "jeté."

Sautillé.--A rapid, uncontrolled "spiccato" that relies entirely on the natural rebounding of the bow for the "bounce."

Scordatura.--Abnormal tuning of the strings (when indicated by the composer) for the purpose of obtaining unusual chords, facilitating difficult passages, or changing the tone color.

Seque.--Meaning "to go on without a pause." When applied to a bowing or fingering pattern, "seque" has a meaning identical to that of "simile."

Senza.--Meaning "without," as in "senza sordino"--"without the mute."

Shift or Shifting.--The movement of the left hand from one position to another for the purpose of extending the range, or for producing tone quality on a specific string.

Simile.--An indication to continue "in a similar way."

Slide.--Term commonly used instead of "portamento."

Slur.--A curved line connecting two or more notes of different pitches, to be played in the same legato bow stroke.

Slurred Staccato.--A series of unaccented "martelé" bowing strokes, all played with one bow--often an up-bow.

Soli.--Designates an important melodic line to be played by the entire section.

Solo.--In reference to an orchestral composition, "solo" indicates a passage to be performed only by the principal player of the section.

Soundpost.--A small pillar of wood wedged inside stringed instruments, slightly behind the right leg of the bridge, whose function is to help support the belly and convey the vibrations to the back of the instrument.

Sourdine, Sordino, or Con Sordino.--See "mute."

Spiccato.--A bow stroke often referred to as "bouncing bow" or "off-the-string" bowing. It results when the bow is allowed to drop onto the string from above the rebound back into the air again after every note in a controlled fashion.

Staccato.--An indication that the sound of a written note is to be shortened. As a designation of bowing technique, it would relate to any notes marked with dots and demanding a space on either side while the bow remains on-the-string.

Staggered Bowing.--A technique for achieving evenness of volume and continuity of tone by having the players within a section change bow strokes alternately. In this way, some will be sustaining the tone while others are changing bow direction.

Stick.--The long wooden shaft of the bow.

Stopped String.--When a string is altered in pitch by application of finger pressure.

Stroke.--The action of the bow as it is drawn across the string in the process of producing tone.

Sul.--Meaning "upon," such as "Sul G"--"upon the G string."

Sul Ponticello.--Same as "ponticello."

Sul Tasto.--Meaning to draw the bow "upon or over the fingerboard," creating a soft, distant sound.

Sur La Pont.--Indicates the player should bow near the bridge in order to achieve a strong tone.

Sur La Touche.--Same as "Sul Tasto."

Tremolo.--The quick reiteration of the same tone, produced by a rapid up-and-down movement of the bow, usually in the upper half or near the tip.

Up Bow.--A bow stroke that starts at or near the tip and moves toward the frog. Indicated by an "up bow" sign (V) placed above the note.

Wolf Tone.--Certain tones (i.e., F# on Cello G-string and C# on Violin A-string) which differ markedly both in intensity and quality from those in adjoining parts of the compass. Caused by a defect inherent in the design and construction of members of the string family. May be lessened by the use of a "Wolf Tone Eliminator."

APPENDIX C

MINIMUM STANDARDS FOR STRING INSTRUMENTS IN THE SCHOOLS

MINIMUM STANDARDS FOR STRING INSTRUMENTS IN THE SCHOOLS[1]

The String Instruction Committee of the Music Educators National Conference, in collaboration with committee representation from the Music Teachers National Association, the National Association of Schools of Music and the American String Teachers Association, believe that by encouraging the purchase of string instruments and string instrument supplies which at least meet with the following minimum standards, string instruction and the development of orchestras in the schools can be materially advanced.

Because the "playability" of string instruments depends so much upon proper construction, correct adjustment and alignment, it is hoped these "Minimum Standards for String Instruments in the Schools" will be followed by consumers and teachers and complied with by merchants, irrespective of the price bracket in which the instruments happen to fall.

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[1] The String Instruction Program in Music Education (Washington, D. C.: Music Educators National Conference, 1957), 18-21. Used by permission. Developed by the Music in American Education Committee on String Instruction, Gilbert R. Waller, National Chairman; Frank W. Hill, Chairman of Subcommittee on Minimum Standards; adopted, March, 1952; revised, March, 1954.

