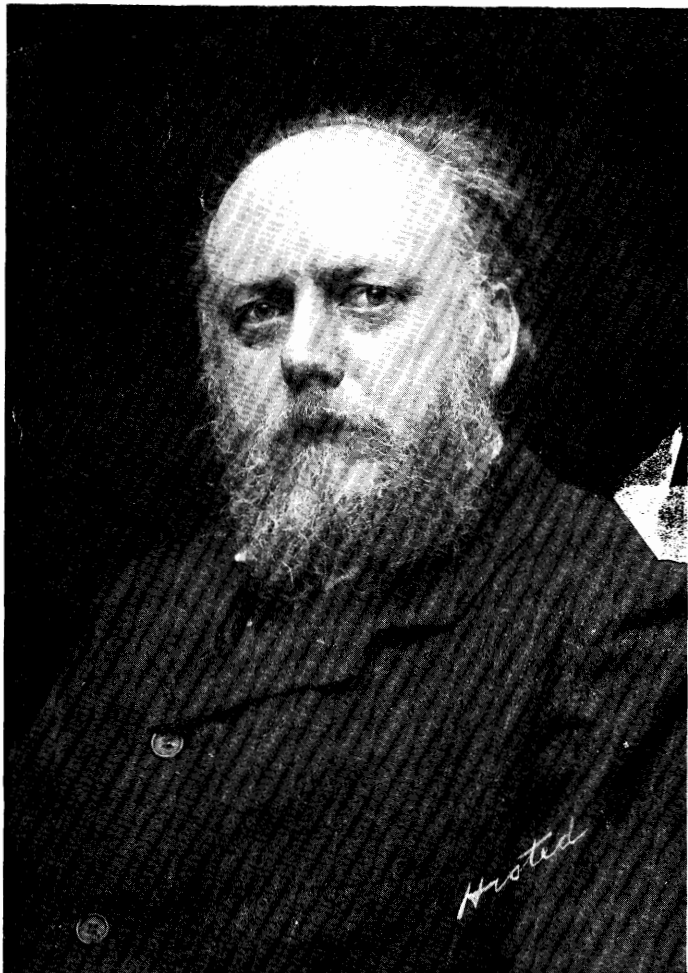


THE
TECHNICS OF VIOLONCELLO
PLAYING.

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E. VAN DER STRAETEN.

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THE TECHNICS
OF
VIOLONCELLO PLAYING

BY
E. VAN DER STRAETEN.

SECOND EDITION.

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*CLOSET
-SHELF*

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Letters received by the Author from the following Artists :—

DEAR SIR,—I received the book you kindly sent me on THE TECHNICS OF VIOLONCELLO PLAYING, which I found excellent, particularly for beginners, which naturally was your scope.

Yours sincerely,

Cadenabbia, Lake of Como,
March 9th, 1898.

ALFRED PIATTI.

HONOURED SIR AND FRIEND,—In sending me your book on THE TECHNICS OF VIOLONCELLO PLAYING you have given me a real and true pleasure. I know of no work, tutors and studies not excepted, which presents so much valuable material, so much that is absolutely to the point, avoiding—I might say, on principle—all that is superfluous and dispensable. Every earnest thinking violoncello student will in future make your book his own and thereby receive hints which will further and complete the instructions of his master.

I congratulate you and ourselves most heartily on the new violoncello book. With kind regards, yours most sincerely,

Budapest,
February 22nd, 1898.

DAVID POPPER.

MY DEAR VAN DER STRAETEN,—With regard to your book THE TECHNICS OF VIOLONCELLO PLAYING, I have read it with great interest, and shall speak about it to my friends as occasion occurs.

Yours sincerely,

ERNEST DE MUNCK.

Professor Guildhall School of Music.

One of the best additions to the Literature of the Violoncello is undoubtedly E. van der Straeten's THE TECHNICS OF VIOLONCELLO PLAYING, which may be strongly recommended to all violoncello players.

JOHANNES KLINGENBERG.

Chamber Musician to the Duke of Brunswick.

Royal Academy of Music,

Hanover Square, W.

DEAR MR. VAN DER STRAETEN,—YOUR TECHNICS OF VIOLONCELLO PLAYING gives me very much pleasure, and appeals to me as a correct and sound basis for the study of the violoncello. I am sure the young student will find your book of great assistance, as the fundamental principles are so clearly and concisely laid before him. Wishing you the success your admirable little book deserves,

I am, yours sincerely,

HERBERT WALENN.

(Professor of Violoncello).

DEAR MR. VAN DER STRAETEN,—I consider your book, THE TECHNICS OF VIOLONCELLO PLAYING, very helpful for any student of the instrument, and the explanations of your method are most clear and concise. Yours sincerely,

W. E. WHITEHOUSE.

Fellow and Prof. R.A. and R.C.M., etc., etc.

PREFACE TO FIRST EDITION.

THE kindly reception which has been accorded to this work by musicians as well as by amateurs since it made its first appearance in the columns of *THE STRAD*, has encouraged the author to allow it to present itself in book form after a very careful revision, and after consultation with some of the greatest masters of the instrument.

To avoid any misunderstanding with regard to the object of this book, let it be said once more that it is not intended as a "tutor," but merely as a handbook for the student to freshen up his memory whenever he has forgotten some part or other of his master's precepts.

It has also been essayed in these pages to give a fuller and clearer explanation of the movements of the hands and arms, and the sundry ways of bowing which seldom has a systematic and never an exhaustive treatment in violoncello tutors. This is particularly the case with regard to the Spiccato, the Staccato, and the D  tach  , about which most amateurs have only very hazy notions. Also the chapter on embellishments has been treated more fully than is usually the case, and a thorough and carefully constructed table of Harmonics has been added, in which also the fifteenth harmonic in the middle part of the string (above the C on the A string) has been included. This harmonic, although very useful, is not to be met with in any of the existing tables to the best of the writer's knowledge. As the present little book is the first of its kind, it may, and will, no doubt, be improved upon, although great care has been taken in its compilation. Any suggestions in that direction will be gratefully received, and shall find a place in the next edition if approved of.

May the book in its present form increase the already considerable number of friends which it has gained through its appearance in *THE STRAD*, and may it prove a useful companion to all of them.

E. VAN DER STRAETEN.

London, January, 1898.

PREFACE TO SECOND EDITION.

THE kindness with which this little book has been received in all parts of the civilised world has surpassed my keenest hopes and anticipations.

Letters of approval and appeals for advice and instruction have reached me from all quarters.

In tendering my sincerest thanks to my unknown friends and patrons, I venture to express the hope that an equally friendly reception may be accorded to this new edition by the votaries of our noble instrument.

I have tried to eliminate mistakes and shortcomings to the best of my ability, yet I feel that more remains to be done, but perfection is not accorded to mortal man.

A few items have been altered according to the advance of modern technic, more stress has been laid on the use of the upper half of the bow, and a little paragraph has been added on the subject of physical exercises which I have found beneficial.

Some of the illustrations have been replaced by better and clearer drawings, especially of the various signs for graces, etc.

In its essential points the book remains unaltered, as it was the outcome of very careful study and research.

So may the book start on its journey, and if it fulfil its purpose, it will have realised the one and only ambition of the author.

E. VAN DER STRAETEN.

London, July, 1905.

Technics of Violoncello Playing.

CHAPTER I.

Primary Conditions for a Violoncellist.

A QUICK and susceptible ear is a *conditio sine qua non*, which, of course, applies equally to all who are desirous of entering the service of Apollo, no matter what their particular line may be.

Normally formed limbs are of the greatest importance, the *normal* form as the most perfect, bringing also the most perfect performance of all their functions within the limits of possibility. Muscular strength and flexibility of joints can then be easily acquired.

Great length of the hand and fingers is less important than a well proportioned relative length, as well as shortness and looseness of their webs and the ligaments across the knuckles, so as to ensure a good stretch.

The action of all the joints of the arms and fingers must necessarily be perfectly free and independent, and the student must constantly try to strengthen his muscles, particularly those that move the fingers of the left hand, and those that move the right arm and wrist.

A natural predisposition in that direction is an endowment of nature which gives great advantages to its owner, although those who possess these qualities in a lesser degree can overcome much, if not all, by earnest study and power of will.

There is, however, one qualification to industry in order to ensure its ultimate success: *it must be thoughtful*. Thoughtful work is fruitful work.

The brain, as well as the fingers, must take its share in the practice of an instrument. The art of violoncello playing, like every other art, is a very difficult one, and the way to mastery is toilsome.

Unless you are prepared to devote a good deal of energy and a fair amount of time to the pursuit of its study, do not begin.

Pupils have come to me, seeking instruction, with the remark: I do not want to go into all detail, and I do not aspire to become a great executant; but I want to learn just enough to play the bass part in some easy trio or quartet.

That is, of course, an incongruity, which is bound to lead to disappointment.

Anyone who tries to play the violoncello, and proceeds in any other than the legitimate, systematic way, will soon find that he cannot do anything, will become disheartened and abandon the instrument in disgust. Only he who slowly, yet steadily, climbs the steep and stony path, will reach the summit.

Some are gifted by nature with special aptitude for acquiring technical skill. Everything that others have to acquire by dint of dogged labour, seems to come to the former instinctively. Talents of this kind stand in great danger of running to seed unless they curb the over rapid flight of ambition, proceed steadily and gradually, and strictly control their studies.

The brain and the fingers stand in the same relationship to each other as a general stands to his army. Unless the former is an able commander, the troops will struggle in vain for victory. They will battle on, fighting

against all sorts of obstacles and difficulties, without any perceptible result; while those who stand under the command of a clear-headed leader will advance steadily and victoriously.

This simile may be pursued still further. As the best general can do nothing with undrilled soldiers, so will the brain be unable to enforce its dictates upon unpractised joints.