Measurements and Terminology of Sizes

Note: Measurements are given with a "plus or minus" (+ or -) sign because instruments of different well-established makers (or even those of the same maker) will vary slightly. It is not the wish of the committee to rule out the many fine instruments that will vary slightly from the accepted "standards."

A. Instrument Measurements

Violin

Standard (full)	(4/4) body length 14"	+or-	(35.56 cm.+or-)
Intermediate	(3/4) body length 13 1/4"	+or-	(33.65 cm.+or-)
Junior	(1/2) body length 12 7/16"	+or-	(31.52 cm.+or-)

Viola

Standard (full	(4/4) (large) body length 16 1/2" and up		(41.9 cm. and up)
	(4/4) body length 15 3/4" to 16 1/2"		(40.9 cm.to 41.9)
	(4/4) (small) body length 15" to 15 3/4"		(38.1 cm.to 40.9)
Intermediate	body length 14"	+or-	(35.56cm.+or-)
Junior	body length 13 1/4"	+or-	(33.65cm.+or-)

Cello

Standard (full)	(4/4) body length 29 5/8"	+or-	(75.3 cm.+or-)
Intermediate	(3/4) body length 27 5/16"	+or-	(69.4 cm.+or-)
Junior	(1/2) body length 25 1/2"	+or-	(64.77cm.+or-)

Bass

Standard	(3/4) body length 43 1/4" to 44 1/2"	+or-	(109.85cm. to 113 +or-)
String length from fingerboard nut to bridge	41 1/2" to 43 1/2"	+or-	(105.4cm. to 109.85 +or-)
Intermediate	(1/2) body length 41 1/4"	+or-	(104.8cm.+or-)
String length from fingerboard nut to bridge	38 3/4"	+or-	(98.45cm.+or-)
Junior	(3/8) body length 36 5/8"	+or-	(93. cm.+or-)
String length from fingerboard nut to bridge	35"	+or-	(88.9 cm.+or-)

B. Bow Length (from tip to end of screw button)

Note: Bows for use with a particular instrument should be the same proportionate size as the instrument, as follows:

Violin	(4/4)	29 1/4"	+or-	(74.3 cm.+or-)
	(3/4)	27"	+or-	(68.6 cm.+or-)
	(1/2)	24 9/16"	+or-	(62.4 cm.+or-)
Viola	Standard	29 5/8"	+or-	(75.2 cm.+or-)
	Intermediate	29 3/16"	+or-	(74.1 cm.+or-)
	Junior	27 1/4"	+or-	(69.2 cm.+or-)
Cello	Standard	28 1/8"	+or-	(71.4 cm.+or-)
	Hair Length	23 3/4"	+or-	(60.3 cm.+or-)
	Intermediate	26 7/16"	+or-	(67.1 cm.+or-)
	Hair Length	22 1/6"	+or-	(56.2 cm.+or-)
	Junior	24 1/2"	+or-	(61.6 cm.+or-)
	Hair Length	20 3/8"	+or-	(51.8 cm.+or-)
Bass*	French Model	28 1/16"	+or-	(71.5 cm.+or-)
	Hair Length	21 9/16"	+or-	(57. cm.+or-)
	German (Butler) Model	30 3/8"	+or-	(77.2 cm.+or-)
	Hair Length	22 1/16"	+or-	(56. cm.+or-)

*Note: At the St. Louis MENC convention in 1950 and again at the Philadelphia meeting in 1952, the String Committee voted a strong preference for the French type bass bow.

Materials and Construction

A. Instruments

1. Back, sides, scroll and top. Wood preferably seasoned seven years before use for instrument construction.

   a. Back sides and scroll-hard maple preferred. (carved)

   b. Top--spruce preferred (carved).

   c. Plywood approved for cellos and basses, thickness to be approved by committee.

2. Construction

   a. All joints glued tightly and reinforced with four full corner blocks and solid upper and lower blocks, full lining inside of top and back. Inlaid purfling preferred.

   b. All edges glued securely.

   c. All cracks, if any, properly repaired (reinforced and glued).

   d. Inlaid purfling strongly preferred over painted purfling.

   e. Bass bar should be of harder spruce than wood used for top itself. Bass bar must be glued in and not carved out from top wood.

3. Trimmings

   a. Pegs--ebony, rosewood, boxwood, or cocobola.

   b. Fingerboard:

      (1) First choice--ebony.

      (2) Second choice--rosewood treated to resist absorption (bass and cello only).

   c. Nut and saddle--ebony preferred.

   d. Tailpiece (copper wire loop accepted for elementary school instruments):

      (1) First choice--ebony.

      (2) Second choice--boxwood.

      (3) Third choice--rosewood (cello and bass only).

   3. Cello and Bass and pin:

      (1) Sturdy, metal, adjustable, extra long.

      (2) Set screw, extra large "thumb--first finger" grip area.

4. Varnish.

   a. Type--good quality of soft texture (oil type varnish preferred; thick hard glossy finish discouraged).

   b. The neck should not be coated with any finish which will prevent the hand from sliding smoothly.

   Recommended Process: Wood surfaced with 00 sandpaper and 00 steel wool. Wood wiped with water-moistened cloth to cause loose fibers to "burr," then again rubbed with 00 steel wool and, after a second application of linseed oil, polished with a chamois or wool cloth. (Other processes producing this result acceptable.)

5. Attachments.

   a. Chinrest--ebony, boxwood, or plastic, suitable size, without sharp edges. Player to have choice to suit his own needs.

   b. Strings--should be good quality fresh strings, properly matched.

   Note: The following are recommended for the majority of instruments in most school situations. Climatic conditions and differences in instruments may suggest some deviation.

   (1) Gauges for gut strings (medium):

   Violin - E steel, with adjuster. (See item 4 "Tuners" below.)
   single strand .010 (.25 mm.)
   aluminum wound on steel .011 (.27 mm.)

   A .029 (.73 mm.) gut
   D .034 (.85 mm.) aluminum on gut
   G .032 (.80 mm.) silver on gut

   Viola - A .029 (.73 mm.) gut
   D .035 (.87 mm.) gut or aluminum on gut
   G .033 (.82 mm.) silver on gut
   C .045 (.112 mm.) silver on gut

Cello -	A	.044 (1.1	mm.)	gut (metal smaller)
	D	.051 (1.126	mm.)	gut (metal smaller)
		.056 (1.35	mm.)	aluminum or gut
	G	.054 (1.36	mm.)	silverplated wire on gut
		.053 (1.4	mm.)	silver on gut
	C	.074 (1.75	mm.)	silverplated wire on gut or silver on gut
Bass -	G	.088 (2.20	mm.)	gut
	D	.114 (2.85	mm.)	gut
	A	.110 (2.75	mm.)	copper or silver (or plated copper) on gut
	E	.138 (3.45	mm.)	copper or silver (or plated copper) on gut

Note: Standardization of large gear box in bass is hoped for.

(2) Metal strings are supplied by manufacturer in balanced sets.

(3) For general school use, metal strings with tuners (see Item 4 "Tuners" below) approved as follows:

Violin - E single strand .010 (.25mm.)
E aluminum wound on steel .011 (.27 mm.)
A steel core with chromium or aluminum winding over silk or plastic underlay .017 (.43 mm.)

Viola - A (same as Violin A) .017 (.43 mm.)
D (same as Violin A) .024 (.60 mm.)

Cello - A (same as Violin A) .025 (.625 mm.)
D (same as Violin A) .036 (.90 mm.)

(4) Tuners (adjusters):

Violin-Viola--type which will not tilt tailpiece or mar top of instrument.

Cello--extra sturdy.

B. Bows

1. Bow stick

   a. First choice--pernambuco, seasoned at least ten years.

   b. Second choice--metal (aluminum)

   c. Third choice--brazilwood, seasoned at least ten years.

2. Frogs and tip

   a. Ebony frog preferred.

   b. Ivory tip preferred; plastic tip acceptable (metal tip acceptable on bass bows.)

      Note: Importers and dealers are urged to standardize eyelet threads on all bows.

3. The bow grip

   Sterling silver wire with thumb leather at lower end and leather ring at upper end preferred. The leather at both ends should be securely glued or shellacked to stick, and wire should be held together by two runs of solder or other appropriate adhesive. In wrapped bow grips, the winding should not be loose. Thumb leather should be of proper length and thickness at upper end.