[Technic depends on nimbleness or flexibility of limb.] It stands in closest relationship to athletic achievements, and must therefore be acquired in precisely the same manner, *i.e.*, by gymnastic exercise, patient practice and careful training. And in these you must always proceed with deliberation. Be sure you are absolutely conscious of the way in which you do a thing, what muscles you call into play, how you place your fingers, hold your bow, etc., etc. The thoughtless student *may* do a thing right, but he cannot with certainty repeat it, because he does not know *how* he did it; the thoughtful student, who is conscious of the way in which he arrived at a certain result, can proceed in that same way again and again, and always arrive exactly at the same result.

Consciousness of purpose will fix on the memory the exact action of each joint which it has to perform for a certain purpose, and thus it will assist not only in facilitating the reproduction of that same effect but also in *playing from memory*. After practising a piece carefully, the mechanical action of the fingers will, by sheer force of habit, act as a prompter to the memory, in case the latter should have forgotten the actual notes of any particular passage. This is the result of accustoming our fingers to run mechanically their wonted course, while our mind is occupied with reflecting on the musical matter itself. And here let me add that teachers make a great mistake when they forbid their pupils to play from memory.

As the fingers should be trained to perform certain tasks when young and nimble, so should the memory be strengthened by practice during those early years when

the mind is more flexible, and receives impressions readily and more lastingly than in later years.

Playing from memory should of course not be exercised before an audience unless the student is absolutely sure of his piece; otherwise it will lead to negligence and incorrectness. It should be proceeded with in the same systematic way as technical studies. Let the pupil be sure of the meaning of his piece, its construction and principal points of modulation. These he must keep in mind as land-marks when he tries to remember the piece. Never trouble at first about matters of detail.

Play on! even if part of it should be wrong, and when you have remembered the outline and principal points of modulation, you can advance one step further, and control the correctness of all your passages.

When engaged in purely mechanical exercise, for the purpose of obtaining strength and suppleness of joints and muscles, never resort to artificial means.

Schumann in his "Advice to Young Musicians" (*Musikalische Haus und Lebensregeln*) says: "So-called 'mute keyboards' have been invented. Try them for a while, and you will soon find out that they are worthless. The dumb cannot teach you to speak."

The same applies to dumb violins, dumb violoncellos and all similar contrivances. A dumb violoncello does not produce a sound that will tell you whether you bow right or wrong, nor whether your intonation is perfectly correct.

The so-called technicons only apply to the left hand, and you run the risk of overstraining your muscles, with the result that permanent weakness or even lameness will be the consequence.

The general increase of muscle does not of itself increase the ability to perform particular functions, and even when the muscles have been trained to perform those functions in one particular position, they cannot perform them with the same facility when the position of the hand or arm to which they belong has once been altered. If, for instance, the fingers of the left hand can

perform a perfect shake on the pianoforte, they cannot do the same on the violin or violoncello without special training. All the muscles required for the performance of a shake on a stringed instrument are brought into an entirely different position from that required for the pianoforte, changing the manner of touch as well as the amount of pressure required. Practice on the instrument itself is of course the primary condition under which technic may be acquired. Yet if that practice is pursued beyond a certain limit, a loss of agility as well as of power will be the consequence. The reason for this is that while we are developing the muscles of the hands and the fingers, those of the fore and upper arm receive but scant attention, and while the former are growing strong they take the nourishment away from the latter, which in consequence are weakened.

The muscular system is more finely organised than the finest and most complicated piece of machinery, every single part standing in closest connection with the whole, and all being exactly balanced in their relative strength when in an absolutely normal condition. If, therefore, one set of muscles is developed at the expense of another that balance is upset, and the perfect equality of strength which secures absolute precision of our movements as they are conceived in the brain no longer exists. To obtain a perfect balance in the development of our muscles we must also pay attention to the *variety* of their movements. We must therefore resort to some kind of physical exercise which supplements the training derived from practice on the instrument. That exercise will best be found in a steady application to a series of gymnastics systematically chosen and carried out. Several excellent works on the subject have been written (one by the late Mr. Ridley Prentice, published by Novello, Ewer and Co.), which have not yet received sufficient attention by the majority of executant musicians. Such works will show the observant student the plan which he should follow. They give a certain number of exercises, explaining in each case their

particular purpose. The student may supplement these by such additional exercises as will serve his special requirements, and which, with a little reflection and experimenting, he can find out for himself. If he is conscious of the weakness of some particular muscle, or set of muscles, he must find out a movement which calls them into action, and repeat it often and regularly, but *never to exhaustion*. The little book by Ridley Prentice for instance, gives some excellent exercises for the development of the muscles of the forearm, which are of very great importance for the bow as well as for the left hand. I have recently found an exercise for the same purpose, not contained in that booklet, which has proved most effective. It consists of the following; place both hands on the top of a square backed chair, about one foot apart. Stand so far back that the arms are stretched out straight. Bend the arms gradually, thus approaching the back of the chair with the upper part of your body until the chin touches it between your hands, and the latter almost touch the shoulders. Then you lift yourself again by gradually straightening your arm, which must be used exclusively in performing that operation. This should be repeated about six times. It will be found to strengthen the muscles of the forearm and elbow joints more than any other exercise. The right elbow joint plays a most important part in the art of bowing, although the fact is unfortunately not yet sufficiently recognised, too much attention being given to the wrist, which of course is of very great importance, but in most cases only in conjunction with the elbow joint.

A very simple exercise to assist in the development of the latter is this: let your right forearm describe a circle round your elbow—which should form the centre—by swinging it catherine wheel fashion, first from left to right, then from right to left, holding the upper arm as steady as possible. Then do the same with the left arm, and afterwards with both together. When you can do it quite easily in that way practise it in contrary motion, *i.e.*, one arm moving from right to left while the other

moves from left to right and *vice versa*. This exercise will greatly assist you in acquiring greater freedom in bowing from the forearm without using the upper arm, and thereby rendering the bow heavy and clumsy. A similar exercise may be used for the upper arm by swinging the arms round the shoulder, backward and forward, alternating the movements as in the previous exercise. In strengthening the muscles of the upper arm this exercise will serve to secure the proper balance between the latter and the forearm.

A useful exercise for the fingers of the left hand is to place big corks (for instance the thick end of champagne corks) between the tips of the fingers, alternately bending and straightening them very slowly from the first and second joints. This might follow some of the finger exercises given in several of the published works on hand gymnastics, for instance, that of holding the hand quite straight, and placing the fingers tightly against each other, then bending them slowly in the first and second joints, and straightening them again without ever letting them get apart.

After going through the above exercises take the tip of each finger of the left hand consecutively with the thumb and first two fingers of the right hand and turn them in a circle from the third joint, holding them perfectly straight.

Another useful exercise for the fingers consists in placing the hand flat on a table, spreading the fingers as much as possible, and then lifting them up, each one several times in succession, first by holding the fingers perfectly straight and afterwards by bending the finger which is lifted. In the carrying out of this exercise only the *one* finger must be lifted while the others remain flat on the table. This, as well as the preceding exercise, is useful in assisting to strengthen the third joint.

There are many similar exercises which cannot be enumerated here for want of space. The student must never lose sight of the fact that just as the muscles of the hand depend in strength and suppleness upon the support

which they received from those of the forearm, so can the reciprocal influence be traced throughout the muscular system. The more the latter can be strengthened the more will it aid us in acquiring some particular technic. It is therefore quite erroneous on the part of instrumentalists to abstain from almost every kind of athletic exercise and sport. They should of course, be selected with regard to the safety of the hands and arms, and indulged in with moderation. Cricketing is, perhaps, the least commendable in this respect, but Association football, tennis, rowing and even cycling will do no harm so long as they are practised not for their own sake, but as a means of strengthening the whole system. In doing this they will naturally strengthen the arms and hands, and where strength is gained speed and suppleness can be acquired by practice; but weakness as we have shown will not let us derive the full benefit from practising.

A moderate amount of rowing for instance will strengthen the arms and hands, thereby fitting them for the better performance of their duties on an instrument, while a momentary stiffness, caused by the above exercise, will soon be overcome after a short rest and a little practice.

Dumb bells and Indian clubs are good substitutes when open air exercise cannot be obtained. The athlete's motto is "*Mens sana in corpore sano*" (a healthy mind in a healthy body). Health and strength are the fundamental conditions upon which are based the proper execution of all physical as well as mental functions. They are, therefore, very essential in the performance of a task which calls for both, as does that of acquiring instrumental technic; and everything we can do to improve our physical condition generally will assist us in ascending the steep hill of technical perfection.

The mind conceives a musical idea and the emotions which it produces; but only the fingers, when applied to an instrument, can convey either to the notice of the outer world. The better they are fitted for their task by the acquisition of a perfect technic the more

subtle and perfect will be the reflex of all our ideas and emotions on the finger-board.

While practising observe and control all the actions of your fingers, the position of the left hand, as also of the right hand holding the bow, the right arm, and the position of the body.

When you feel tired from practising, stop playing for a while. Turn to theoretical studies, which should always go hand in hand with the study of any musical instrument; and do not resume practising until you feel rested. Mental fatigue should be equally avoided; the mind when tired will lose its faculty of controlling the actions of the limbs; and the result of continuing to practise under these conditions would be a careless technic, and impure intonation.

Three to four hours are the maximum of time that should be devoted daily to practising, and this is quite sufficient to acquire even the higher degrees of technic, provided the student makes proper use of his time. The instructions and criticisms of his teacher he should carefully remember, and recall to mind when practising. It is advisable, therefore, that immediately after receiving a lesson, the pupil should devote a short time to the summing up of all that has been done and said during that lesson, and try over again any technicalities with regard to bowing or fingering which he has just learned in order to fix them upon his memory.

If the student be strict with himself, and carefully and conscientiously follow the advice of his master, he will ensure progress; especially if he finds out the reason *why* he should do a thing one way and not another, although in some instances he will have to accept statements on the authority of his teacher, as experience alone will prove them to be correct.

This applies particularly to the advice of progressing steadily step by step. Never attempt to rush over one difficulty in order to get on to the next. Only when the former has been fully mastered should you proceed, or else your playing will resemble a picture whose outlines are blurred beyond recognition.

To follow the advice of a teacher with success, it is, of course, necessary that he be a man of ability and experience, and this leads me to say a few words on the important question of

WHOM TO CHOOSE FOR A TEACHER.

Many people labour under the illusion that any teacher is good enough for the beginner, and that a superior teacher may be chosen when the pupil has overcome the elementary difficulties, and has shown that he or she likes the instrument, and will continue its study. Now this is erroneous from more than one point of view.

In the first instance no one should attempt to study the violoncello unless he has a decided predilection for that instrument. The difficulties of its technic are so great that unless strengthened by love and enthusiasm, the pupil's interest will soon slacken. Secondly, as there is no season that requires more tender nursing than infancy, so do also the early years of musical training require the most careful guidance of an experienced hand. Bad habits that have been contracted in early musical training are almost as difficult to eradicate in after life, as those that have grown up in a child by neglect of its early education. And it requires not only a man who understands his instrument well, but one who also possesses experience and patience in teaching; qualities much needed when imparting his knowledge to beginners. Great virtuosos are naturally not inclined to undergo this drudgery, and will sometimes pre-suppose knowledge or ability on the part of the pupil, which he does not possess. To derive the full benefit from the example of a *great* master the student should have reached the verge of mastery himself, so that he can observe with a critical eye, and imitate that which he sees.

Vaslin relates in the preface to his excellent work, "L'art du Violoncelle," that, taking Baudiot's style of violin playing for his model, he arrived by close observation and imitation at the results which he has laid down

in the above mentioned work, and latterly Mr. Boris Hambourg modelled his style of bowing after Ysaye.

The importance of possessing a sensitive ear has already been dwelt upon. [Some people possess the gift from nature of discerning the very finest gradations of pitch; while in others, though not present to the same degree, it is capable of development. In both cases the ear should be guided and trained by the study of singing, which should be commenced at a very early age]

If nature endows a child with a beautiful voice, it should, of course, be looked upon as one of its most priceless gifts, and should be treasured and nursed accordingly. But even if the voice is not of a character to call up visions of future greatness, it should be cultivated, to wake up the sounds that slumber in our soul, and to train the sensitiveness and quickness of our ear.

The printed sign of a note should, through the medium of the eye, effect a mental reproduction of the sound which it represents, and thus enable us to produce that sound actually by means of the vocal organs.

The practice of singing will therefore have the effect that we learn exactly how a note should sound, as soon as we see its written or printed sign. In trying to play it on the violoncello, without stopping the string exactly in the right place, we shall find the sound emanating from the instrument to differ from the mental effect which that note produced, and by investigating the nature and extent of that difference, we shall discover the secret of pure and correct intonation. [It is therefore strongly to be recommended that pupils should sing their exercises before trying to play them] as long as their fingers are not sure of stopping the notes correctly on the strings of an instrument.

CHAPTER II.

The Instrument and its Accessories.

I.—CHOICE OF AN INSTRUMENT.

WHEN people imagine that any instrument will be good enough for the beginner, they commit the same error as when they consider any teacher good enough to impart elementary knowledge. Not even the greatest artist can draw a good tone from an absolutely bad instrument, and the tone produced by an unpractised hand will dishearten the beginner, particularly if after some months of struggle he finds it to be as unsympathetic as ever.

Happy, of course, is the pupil who can start his practice on a very fine old instrument, but in any case

care should be taken to select one of good and sound quality from which at least a fair tone can be produced.

It will stimulate the zest of the young student if he finds that the tone emanating from his instrument is agreeable to listen to, just as the reverse effect will result if he finds it persistently coarse and unrelenting.

Choosing a good instrument does not mean that one need pay a large sum for it. Good instruments are procurable at a moderate price, but someone who possesses technical knowledge should be consulted when purchasing. The lowest average price of a fair instrument for beginners is from about £5 to £10.

II.—THE BOW.

The same that has been said about the quality of the instrument applies also to the bow. The latter should be well balanced, elastic, and always well haired. If it possesses no spring, or is too heavy at one end or the other, it will impede the progress of the student. A bow which will satisfactorily answer the requirements of the beginner is obtainable for about £1 1s.

The next things to which attention should be given are:

III.—THE STRINGS.

The best strings are those made in Italy, and although their price is higher than that of strings made elsewhere, they will prove more satisfactory with regard to quality of tone and durability. The next best are German strings, which possess particularly the latter quality in a marked degree.

The string must be spun evenly from end to end, as otherwise it will not vibrate evenly and accurately, and thus give impure fifths.

To try this, press one finger straight across two adjoining strings, in any part of the fingerboard, and

they must, when sounded, give perfect fifths, provided the instrument was properly tuned in the first instance.

[If you will test a string as to its purity and evenness, hold it at both ends between thumb and forefinger of each hand; stretch it out, and set it vibrating with one of the fingers. If it shows only the two outer lines it will be found true. If, however, it shows a third line between these two, either throughout the whole length, or any part of it, the string is false.]

Keep your strings always clean. A piece of flannel with a little vaseline or sweet oil will remove the dirt quite easily from the gut strings, while spirits of wine, methylated spirits, or eau de Cologne (which is more pleasant to use, as the former has an objectionable smell) will best clean the spun strings.

Care must be taken that the oil or vaseline does not touch the part between the fingerboard and the bridge, where the bow touches the string, as it would prevent the latter from biting. This part of the strings should from time to time be cleaned with spirits of wine, methylated spirits or eau de Cologne. One must however, be careful not to let a drop of spirits fall on the table, as it would affect the varnish. The body of the instrument should be kept clean from dust and rosin by means of an old silk handkerchief or piece of flannel.

The following are the principal dimensions of the violoncello taken from a celebrated Strad:

Height of instrument from	A to C	..	..	..	48 inches
" body	B to C	..	..	..	29 $\frac{1}{2}$ "
Width of upper table	M to N	..	..	..	13 $\frac{3}{4}$ "
" middle	D to F	..	..	..	9 "
" lower	O to P	..	..	..	17 $\frac{1}{4}$ "
" bouts	G to H	..	..	..	6 $\frac{1}{2}$ "
" rib	D to E	..	..	..	5 "
Length of upper table to foot of bridge	B to L	..	..	..	15 $\frac{1}{2}$ "
Length of fingerboard (excluding nut)	I to K	..	..	..	23 "
Length of F holes	I to 2	..	..	..	5 "

IV.—THE PARTS OF
THE VIOLONCELLO.

<i>a</i> ..	..	scroll
<i>b</i> ..	..	pegs
<i>c</i> ..	..	pegbox
<i>d</i> ..	..	neck
<i>e</i> ..	..	fingerboard
<i>f</i> ..	..	nut
<i>g</i> ..	..	ribs
<i>h</i> ..	..	soundhole
<i>i</i> ..	..	table
<i>k</i> ..	..	bridge
<i>l</i> ..	..	tail piece
<i>m</i> ..	..	tail pin
<i>n</i> ..	..	peg
<i>o</i> ..	..	corners

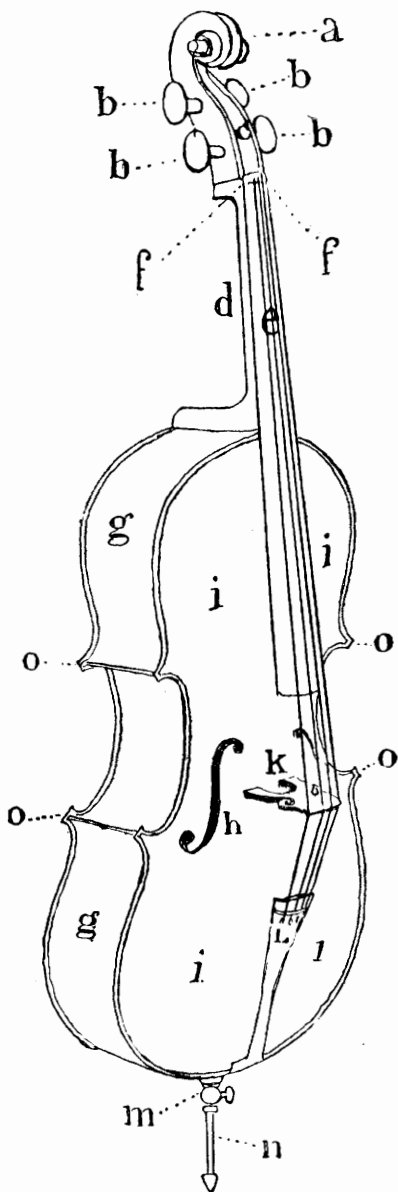


FIG. 1

V.—DIMENSIONS
OF THE VIOLONCELLO.

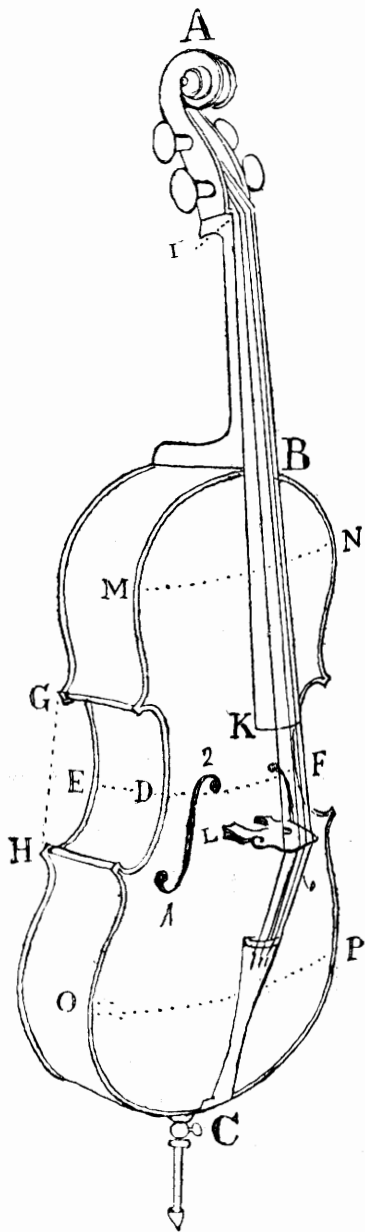


FIG. 2.