C. Cases

1. Type--shaped or oblong type. Hard shell plywood with Keratol, leather or other durable covering preferred. Cases must fit the instrument as well as being of proportionate body area. Special attention should be given to viola cases since there are varied sizes within the 4/4 or standard group.

2. Interior

   a. Lining soft and attractive (plus material preferred).

   b. Bottom and sides well padded.

c. At least one accessory pocket and two bow holders.

d. Zipper instrument cover highly desirable.

3. Zipper cover for case desirable, especially in colder climates.

4. Cello and Bass bags--zipper openings preferred. (Cloth or leather between zipper and bouts.)

Adjustments

A. Pegs

1. Must be properly fitted to give snug fit at both sides of peg box.

2. Must be lubricated with fresh yellow laundry soap, commercial peg soap, or ordinary chalk.

B. Fingerboard

1. Must be straight but slightly concave.

2. Must have medium curvature.

3. Distance from end of fingerboard to top of instrument should be as follows:

Violin (4/4): 19 1/2 - 20 1/2 mm.

Viola (4/4): 24-25 mm. at a fingerboard length of 130 1/2 mm.
(4/4 large instruments slightly more).
(4/4 small, intermediate /3/4/ and junior).
/1/2/ sized instruments slightly less.)

Cello (4/4): 62-65 mm. at a fingerboard length of 58-60 cm.
(3/4 and 1/2 sizes slightly less).

Bass Standard (3/4): 9 1/2-11 cm.
Intermediate (1/2): same
Junior (3/8): same

C. Nut

1. Height must be that to give small clearance below strings.

2. Over-all spacing of nut (full or standard size) center of string to string:

Violin	E to G	5/8"	(15.6 mm.)
Viola	A to C	11/16"	(16.9 mm.)
Cello	A to C	7/8"	(21.5 mm.)
Bass	G to E	1 3/16"	(29.6 mm.)

D. Bridge

1. Curvature

a. Material--Hard maple preferred.

b. The first requirement of bridge curvature is that it conform to the curvature of the fingerboard, assuming of course that the fingerboard curvature is correct. Although there are two distinct curvatures in existence, only the first (the French) is being recommended because it is the more widely used and is considered by most teachers and performers to be the better.

c. French Curvature possesses less curve (not as round) and is slightly lower at the A and D (violin) strings. It enables the player to perform more rapidly and to develop better and faster technic. Another advantage is the reduction of fatigue, since the actual distance between two strings is shorter, less motion of the bow arm is required. This curvature requires careful alignment of the fingerboard, lest the player touch two strings simultaneously. But this is also an advantage in that double stops and chords are more easily played.

d. Viennese Curvature is slightly rounder and a trifle higher at the A and D (violin) strings. It is usually used when the fingerboard is not properly "dressed." The advantage is: more clearance for playing on each string; and the disadvantage is: wider travel of the bow and greater fatigue of the bow arm.

2. Grooves

   a. Should be made just deep enough to hold the strings in place.

   b. Should be half round in shape and just large enough to accept the string which it is to accommodate.

   c. Ebony or equivalent inlay desirable under metal strings.

3. Height

   a. Should be high enough to give the following clearance between strings and end of fingerboard (standard or full-sized instruments; smaller instruments slightly less):

Violin - E	1/8"	(3.12 mm.)
Violin - G	3/16"	(4.6 mm.)
Viola - A	3/16"	(4.6 mm.)
Viola - C	4/16"	(6.25 mm.)
Cello - A	1/4"	(6.25 mm.)
Cello - G	5/16"	(6.80 mm.)
Bass - G	7/16"	(10.9 mm.)
Bass - E	11/16"	(17.17mm.)

4. Feet must be shaped to fit the instrument top, bridge tilted backward to form right angle between back side of bridge and top of instrument.

5. Unfitted bridge must be cut to medium thickness and tapered to the top thickness as listed below:

Violin	1/16"	(1.55 mm.)
Viola	1/16"	(1.55 mm.)
Cello	3/32"	(2.32 mm.)
Bass	3/16"	(4.67 mm.)

6. Proper string spacing at bridge (center of string to center of string), full size (smaller instruments slightly less):

Violin	7/16"	(10.9 mm.)
Viola	1/2"	(12.5 mm.)
Cello	5/8"	(15.6 mm.)
Bass	1 1/8"	(28.1 mm.)

7. Bridge should center on the inner F hole notches.

E. Tailpiece

1. Gut should be just long enough so that the end of the tailpiece is even with the center of the saddle.

2. Saddle should be high enough so that the tailpiece and ends of tailpiece gut are well in the clear over the top plate. Violin, at least 1/16", proportionately more for other instruments.

F. Sound Post

1. Location immediately behind the right foot (1st string side) of the bridge. The distance between the back of the bridge and the front of the sound post should be approximately one-half the thickness of the post (a little more for some instruments).

2. Size

Violin	1/4"	(6.1 mm.)	diameter
Viola	1/4"	(6.1 mm.)	diameter
Cello	7/16"	(10.9 mm.)	diameter
Bass	11/16"	(17.1 mm.)	diameter

3. Fitting--must fit snugly (but never glued), ends beveled to fit flush with top and back.

G. Bow

1. When the frog is in full forward position, the hair should be relaxed (not loose) and the opposite test should also apply in tightening the bow screw.

2. The hair should be "sighted down" to make sure there are no crossed hairs.

3. The stick (tightened 1 1/2 or 2 rounds for playing) should be "sighted down" to see that it is straight.

4. The frog should seat firmly on the bow, not rock from side to side.

5. The bow screw should work smoothly.

6. The bow grip should be properly attached. (See Item 3 under "Bow Materials").

Miscellaneous

(Direction Sheet for Care of Instruments)

A. Keep bow and instrument in case when not in use.

B. Keep bow hair always under slight tension. To use, tighten bow screw only about two (+or-) rounds.

C. Leave strings always tuned up to pitch.

D. Wipe rosin dust from instrument top and bow stick after playing.

E. Never leave an instrument near a radiator or in a cold room.

F. Do not allow anyone except your teacher to handle your instrument.

G. Have your teacher check frequently for cracks, bridge adjustment, buzzes, etc.

H. Keep case latched (but not locked with the key) when instrument is not in use.

(Excellent literature on the care of the instrument has been published by leading stringed instrument dealers.)

APPENDIX D

SELECTED LIST OF PUBLISHERS

Selected List of Publishers

Alfred Music Co., Inc.
75 Channel Drive
Port Washington, New York 11050

American Music Edition
258 East 7th Street
New York, New York 10009

American String Teachers Association
1202 Sixteenth Street, N. W.
Washington, D. C. 20036

Associated Music Publishers, Inc.
(See G. Schirmer, Inc.)

Avant Music
2859 Holt Avenue
Los Angeles, California 90034

M. Baron Company
P. O. Box 149
Oyster Bay, New York 11771

Belwin, Inc.
250 Maple Avenue
Rockville Centre, Long Island, New York 11570

The Big 3 Music Corporation
1350 Avenue of the Americas
New York, New York 10019

Boosey & Hawkes, Inc.
209 Victor Street
Oceanside, New York 11572

Boston Music Company
116 Boylston Street
Boston, Massachusetts 92116

Bourne Company
136 West 52nd Street
New York, New York 10019

Broude Brothers
56 West 45th Street
New York, New York 10036

Robert B. Brown Music Company
1815 N. Kenmore Avenue
Hollywood, California 90027

Carlin Music Publishing Company
Oakhurst, California 93644

Chappell & Company, Inc.
609 Fifth Avenue
New York, New York 10017

Franco Columbo, Inc.
(See Belwin, Inc.)