THE DIFFERENT PARTS OF THE BOW.

FIG. 3.

<i>a</i>	..	..	..	..	the stick
<i>b</i>	..	..	..	..	the point
<i>c</i>	..	..	..	..	the nut
<i>d</i>	..	..	..	..	the screw
<i>e</i>	..	..	..	..	the hair
<i>f</i>	..	..	..	..	the lapping

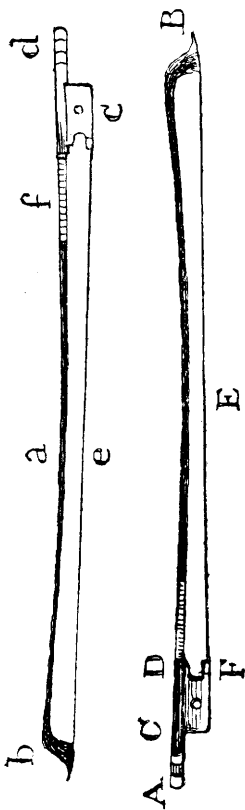


FIG. 3.

FIG. 4.

The stick should be perfectly straight, elastic, and possess a good deal of spring. It must also be well balanced throughout or it will impede the bowing, especially the skipping from lower to higher strings, or vice versa. The pupil should always ask the advice of a connoisseur when purchasing.

The lapping (*f*) of the bow is made of silver wire, leather or cane. The latter two are preferable as they neither tarnish nor unravel.

DIMENSIONS OF THE BOW.

FIG. 4.

Length of bow A—B	..	..	28 $\frac{1}{4}$ in.
" hair E	..	..	24 $\frac{1}{4}$ "
" nut C—D	..	..	2 "
Width of nut D—F	..	..	$\frac{7}{8}$ "
Weight of bow	..	..	2 $\frac{3}{4}$ ozs.]

These are measures and weight taken from a bow by Mr. Jas. Tubbs, of Wardour Street, London, whose bows are justly considered as some of the best in existence.

The lapping of the bow is usually of silver wire, but leather is preferable as it wears better. With regard to bridges some innovations have been made in constructing three and four-footed bridges which are supposed to give more

tone to the middle strings than the ordinary two-footed bridge. Dr. Alfred Stelzner, one of the greatest authorities on acoustics in stringed instruments, has proved this to be an absolute fallacy. He has also succeeded in making some alterations in the model of stringed instruments which have proved of great advantage both as to power and quality of tone.

CHAPTER III.

The Holding of the Violoncello.

SELECT a chair according to your height, so that when you sit, your feet placed firmly on the floor, your legs are in a natural and comfortable position (Fig. 5).

Sit on the edge of the chair, perfectly straight, though unconstrained.

Pull out the tail pin, which runs through the button, so far, that when you place the instrument between your knees in a slanting position, the lower edge of the left indenture touches the inner part of the left knee joint, while the calf of the right leg touches the lower rim of the table. The knees or legs should touch the violoncello as little as possible, as they interfere with the free vibration of the wood and thus deaden the tone, and reduce the power of the instrument. Put the left foot a little forward, while the right foot is placed back, and the right knee bent inward and lowered so far as to allow the bow to pass over it without touching the leg.

The upper rim of the back, on the right side from the neck, must rest against the middle of the chest, the instrument slanting forward, and also a little sideways from left to right, so that the pegs of the C and G strings stand about two or two-and-a-half inches distant from the left ear. The fingerboard is thus turned inward so that the A and D strings appear side by side throughout their whole length.



FIG. 5.

The use of the tail pin is now generally adopted, and offers the double advantage of steadying the instrument and strengthening its tone by an additional amount of resonance, resulting from the communication established by it between the body of the violoncello and the floor.

If the tail pin be of steel, as is now generally the case, it will prove even a stronger medium than a tail pin made of wood, metal being a better conductor of the vibrations of sound.

A wire fixed to the soundboard of a piano will communicate sound quite distinctly from one room to another; in the telephone it fulfils a similar function.

Formerly the violoncello was held in the following manner. The legs were extended with the feet turned outwards, and the instrument held so that the lower edge of the table pressed against the right calf, and the lower edge of the back against the left calf. This manner, which is still practised in isolated cases, has the disadvantage of giving the instrument a rather upright position, rendering it somewhat stiff, and necessitating the covering, by the legs, of a greater part of the ribs, which prevents the free emission of sound.

Ladies hold the violoncello in different ways. Some place the instrument in the ordinary way between the knees. This has now been almost universally adopted, because it brings the instrument under more complete control. The other methods, which were considered more graceful, have become almost obsolete on account of the obvious disadvantages.

The first and better of these ways of holding the instrument is to turn both legs to the left, bending the right knee and placing it under the left one. The left edge of the back should rest against the left knee, and the instrument against the chest, in a slanting position.

The second is, to rest the right knee on a cushion or stool concealed by the back of the instrument, the latter leaning against the left knee.

Some ladies cross the right leg over the left, and rest the instrument against the right leg. This is, however, not to be recommended, as it necessitates a forced and unnatural position of the whole body in handling the instrument.

THE HOLDING OF THE BOW.



FIG. 6.

Turn your right thumb inward, holding it out straight, and place it against the bow-stick just in front of the nut, at the root of the nail (Fig. 6a), so that the point of the thumb touches the end of the nut itself, at the lower edge of the stick (Fig. 7, 1).

Then place the second and third fingers opposite, the second finger touching the hair of the bow next to the nut with its first joint, while the same joint of the third finger rests against the silver mount, which holds the hair.

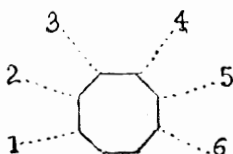


FIG. 7.

Section of Bow across the stick close to the nut.

The thumb with the second and the third fingers must hold the bow so that when the arm is stretched out, and the hand hangs loosely downward from the wrist, the hair should be in a horizontal position. [The top of the stick (Fig. 7, 3-4) must just touch the middle joint, so that when you raise your hand to a level with your arm, you can do so without turning the bow stick, by bending the fingers over it in their middle joint.]

Now bring the wrist slightly forward from right to left, so that the relative position of hand and bow are about

thus: “ $\frac{\text{nut}}{\text{hand}} / \frac{\text{bow}}{\text{hand}}$ ” and place your first finger on the

bow-stick, at a little distance from the second finger, bending it forward so that it holds the bow stick at 6 (Fig. 7) in the first joint; then place the fourth finger at a little distance from the third, so that it touches the nut near the end. The bow stick is thus held between the thumb and the two middle fingers like the beam of a balance, while the first and fourth fingers act like weights in the respective scales.

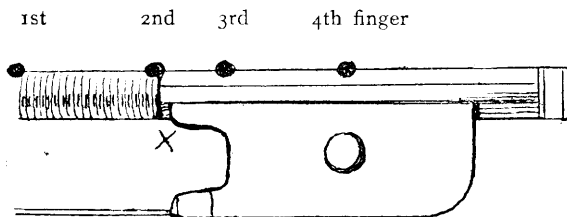


FIG. 8.

Showing exactly where the fingers and thumb should hold the bow.

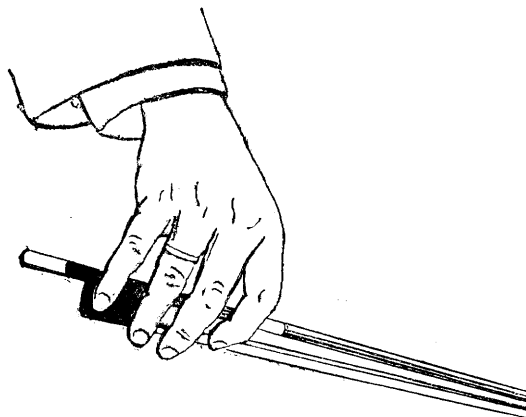


FIG. 9.

Figures 9 and 10, showing the position of the fingers and thumb on the bow stick.

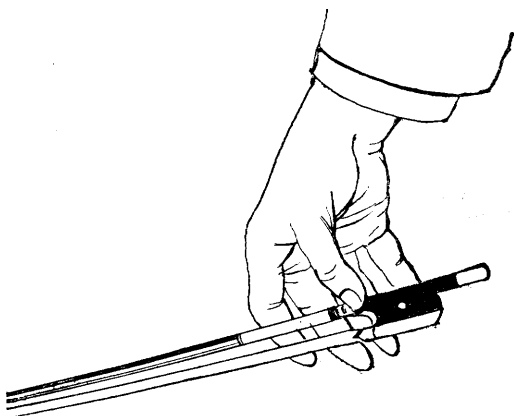


FIG. 10

The first finger presses the bow on to the strings, and receives additional power by turning the hand from right to left from the elbow joint, while the opposite movement, accompanied by a pressure of the fourth finger, will lift the bow up from the string.

These two movements, modified and supplemented by a change of distance between the bow and the bridge, will give all gradations of tone from *fortissimo* to *piuissimo*.

Care must be taken not to bend the thumb when giving greater pressure on the bow. The thumb must always be perfectly straight, as otherwise it will lose its power to hold the bow firmly against the two middle fingers.

There are two faults in the position of the right thumb against which the beginner should particularly guard. One is, to place the thumb *flat* against the bow-stick instead of sideways, as above described, and the other to let it slip under the stick when bowing. The first prevents a free action of the wrist and the second prevents the hand from exercising proper control over the bow.

It is not my intention to explain here all obsolete or faulty ways of holding the bow. The discussion of the former belong rather to the history of the instrument, while the latter are legion, they must be corrected in each particular instance by a competent master.

Suffice it to add, that the rules for holding the bow as given above have been proved to be the best: also that any other are faulty and will bring their own punishment in their train. It is advisable to study in front of a dressing or cheval glass.

This is to be recommended for two reasons. Firstly, to watch the movements of the hands and arms, and secondly, to watch the attitude of the whole body very carefully; it is of great importance how the player impresses his audience by his personal appearance. A player whose attitude or mode of playing is awkward, or who even goes so far as to make grimaces or give visible signs of exertion, will always prejudice the audience against himself. There are a great many excellent players who do not take the rank they deserve merely on that account.

All affectation has to be avoided just as carefully. Affected movements are apt to interfere with those that are necessary, and to render the player an object of ridicule.

THE TUNING OF THE VIOLONCELLO.

In tuning the violoncello one begins with the first, or A string. In the orchestra, the pitch for this note is given by clarinets or oboes. When tuning from the pianoforte it is customary to tune from the D minor chord of the middle octave. The reason for this has to my knowledge never been properly explained, but it has an acoustic basis.

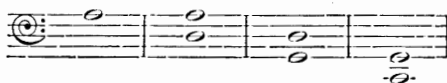
The piano is tuned according to the tempered scale, which involves the equalisation of the semitones, and its intervals, on that account, differ slightly from the acoustic intervals. If therefore the A string of the violoncello is tuned only after the middle A of the piano-

forte, it will sound again slightly out of tune when sounded against the D minor chord, as its aliquot tones will not harmonise with the tempered notes of the piano chord.

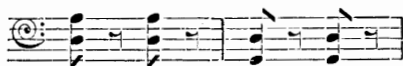
The A string will then have to be tempered to this chord, and thus we obtain a better harmonic result. I find it still better to use the A major chord alternately with the one of D minor, as it gives two principal harmonics (aliquot tones) of the A string, viz., E and C sharp, which, on account of their being slightly out of tune on the pianoforte, will require a still further modification in the tuning of the violoncello string.

Then you proceed to tune the fifths between the strings of your instrument (viz., A—D; D—G; G—C), without the assistance of the pianoforte, as the fifths of the latter are not absolutely true on account of the temperament.

[In thus tuning your fifth watch for the appearance of the harmonics or aliquot tones (octave, thirteenth, etc.), which give it a peculiarly rich and full sound producing an almost chordal effect. These harmonics will only appear when the fifths are absolutely *perfect*! and therefore prove that the instrument is in tune, while their absence proves the contrary. Long bows and a fair amount of pressure should be employed in tuning, so that the notes will sound like this :



Short bows like this :



are apt to deceive the ear.

After these preliminary remarks we shall now enter upon the investigation of our subject proper.

PART I.

THE ART OF BOWING.

Introductory Remarks.

AS this work is not destined to serve as a "Tutor" for the violoncello, but merely as a work of reference, a handbook for teachers and students of the instrument, it will be better to separate the technic of the left hand from that of the bow, or right hand and arm. As we must first learn how to produce a note on the violoncello before we can learn to play a scale, I will treat of the art of bowing before entering on the technic of the left hand.

Unfortunately the former receives but scant consideration from the majority of existing Violoncello Tutors, and even from the greater number of teachers. Yet the noblest and principal functions devolve upon the bow, viz., beauty and power of tone and expression.

Many teachers content themselves with rudimentary hints as to bowing, leaving the rest to the sagacity (?) and observation of the pupil, and merely telling him that he will learn certain details in course of time, by imitating good players; but that it is impossible to exactly *explain* how it is done. That is, however, quite erroneous; no movement, however small it may appear, should escape thorough investigation, or pass without explanation on the part of the teacher.

The advanced student will learn and benefit by close observation; the beginner will utterly fail if he attempts to learn in that way. He lacks sufficient knowledge to discern between right and wrong, and will not even detect that which is essential. The difficulties which the art of bowing offers are greater than those which the student will encounter in the study of the technic of the left hand.

All physiologists are aware of the sympathy which exists between the movements of the various muscles of the arms, hands and fingers, and which always induces the one to follow the movements of the other. To overcome this natural tendency is far more difficult than would at first appear. It is already proved in the childish game of describing a circle with one hand, while the other moves up and down in a straight line. This apparently simple problem presents to many people an almost insurmountable difficulty.

Only by long and arduous study can we obtain that independence of all the muscles and limbs which ensures ease and elegance, or places that reciprocal influence of movements under such perfect control that it can even be made to serve in producing a crisper accentuation and finer shading of the notes. Yet everything in the way of technic can be acquired by dint of practice.

It is quite a mistake to imagine that certain kinds of bowing can only be effected by those who are endowed by nature with special aptitude. The staccato, arpeggio, spring-bow, etc., as well as beauty of tone, can all be acquired by study.

Baillot says, "True talent is to know how to study."

Beginners often make the mistake of confounding speed and technic. The quantity of notes played per minute does not constitute perfection of technic, unless the quality has received equal consideration.

Do not imagine either that speed depends upon talent; it is simply the outcome of repetition—observant repetition of notes. I may remind the pupil that playing is not always *studying*.

In trying to find the right attitude of the body, the proper way of holding the instrument and the bow, remember that all positions of the player should be natural, unconstrained; the reverse involves stiffness and awkwardness of joint and limb.

Holding the violoncello and the bow as described above, let the right upper arm hang down loosely and straight from the shoulder, and the forearm stand forward, and almost at a right angle to the former. The right hand holding the bow should hang loosely from the wrist.

Before beginning to play, screw up your bow, but not too tightly, as otherwise it will lose its elasticity, and the tone, thus deprived of all suppleness, would become flat and colourless. The elasticity of the bow must be analogous to, and in accordance with, that of the string, as on the reciprocal action of these two bodies depend the solution of the whole secret of sonority and beauty of tone.

[The bow should not merely *rest* on the string and be guided by the right hand; but the hand should carry it with a tendency to raise the nut in the progress of the down stroke.] The bow must be well suspended over the strings, to which it should offer an elastic surface so that while the fingers clasp it tightly it may produce all gradations of pressure, from the slightest to the strongest, and that it may be arrested at any moment without relaxing the degree of pressure used for the stroke.

CHAPTER IV.

The Elementary Principles of the Stroke.

HOLD your instrument and bow as previously described and shown in Fig. 5.

Place the bow on the G string, close to the nut, the hair resting *flat* on the string. In order to do this the upper arm, which in its elementary position has to hang down straight from the shoulder by the side of the body, must be brought a little forward, so that the back of the elbow joint stands about three to four inches in front of the lower rib, just at the right side.

The bow should touch the string about an inch and a half above the bridge and stand quite parallel to it. The wrist at this point projects a little as shown in Fig. 5, but the beginner should guard against forcing it out too much. See that it just describes a curve from the forearm down to the tip of the fingers.

This being the most perfect and pleasing line from an

artistic point of view, is also the most natural and unconstrained. In fact all thoroughly natural attitudes are always the most pleasing to the eye, and those best adapted to ensure elasticity and agility in movements of all kinds.

Place the hair firmly on the string by a pressure of the first finger as described above, but not so much that the bow stick touches the string, then pull the bow slowly across from nut to point. In doing this, see that the bow travels in its own direction, parallel to the bridge, and without changing its position or distance from it.

The movement of the bow from nut to point is called *down bow*, that from point to nut, *up bow*.

Do not trouble at first about the quality of your tone. The novice, fearing a miss-tone, will by his nervous hesitancy produce the very evil he is trying to avoid. The best remedy is to continue in your practice, strictly observing the given rules, without being too nervous about a casual failure of the note produced, which, with a firm grip of the bow, and a proper position and movement of the wrist and arm, will soon be found to improve.

There are three moments in each stroke of the bow which determine its proper direction as well as that of the right hand and arm; these are: the nut, the middle, and the point. At the beginning of the down stroke the bow rests on the hair right at the nut; the upper arm hangs down by the side of the body, the forearm and right hand standing as shown in Fig. 5. In pulling the bow, the upper arm moving away very slightly from the body, just enough to enable the forearm to proceed, we find, at the middle of the bow, a point at which we cannot go any further without some change in the position of the arm. The position of arm and bow at this point is shown in Fig. 11.

If the forearm proceeds any further in exactly the same direction as before, we must either push out the elbow, or raise the shoulder, or do both simultaneously; and all these movements are awkward, and impede an easy and free up and down movement of the bow. It will therefore be necessary to find another movement, which will

enable us to avoid this, and we shall find it in a *slight* twist of the forearm in the elbow joint from left to right which will bring the elbow slightly inward. This will allow the forearm to proceed to the end of the stroke without altering the relative position of bow arm and bow. It is the opposite movement, viz., a turn of the forearm from right to left which, applied stronger, with a firm wrist, and an additional pressure from the first finger, will augment the tone.



FIG. II.

While the bow proceeds from nut to point, or vice versa, the wrist must be constantly and gradually altering its relative position to the forearm.

At the commencement of the down bow the wrist stands slightly outward as shown in Fig. 5. When the bow proceeds towards the point, the hand is gradually raised a little, while the wrist sinks in equal proportion and the fingers are bent round the bow stick in their second joints, in order to allow the hair to retain its exact position on the string. Towards the middle of the bow the right hand still describes a *slight* curve, though approaching the level with the forearm which must be ultimately reached when the bow stands right at the point as in Fig. 12.



FIG. 12.

The level line with the forearm must never be exceeded under any circumstances whatever, as it will necessitate breaks in the progress of the bow which will become particularly noticeable and troublesome in the up bow.

If you notice that your wrist is going in a wrong direction during the stroke, for instance, falling below the level line, do not trouble to mend its position, but recommence the stroke at once.

As the bow proceeds from nut to point it would be impossible to keep the upper arm close to the body, but while it is necessary to move it a little outward, this movement should be minimised and the elbow always kept down. Figures 5, 11 and 12 show the position of bow and arm in the three principal stages.

Although an enemy to all mechanical remedies, I have found it a great help to beginners if they tie a string or a strap round the right arm and body, passing it under the left arm and over the right one just in the elbow joint, and tightening it so that it only allows the arm to move away sufficiently to pull the bow to its point. As soon as the pupil is perfectly conscious of the movements which the wrist and arm have to perform, this remedy can be dispensed with. There must be no tension in any of the muscles of the arm. As long as they are perfectly loose and unconstrained, and the upper arm hanging quite free from the shoulder it will do all that is required by itself. The less the pupil troubles about it the better, only keep it under observation.