Composers Facsimile Edition
American Composers Alliance
170 West 74th Street
New York, New York 10023

Concordia Publishing House
3558 South Jefferson Avenue
St. Louis, Missouri 63118

Cundy-Bettoney Company, Inc.
96 Bradlee Street
Hyde Park, Massachusetts 02136

Dover Publications, Inc.
180 Varick Street
New York, New York 10014

Edition Musicus, Inc.
333 West 52nd Street
New York, New York 10019

Elkan-Vogel Company, Inc.
1712 Sansom Street
Philadelphia, Pennsylvania 19103

Carl Fischer, Inc.
62 Cooper Square
New York, New York 10003

H. T. FitzSimons Company, Inc.
615 North LaSalle Street
Chicago, Illinois 60610

Sam Fox Publishing Company
1841 Broadway
New York, New York 10023

Galaxy Music Corporation
2121 Broadway
New York, New York 10023

Gordon Music Company
408 North Rodeo Drive
Beverly Hills, California 90210

Hansen Publications of New York, Inc.
119 West 57th Street
New York, New York 10019

Highland Music Company
1311 North Highland Avenue
Hollywood, California 90028

International Music Company
511 Fifth Avenue
New York, New York 10017

Edwin F. Kalmus
1345 New York Avenue
Huntington Station, Long Island, New York 11746

Kendor Music, Inc.
Main & Grove Streets
Delevan, New York 14042

Neil A. Kjos Music Company
525 Busse
Park Ridge, Illinois 60068

Leeds Music Company
(See MCA Music)

Ludwig Music Publishing Company, Inc.
557-567 East 140th Street
Cleveland, Ohio 44110

Edward B. Marks Music Corporation
136 West 52nd Street
New York, New York 10019

MCA Music, A Division of MCA Inc.
543 West 43rd Street
New York, New York 10036

Mills Music, Inc.
1619 Broadway
New York, New York 10019

Edwin H. Morris & Company, Inc.
31 West 54th Street
New York, New York 10019

Music Educators National Conference
1201 Sixteenth Street, N. W.
Washington, D. C. 20036

Music Publishers Holding Corporation
(See Warner Bros.--7 Arts, Inc.)

Oxford University Press, Inc.
200 Madison Avenue
New York, New York 10016

Peer International Corporation
1619 Broadway
New York, New York 10019

C. F. Peters Corporation
373 Park Avenue South
New York, New York 10016

Theodore Presser Company
Presser Place
Bryn Mawr, Pennsylvania 19010

Pro Art Publications, Inc.
469 Union Avenue
Westbury, New York 11590

Rubank, Inc.
16215 N. W. 15th Avenue
Miami, Florida 33169

Scherl & Roth Incorporated
1729 Superior Avenue
Cleveland, Ohio 44114

G. Schirmer, Inc.
609 Fifth Avenue
New York, New York 10017

Schmitt, Hall and McCreary
527 Park Avenue
Minneapolis, Minnesota 55415

Shapiro, Bernstein & Company, Inc.
666 Fifth Avenue
New York, New York 10019

Shawnee Press, Inc.
Delaware Water Gap, Pennsylvania 18327

Southern Music Company
P. O. Box 329
San Antonio, Texas 78206

Southern Music Publishing Company
1619 Broadway
New York, New York 10019

Spratt Music Publishing Company
17 West 60th Street
New York, New York 10023

The Staff Music Publishing Company, Inc.
17 West 60th Street
New York, New York 10023

Summy-Birchard Company
1834 Ridge Avenue
Evanston, Illinois 60204

Tempo Music Publications, Inc.
P. O. Box 129
Chicago, Illinois 60690

Volkwein Bros., Inc.
117 Sandusky Street
Pittsburgh, Pennsylvania 15212

Warner Bros.--7 Arts, Inc.
619 West 54th Street
New York, New York 10019

Weintraub Music Company
240 West 55th Street
New York, New York 10019

The Willis Music Company
440 Main Street
Cincinnati, Ohio 45201

World Library of Sacred Music
2145 Central Parkway
Cincinnati, Ohio 45214

Ybarra Music
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APPENDIX E

SELECTED DIRECTORY OF MUSIC ORGANIZATIONS

Selected Directory of Music Organizations[1]

AMATEUR CHAMBER MUSIC PLAYERS
15 W. 67th Street
New York, New York 10023

AMERICAN COMPOSERS ALLIANCE
170 W. 74th Street
New York, New York 10023
While a performance licensing organization, ACA subsidizes recordings and concerts as well as other related activities, and maintains a public library of contemporary American music.