With the wrist well suspended the bow can cross from one string to another with only the slightest raising of the hand, combined with a slight turn of the forearm. To find out the minimum of motion that will suffice to effect this, is tantamount to an increase of ease and speed, while the strength and firmness of the wrist means strength and equality of tone. "Too much" is the usual fault in all the movements of the beginner.


The thumb must always press the bow-stick firmly against the two middle fingers, and the first and fourth finger should never leave the bow-stick. The so-called

“graceful movements”—especially the lifting up of the fourth finger—and “ornamental bowing” are detrimental to a sound, firm stroke.

SIGNS AND ABBREVIATIONS USED WITH REFERENCE TO BOWING.

□ or \wedge Down bow. □ or \vee Up bow. P. or Sp.

(German abbreviation) At the Point. M. In the middle of the bow (Same in German). H. (Heel). N. (Nut), or F. (German abbreviation) At the nut. F. B. or G. B. (German abbreviation) Full bow. H. B. Half bow (same in German). The terms “down bow” and “up bow” are taken from the violin, on which the bow actually does move downward from the nut to the point and upward from the point to the nut.

All signs referring to musical expression do not come within the compass of this work, but will be found in any book treating on the elements of music; but the following two find a place here as influencing the use of the bow: “.” or “- - - - -” means that the notes should be detached by using a separate bow for each of them.  “the slur” indicates that all notes thus tied together should be played in one bow.

THE FIRST BOWING EXERCISES.

It is best to begin the first bowing exercises on the D and the G strings, which, as middle strings, do not require the extreme movements of the wrist and arm.

All bowing exercises must be practised in a certain well-defined tempo which must be strictly adhered to. It may be slow or quick and either triple or common time may be used. At the beginning it is best to choose common time, counting four beats to a bar in slow time as follows:—



In drawing your bow down slowly from nut to point see that you use just one quarter of its length to each crotchet. To follow this exactly you can subdivide the bow stick between the nut and point into four equal parts by sticking on it little pieces of paper, paying attention that the exact length of one subdivision be used to each beat of the bar.

The bow divides itself into a lighter and a heavier half. This may be explained by a diminution of pressure in proportion to the distance from that lever which is formed by the middle fingers and thumb of the right hand in holding the bow; and it has to be rectified by a gradual increase of pressure, produced by forcing down the forefinger on to the bow stick by a twist of the forearm from right to left. The up bow naturally requires the reverse of this procedure, viz., a gradual decrease of pressure, as the stroke approaches the nut.

At the end of each bar the bow should stop on the string, without increase or decrease of pressure, for the space of one bar. This will allow sufficient time to examine the holding of the bow and arm, as well as the general attitude of the player, and to rectify any mistakes; after this you proceed to the next bar, always adhering strictly to time and rhythm.

When changing the bow from down to up bow, the new bow should be attacked exactly in the same manner as the former was quitted, *i.e.*, with exactly the same amount of pressure, and without the slightest change in the position of the wrist. In this way the change of bow can be so equalised that it becomes quite unnoticeable. Many players try to equalise the change of bow by swinging the hand backwards from the wrist at the end of each stroke. This system, however, is only apt to produce a jerk which will always remain distinctly perceptible. The best way is to proceed as above described, and to minimise the duration of the changing point so that the bow proceeds without a break in the opposite direction, as soon as it comes to the end of a stroke, be this at the end, the middle or any other part of the bow.

The exercise on page 33 must be practised on all four strings, and for this purpose it will be necessary at this point to explain

HOW TO CHANGE FROM STRING TO STRING.

For this purpose it will be best to commence with the G string, by placing the bow flat against the string, near the nut. The wrist in this position is well rounded, while the upper arm is brought slightly forward so that the back of the elbow joint stands about three to four inches in front of the lower rib just at the right side.

The bow should touch the string about an inch and a half above the bridge, standing quite parallel to it. (See Fig. 11, showing the bow in this position). Turning the hand and forearm from the elbow joint a little from right to left, without drawing the bow, its hair will next touch the D string as well as the G string, and turning the hand still a little more it will quit the latter, and rest on the D string alone.

The point of the bow will then be turned slightly downward, while the bow stick inclines slightly towards the fingerboard, whereby the hair, which was resting flat against the G string, is placed a little edgeways.

Care must be taken that the bow does not change its distance from the bridge, nor that the bow stick inclines so much sideways (towards the fingerboard) as to touch the string.

Turning the hand still more from right to left in the same manner as before, the bow will leave the D string for the A string, and here we shall find the point lowered a little more than on the former string, while the hair touches the string still more edgeways.

Turning the hand from left to right we return first to the D, then to the G, and finally to the C string, on which the bow retains its parallel position to the bridge while the hair rests quite flat against the string.

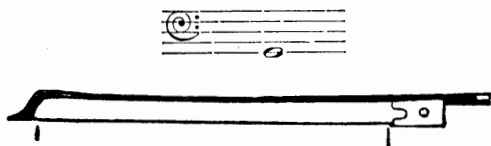
The latter string presents perhaps the greatest difficulties

with regard to bowing, as it is necessary to push the elbow well back close to the side of the body in order to make room for the forearm, which must always move horizontally, care being taken that the bow moves parallel with the bridge. The wrist movement required for this purpose is greater than on the other strings, but it must be remembered that the wrist must *never* sink below the level with the forearm; nor should the movements of the wrist be sudden or self-intentional. Their only purpose is, to allow the bow to travel in the right direction and to the proper distance; and in order to fulfil their purpose they must *follow* those primary motions, being just sufficient to allow their proper execution, which will be impeded by excess. The elbow is slightly brought forward and travels a little outward sideways as we approach the A string, where it reaches its greatest distance from the side when drawn to the point. It is necessary to guard against anything which will bring out the elbow too much, and thereby raise the shoulder. It should never remind one of the position of a tailor sewing up a coat.

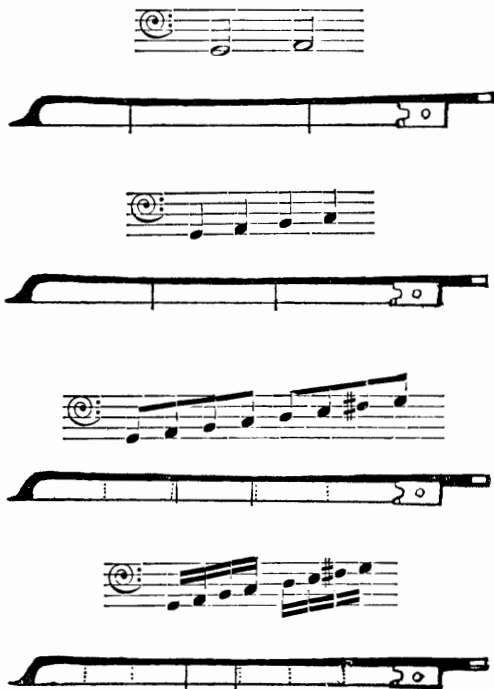
DIVISION OF THE BOW.

As I have already explained, a proper division of the bow is of the greatest importance in order to obtain a round and powerful tone. The greatest obstacle to this is a natural tendency, when slurring several notes, to use too much bow on the first note or notes, so that there is not enough left for the last. The effect is the same as with a singer who cuts the last notes of a phrase short, because he cannot manage his breath.

This tendency of letting the bow travel too quickly at the beginning of a stroke can only be overcome by a strict control of the movements of the right arm and hand, and is best counteracted by an excess in the opposite direction. As the quantity as well as the quality of the tone are to a great extent dependant on the elasticity of the bow, it is but natural that its extreme ends, which are entirely void of that quality, cannot pro-



The two lines mark the points of start and finish respectively. The pressure, which must be applied *before* starting, must be the same throughout the stroke, and must not be reduced at the finish, so that the new stroke may be resumed with exactly the same amount of pressure.



The quavers and semiquavers can be played in the middle as well as in different parts of the bow. The latter are indicated by dotted lines. This may also apply to the crotchets if they are played in quick time.

The use of the *upper* part of the bow—middle to point—should receive the *greatest* attention, as all figures played at the point will sound lighter and more brilliant than those played in the lower part or even in the middle, which parts have been used with preponderance up to the present. To follow Vaslin's example and take a good violinist as model, will produce good results here also.

In order to obtain a perfect control over the bow in all its parts, it is advisable to practise scales or simple exercises in all the different ways above indicated.

THE LONG DETACHED BOW.

(*Fr. Le Détaché.*)

This kind of bowing forms the basis and foundation of all detached bows, and should receive the greatest attention on the part of the student. The short detached bow or *martelé*, the staccato and others, are more or less modifications of the above, and will never be fully grasped without an absolute mastery of the former.

There are three points which determine its perfection :

- (a) The pressure of the right forefinger.
- (b) The start.
- (c) The direction.

The pressure must be applied *before* the bow is started. The start must be clean and without hesitation, and the direction of the bow must never be altered during the stroke.

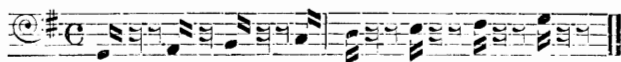
Some artists recommend a relaxation of the pressure after a note has been started, and some recommend that the bow should travel in a slight curve.

They may, by an immense study, and a peculiarity of their individual way of moving, have smoothed over some of the defects inherent to these faults, but that does not prove that they would not play much better if they

followed those rules which are based upon physical laws, and cannot be infringed without punishment.

Another fault which cannot be too carefully guarded against, is the bending in of the wrist at the start, which prevents the hand (and with it the bow) from recovering its proper position during the stroke. The clearness and freedom of tone in *piano* passages is even more difficult than in the *forte*, but the study of the latter will give the necessary strength and flexibility to the joints of the right hand and arm, which will ensure a successful study of the former.

The first of the subjoined lines shows the detached bow as it is written, and the second one, the manner in which it is executed.



The bow must travel with the greatest possible speed from nut to point and from point to nut, stopping abruptly at either end without relaxation of pressure. As will be seen from the above example, this stroke must not occupy more than about one quarter of the value of each note, while the bow rests at the point or nut respectively for the space of the remaining three quarters, retaining the same pressure as at the start, and with that the new stroke must again be started. The bow must be used to its *full length*, not the least space being left at either end. It is advisable to practise this kind of bowing first on the two middle strings, as in their case the presence of another string necessitates straight bowing, otherwise one of the neighbouring strings would be touched. When practising this bow on the C string it is advisable to imagine the presence of a lower fifth string; this will ensure a proper

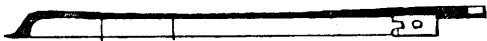
direction of the bow on the fourth string, and also prevent the nut from touching and damaging the rim of the instrument.

THE SHORT DETACHED BOW.

(*Le Petit Détaché.*)

While on the long detached bow the latter is used to its full length, we have also a short detached bow which requires the use of only a part of the bow's length.

In order to determine the length of bow necessary, we have naturally to consider the duration of each single note; and while a crotchet in quick time (*allegro*) requires about one quarter of the length of the bow, the space for a semiquaver at the same time should be minimised as much as possible. The character of the *détaché*, viz., the sharp clear ending and crisp attack obtained in the manner above described, must be retained also in the shortest notes.




This *détaché* requires the upper part of the bow (about the middle of the upper half) when a passage of short notes is concerned, but it must be practised in all parts of the bow, as they may be required in combined long and short notes, etc.

In the above description of the "detached bow" the student has been warned against starting a note before the bow rests on the string and has received the necessary pressure, and it is advisable that he should strictly adhere to this until he has fully mastered that mode of attack as the fundamental, and most frequently used.

There is, however, a second mode of attack, which is very effective when used judiciously.

It is produced by holding the bow well suspended at about an inch and a half from the string, which is touched briskly by a stroke from the forearm. The hair must stand flat against the string, and touch it about the middle of the bow, or near the nut. This stroke, if properly executed, produces a tone of great roundness, as

it gives the string free scope to vibrate by itself; but as these vibrations soon cease the tone is of but a very short duration. It is particularly useful in passages of short detached notes on the C string, and even on the G string, when it should be played close to the nut.

The *sforzato* or *sforzando* is executed in the following manner: The bow is pressed down on the string as in the case of the detached bow, but as soon as the note has been attacked the pressure is relaxed without lifting the bow from the string, which former travels on, but without pressure for the rest of the duration of that note. The *sforzato* is written: "*sfz*," "*fz*," or by the sign  over or under the note for which it is intended.

All the different kinds of bowing may be subdivided into two classes: (1) those with the bow *resting* on the string, and (2) those with the bow suspended over the string.

Under the first kind should be counted: (1) the detached bow; (2) the tenuto or detached bow with smooth finish; (3) the martellato or hammered bow; (4) the staccato. Under the second kind should come: (1) the détaché with a suspended bow sometimes called *chopping* stroke; (2) the spiccato or spring bow (French *sautillé*); the gettato or thrown stroke.

The arpeggio can be executed in either way.

THE TENUTO OR DETACHED BOW, WITH SMOOTH FINISH

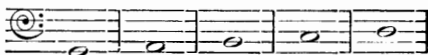
The chief difference between this and the *detached* bow is, that while in the case of the latter the bow is rushed down on one part of the note, and then stopped abruptly resting on the string for the remaining part of the note, the *tenuto* requires that the bow should travel deliberately throughout its length, or part of it, so that the stroke finishes exactly with the duration of the note or notes (the latter in case of a slur). The rules for the division of the bow as given in the above table are also applicable in this case.

There must be no break between two strokes, as in the case of the detached bow, so that the change becomes almost imperceptible. This is attained by

starting the new stroke as soon as the former is finished.

The student should never try to smooth over the change of bow by a jerk from the wrist; although this way is practised by some players, the result is not satisfactory as the bow is for that moment not under perfect control. A clean start in the way above indicated is always the best, and careful and diligent practice will eventually teach the pupil to overcome the difficulty of making the change of bow unnoticeable.

The *tenuto* must be practised in the following ways :

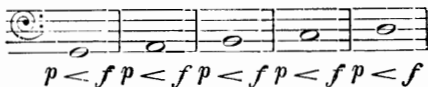


To be played at slow time, first *forte*, then *mezzoforte* and finally *piano*, without crescendo or decrescendo. Scales are the most suitable for this and the following exercises :

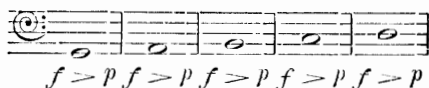


Start very *piano* and make a *gradual* crescendo leading up to *forte* at the very end of the bar. Start the new bar again with a *forte* exactly at the point of the bow where the first bar left off, and without a break. Make a decrescendo to the end of the bar, when a soft *piano* should be reached—and not before then.

Start the third bar again *piano*. This exercise must be practised commencing with a down bow as well as with an up bow.

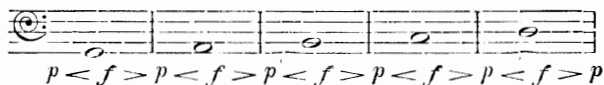


Start *piano* reaching *forte* at the end of the bar, and starting the second bar again with a sudden *piano*, returning to *forte* at the end of it. To be continued, in the same way, and to be practised first commencing with an up bow and then with a down bow.



Start *forte* making a gradual diminuendo to the end of a bar, when *piano* should be reached, and start the second bar again with a sudden *forte*. To be practised commencing with an up and down bow alternately.

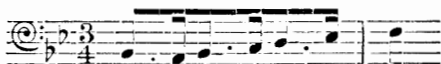
Start each bar *piano* making crescendo to a *forte* in the middle of the bar, and then diminuendo to *piano* at the end of the bar. The next bar commences again *piano*.



THE PRICKED BOW.

(Fr. *Piqué*.)

This is a variety of the detached bow. It can be played commencing with a down bow as well as with an up bow. It is written in this way:



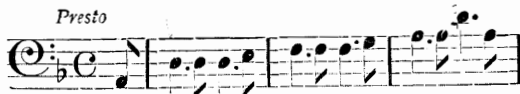
and executed thus:



The bow being stopped abruptly, after giving the first note only two thirds of its value (two semiquavers), must rest on the string during the remaining third (one semiquaver). For the second note the same amount of bow must be used for the first, in order to start the third note (second longer note) at exactly the same spot as the first, that is, either at the nut or at the point. The bow must therefore travel very rapidly on the second note, which receives only one third of the value of the first.

In very quick time it is advisable always to play passages of this kind with an up bow on the long note, which ensures greater crispness and precision.

Extensive use is made of the pricked bow in the Finale of Schubert's D minor string quartet :



taken in a down bow and the higher one in an up bow. The reason for this will be found in the different position of the instruments, for on the violin the first or E string is nearest the bow hand, while on the violoncello it is the fourth or C string, so that in reality both instruments proceed in the same manner, taking the string nearest to the bow-hand in an up bow and the farther string in a down bow. The same system is also followed in those passages which the French call

BATTERIES.

To these belong the latter example, while a very familiar figure is also the following :



This should also—as a rule—be started with an up bow, at all events in longer passages of that kind. As, however, in orchestral as well as chamber music, a few figures of this kind sometimes appear in a way which would make a sudden change of bow awkward and undesirable, it is as well to practise it also by commencing with a down bow. One can never make the movements of the bow too independent; it remains therefore advisable to practise every kind of bowing in the up bow as well as in the down bow, even though one may afterwards give preference to one or the other.

Other kinds of batteries commencing with an up bow are the following :



In the first example the two dotted notes have to be played in one bow by suddenly stopping the bow as in the case of a detached note and then attacking the second note in the same manner. The execution might be illustrated thus:



The second example does not call for special comment; it may, however, be remarked that equality in the slur, when skipping back to the first note, will present some difficulty to the beginner.

The following is a specimen of batteries commencing with the higher note and therefore with a *down bow*.

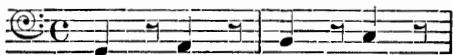


THE STACCATO.

No kind of bowing has caused more controversy among the greatest violoncellists than the staccato. Many have declared it to be entirely a question of talent which might be developed and perfected, but that it could never be fully acquired by dint of study.

There are some players to whom the staccato comes quite naturally, and they will have far less trouble in perfecting it than those who are not so liberally endowed by nature. Yet I am inclined to take the view expressed by Vaslin, and also by my late lamented master,

Hegyesi, that staccato is no more an absolute question of talent than any other kind of bowing. It is nothing more than a succession of hammered (*martelé*) notes played in one bow, and its successful execution depends entirely on systematic and diligent study. Some recommend practising it slowly at first and with a few notes only, thus :



beginning alternately with an up bow and a down bow. Others advise practising it in quick time from the very beginning, as it is a nervous movement which can hardly be performed in slow time. Although this latter view has much in its favour, I would advise a compromise between the two. [The impulse to the bow should come from the forearm by tightening its muscles, and then pushing or pulling the bow from end to end by short nervous jerks. It should be practised at a moderately quick pace on a few notes only, in the upper part of the bow.



Press the bow firmly down with the hair almost flat against the string, and do not mind the grating, which will disappear as soon as the hand acquires the necessary skill. Beginning this exercise sometimes with a down bow, and sometimes with an up bow, and changing at the second bar, will ensure facility in both kinds of staccato. For several reasons the D string is the best to commence with, as one has to avoid touching other strings, and on the other hand it allows of the most natural position of the right arm and hand.

The number of notes and the speed should be gradually increased.

The first note of a staccato passage should receive a little extra pressure and a slight fraction more of the bow than the rest of the notes, except the last, which must also be sounded very distinctly. The passages will thus receive a more vigorous start. It must not be inferred from this that clearness is of no importance for the other notes, only the end notes should receive a little more power. In practising it is advisable to begin with a down bow which must receive a certain elastic swing, and then start the staccato on an up bow, *pressing the point of the bow slightly downward*.