AMERICAN FEDERATION OF MUSICIANS OF THE UNITED STATES AND CANADA, AFL-CIO
641 Lexington Avenue
New York, New York 10022
As stated in the Constitution of the American Federation of Musicians, the purpose and function of the organization is to unite all local unions of musicians, the individual musicians who form such local unions of the American Federation of Musicians into one organization, for the purpose of general protection and advancement of their interests and for the purpose of enforcing good faith and fair dealing, as well as consistency with union principles, in all cases involving or of interest to members and Local Unions of the Federation.

AMERICAN GUILD OF AUTHORS AND COMPOSERS
50 W. 57th Street
New York, New York 10019
A checklist of services; Collection of Royalties; Copyright Service; Legislative Action; Copyright Reform.

AMERICAN GUILD OF DOUBLE BASS PLAYERS
c/o Mr. Lucas Drew
School of Music
University of Miami
Coral Gables, Florida 33124
"To provide a means of communication among bass players in regard to new music, research, pedagogy, and performance," is the Guild's purpose.

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AMERICAN MUSIC CENTER, INC.
2109 Broadway, Suite 15-79
New York, New York 10023
AMC is the official U. S. Information Center on Music.

AMERICAN MUSIC CONFERENCE
332 S. Michigan Avenue
Chicago, Illinois 60604
Serving as the music industry's educational and public relations voice, to foster growth of amateur music participation by youngsters and adults in the nation's schools, homes, industries, and community organizations.

AMERICAN SOCIETY OF COMPOSERS, AUTHORS AND PUBLISHERS (ASCAP)
575 Madison Avenue
New York, New York 10022
ASCAP serves as a clearing house in the field of performing rights, that is, in the use of copyright music in public performances for profit. Organized in 1914 by Victor Herbert and other leading composers, ASCAP is an unincorporated membership association of writers and publishers who make their vast repertory of music available to users at a minimum of cost in a field where individual negotiation is not practicable.

AMERICAN SOCIETY OF MUSIC ARRANGERS
224 W. 49th Street
New York, New York 10019

AMERICAN STRING TEACHERS ASSOCIATION
c/o Mr. Robert Marince
Lawrence Twp. Public Schools
2455 Princeton Pike
Trenton, New Jersey 08638
ASTA is affiliated with MTNA and MENC and is dedicated to the improvement of string playing and string teaching.

AMERICAN SYMPHONY ORCHESTRA LEAGUE
Symphony Hill
P. O. Box 66
Vienna, Virginia 22180
Non-profit, membership corporation of symphony orchestras in the U. S. and Canada and operating as a research, service, educational and coordinating agency for the symphony orchestras and related arts groups.

BROADCAST MUSIC, INC.
589 Fifth Avenue
New York, New York 10017
Performing rights licensing organization.

COMPOSERS AND LYRICISTS GUILD OF AMERICA
6565 Sunset Blvd., Suite 419
Hollywood, California 90028

DELTA OMICRON INTERNATIONAL MUSIC FRATERNITY
18518 Cherrylawn
Detroit, Michigan 48221
(Members elected)
"To do any and all things conducive to the service, betterment and ultimate welfare of women in music."

INTERNATIONAL SOCIETY FOR MUSIC EDUCATION
c/o MENC
1201 Sixteenth Street
Washington, D. C. 20036
An organization made up of the MENC and similar groups from other countries, dedicated to the furtherment of music education on a world-wide level.

MODERN MUSIC MASTERS HONOR SOCIETY
P. O. Box 347
Park Ridge, Illinois 60068
A non-profit educational organization.

MU BETA PSI
National Honorary Musical Fraternity
3401 Hickory Crest Dr.
Marietta, Georgia 30060
To promote a better fellowship among the musicians of the various musical organizations of a college and among the musicians of the various musical organizations of the different colleges. To advance music to its proper place as an educational subject.

MU PHI EPSILON
International Music Sorority
National Executive Office
1097 Arnott Way
Campbell, California 95008
(Members Elected)

MUSIC EDUCATORS NATIONAL CONFERENCE
1201 Sixteenth Street, N. W.
Washington, D. C. 20036
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MTNA is a nonprofit organization, representing music teachers in studios, conservatories, music schools, private schools and institutions of higher learning.

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15 W. 67th Street
New York, New York 10023
Promotion of American music and musicians. Gives four free concerts in New York. Other chapters in Los Angeles, Philadelphia and Washington, D. C.

NATIONAL ASSOCIATION FOR MUSIC THERAPY, INC.
P. O. Box 610
Lawrence, Kansas 66044

NATIONAL ASSOCIATION OF MUSIC MERCHANTS, INC.
222 W. Adams Street
Chicago, Illinois 60606
The NAMM provides services to raise the level and productivity of retail selling of music instruments.

NATIONAL CATHOLIC MUSIC EDUCATORS ASSOCIATION
620 Michigan Avenue, N. E.
Washington, D. C. 20017
The NCMEA is designed to assist professionally musicians, music teachers, students, administrators, and clergy, in the many aspects of the music profession. Consists of diocesan units throughout the nation and Canada and departmental structures on both the national and diocesan levels. Holds a yearly National Convention. Official Publication, MUSART, is issued six times per year.

NATIONAL FEDERATION OF MUSIC CLUBS
NFMC Headquarters, Suite 1215
600 South Michigan Avenue
Chicago, Illinois 60605
The object if to bring into working relations with one another, music clubs and other musical organizations and individuals directly or indirectly associated with musical activity for the purpose of developing and maintaining high musical standards; and aiding and encouraging musical education.

NATIONAL GUILD OF COMMUNITY MUSIC SCHOOLS
626 Grove Street
Evanston, Illinois 60201

NATIONAL MUSIC COUNCIL
2109 Broadway
Suite 15-79
New York, New York 10023
Composed of representatives of musical associations of national scope and activity in the United States. Organized to provide the member organizations with a forum for the free discussion of problems affecting the national music life of this country; to encourage the development and appreciation of the art of music and to foster the highest ethical standards in the professions and industries.

NATIONAL MUSIC PUBLISHERS ASSOCIATION, INC.
460 Park Avenue
New York, New York 10022
The Association protects copyrights and performing rights and is concerned with licensing arrangements.

NATIONAL SCHOOL ORCHESTRA ASSOCIATION
c/o Orville Dally
633 Center Street
Bryan, Ohio 43506
The NSOA is dedicated to the promotion and improvement of school orchestras and their literature.

PHI BETA FRATERNITY
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Yale School of Music
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New Haven, Connecticut 06520

The Society sponsors the annual publication of a chamber music composition by an American composer.

CHAPTER IV

SUMMARY

The inexperienced school orchestra director urgently needed a single reference work to guide him in his quest for a successful orchestra program. Most specific books on stringed instrument playing were too complex to be readily understandable and of a practical value to the director. Articles found in periodicals were too numerous and widely dispersed to be readily accessible to the director. To fill this need, a manual was developed that described clearly and as simply as possible the more important and involved aspects of stringed instrument technique, as well as practical information relating to the development of the orchestra as a vital part of the school music program.

The manual was directed especially to the school band director who, though lacking in extensive orchestral background or experience, has found it necessary or opportune to accept the responsibility of a junior or senior high school orchestra. With this person in mind, the manual provided simple, clear-cut solutions to the normally more complex techniques of stringed instrument performance.

A review was made of all known and available material relating to school orchestra and stringed instrument performance. Subtle techniques and obscure theories were eliminated to allow the manual to be free of unnecessary explanation and detail. Consultation with successful stringed instrument specialists and orchestra directors was undertaken to insure the inclusion of the information considered most pertinent to the junior or senior high school orchestra. Additional appendical information and extensive bibliographical listings were included for reference.

The primary task of the study was to collect and disseminate from vast amounts of divergent materials the most relevant information on stringed instrument techniques. Combining the material into a single source created the resultant manual.

It is hoped the manual will usefully serve the following:

(1) The band director working with an orchestra for the first time.

(2) The new music teacher, embarking on a career in orchestral conducting.

(3) As a text book for the college music education course in stringed instrument or school orchestra methods.

(4) As a possible reference source for music supervisors and stringed instrument specialists.

It is a most sincere wish that the information contained in the manual will aid in guiding the development of a superior orchestra program. May this work provide the insight and inspiration necessary to develop a lasting comradeship with the orchestra and a fondness for stringed instrument performance.

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