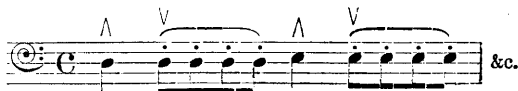


FIGURE FOR PRACTICE.

There are two distinct schools in staccato playing as in the hammered bow, viz., the German, and the Belgian and French Schools. The former declare that no staccato will be perfect which is not played entirely by a lateral movement from the wrist accompanied by a pressure from the index, the same way in which they execute the hammered bow, which is the foundation of the staccato.

Servais and de Swert executed the staccato from the forearm as I have explained it before, and so did Franchomme and Vaslin, and with them all other Belgian and French masters. Vaslin says in his "L'Art du Violoncelle": "One can acquire a vigorous, broad staccato, by practising it very slowly, giving the impulse to the bow by a short thrust from the wrist accompanied by a light pressure from the index, which is limited however to a succession of eight or ten notes at the utmost." For longer passages he adhered to the staccato from the forearm.

I have heard celebrated violoncellists execute the

staccato on any number of notes in either way, yet I am inclined to give the preference to the Belgian and French method, as easier to acquire and ensuring greater power and crispness.

It is amusing to quote Bernhard Romberg's remarks on the subject. He evidently never mastered the staccato, as in all his ten concertos there is not one specimen of this kind of bowing. In his Violoncello School, under the heading "staccato," he dwells first on the fact that it is much easier to play staccato on the violin than on the *'cello*, and that it is considered an indispensable acquirement of the votaries of the former. After that he continues: "On the violoncello, where the staccato cannot be produced by merely giving a gentle pressure, it must either be made with the arm held stiff, or the bow must be drawn up so tight as to rebound from the strings by its own tension, and even then the player can never be sure of success. Indeed, as the violoncellist is so seldom called upon to employ the staccato, it would be a great pity that he should spoil his bow hand by practising it to any extent; and I would rather advise him to abstain from it wholly and entirely. In quartets and other compositions (which are not to be considered as solos) passages are marked to be played staccato. The notes of such passages may be played with a short, detached bow."

Needless to say that Romberg was quite on the wrong track with regard to staccato, and that tightening the bow to such an extent that it rebounds by its own tension, is the best way never to acquire proficiency in this kind of bowing.

It appears, however, that the staccato was not the common property of the virtuosi of that time, for although we find that limited use was made of it in a concerto in F major, op. 20, by J. B. Breval (1756-1825), and one in D major, op. 8, by A. Bohrer (1783-1852), no trace of it is to be found in the works of J. Stiasny (1764-1830?) who, for technical ingenuity surpassed all his contemporaries. The late development of the higher

technic of the violoncello, of which Romberg was the first and foremost champion, may to a great extent account for this fact.

The execution of the staccato is far more difficult on the violoncello than on the violin. On the latter instrument the bow *rests* on the strings, while on the former it has to be carried and held against the string by the right hand.

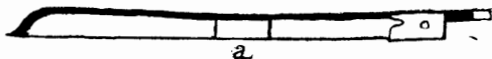
The staccato on a down bow presents greater difficulties to most people than that on an up bow, and again the former is more difficult from higher to lower strings than from lower to higher strings, while there is but little difference between the two as regards the difficulty of execution of the staccato in the up bow. Frequent change of strings, and especially of position, in staccato passages increases their difficulty very considerably. But all this may be victoriously overcome by patient and persevering study

[THE SPRING BOW.
(Fr. *Sautillé*. It. *Spiccato*.)

With the staccato we have finished the list of bowings with the hair of the bow resting on the strings throughout, the arpeggio may belong to this or the following species, as will be shown anon.

With the spring bow we come to the class of bowings in which the bow leaves the string after each note.

In order to obtain facility in this kind of bowing bring the upper arm a little more forward than usual, so that when the forearm stands well out from it, the right hand, hanging down quite loosely from the wrist, may hold the bow over the string on which one intends to start, near the middle in its lower half (see diagram *a*).



It is impossible to lay down hard and fast rules as to the exact spot of the bow which should be used for spring bow, since every single bow has a more or less different balance from every other. The player must find out for

himself which part of his bow is best adapted for this kind of bowing. It will be found that as a rule it is in that part which has been indicated above, viz., the lower part of the bow near the middle.

The stroke is executed *entirely* from the wrist, which should stand out a little more than usual, by swinging the hand to and fro with a rapid oblique motion which must be constant and absolutely regular. The bow must fall on the string in the middle of this movement, and immediately rebound to fall down again during the next stroke in the opposite direction.

Both upper arm and fore-arm must remain perfectly rigid. This bowing can only be executed at a rapid pace, as the rebounding of the bow is not controlled by the hand, but depends entirely on the elasticity of the bow, which would fall back on the string too soon unless the movement of the hand be sufficiently rapid to prevent it from doing so before the bow has changed.

The bow must be held quite loosely between the fingers, which, however, should all lie on the bow stick and not be lifted up from it, as is often done even by well known players, especially in the case of the fourth, and even of the third and fourth finger.

The tone can be graduated from *pp* to *ff* by changing the position of the bow over the strings from fingerboard to bridge, and by shifting the touching point of the bow from the lower to the upper part of the bow, which also admits of an increase of tone.

The spring bow is not always indicated by the word *spiccato* or *sautillé* being placed under the notes, but it may be taken for granted that if groups of often repeated notes with dots over them appear in a rapid movement they are supposed to be executed in this kind of bowing, thus for instance :



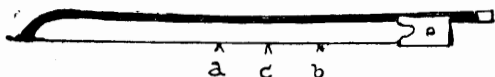
from "Papillon," by Popper. His "Elfentanz," however, as well as "Am Springbrunnen," by Davidoff, two of the finest specimens of this kind of bowing, both contain verbal indications with regard to the use of the spring bow.

THE THROWN BOW.

(*It. Gettato.*)

Although its notation is the same as that of the spring bow it differs materially in its execution. While the former was executed from the wrist, the *thrown bow* is played entirely from the forearm.

The bow must be held over the string, well suspended, and while the forearm moves to and fro, using but a very small fraction of the bow, the latter must be dropped on to the string, and, after rebounding, is arrested in its suspended position by the right hand until the bow has been reversed from down to up bow or vice versa, when it is again dropped *always in the middle of the stroke*. This may be more clearly explained by the illustration below: *a, b*, shows the portion of bow to be used and *c* points to the spot which should touch the string.



Of course the same remark made with regard to the most suitable part of the bow for the execution of the spring bow, applies also in this case. It will be found to vary a little in every single bow according to its balance. While, however, the bow should be held quite loosely for the spring bow, it must be clasped tightly for the execution of the thrown bow.

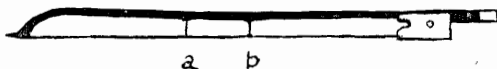
It is used in moderately quick time, as in rapid time the spring bow takes its place. The following is a specimen of the *Gettato* from R. E. Bockmühl's Studies, Op. 47.



In chamber music it is frequently used. There are also groups of dotted lines like this:—



which some play in spring bow, which implies a loose wrist, while others advocate the *spiccato near the nut*, or again, *gettato near the nut*. I consider the latter nearest the mark, but the *gettato* in the part *a, b*, indicated below, will produce much neater and crisper notes.



THE ARPEGGIO.

This figure, already effective on the violin, is according to its true nature the property of the violoncello, which, with its roundness and power of tone, lends a particular charm to these chords, broken up in a hundred various ways. There is scarcely a single brilliant solo piece for the violoncello which does not make more or less extensive use of it. Its study is most important, not only for the perfect execution of the arpeggio itself, but for the acquisition of a pliable wrist and a light and elegant bow. Romberg in his "Violoncello School" says: "The arpeggio is a test of every mode of bowing, and betrays at once if the player execute with a stiff or a free arm." For whoever can use his bow from the point to the nut without laborious exertion, cannot possibly play stiffly. The arpeggio must be practised very slowly, using the full length of the bow. The crossing of the strings must be effected entirely by raising or lowering the right hand

from the wrist as described in the "Elementary Principles of the Stroke" on page 28. The variety of the combinations of different bowings and fingerings in the arpeggio is practically inexhaustible, but it will be sufficient to explain the elementary kinds. All the rest are composed merely of different combinations of the former, which, when fully mastered, will explain any new variety that may be met with. In this part of our work we have, of course, to deal only with the bowing of these figures; of their fingering we shall hear anon.

As preparatory wrist exercises for the arpeggio, the following will be found of great value as developing its strength and agility in an equal degree. In order to save space the different bowings are indicated underneath each specimen.

(A)

(B)

(C)

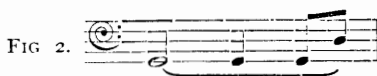
Detailed description of the musical exercises: Exercise (A) is in 2/4 time and consists of a sequence of notes: G4, A4, B4, C5, B4, A4, G4. Below the staff, five different bowing techniques are indicated: 1. A single dot above the first note. 2. A single dot above the second note. 3. A slur under the first two notes. 4. A slur under the first three notes. 5. A slur under the first four notes. Exercise (B) is in 3/4 time and consists of a sequence of notes: G4, A4, B4, C5, B4, A4, G4. Below the staff, four different bowing techniques are indicated: 1. A slur under the first two notes. 2. A slur under the first three notes. 3. A slur under the first four notes. 4. A slur under the first five notes. Exercise (C) is in 2/4 time and consists of a sequence of notes: G4, A4, B4, C5, B4, A4, G4. Below the staff, four different bowing techniques are indicated: 1. A slur under the first two notes. 2. A slur under the first three notes. 3. A slur under the first four notes. 4. A slur under the first five notes.

No. 1. Full length of bow. No. 2. Short detached bow, middle. No. 3. First full bows, then short bows, middle. No. 4. Same as No. 3. First with about half bow (middle) to each slur, then with short bows (middle).

All these exercises should be practised commencing with a down bow, as well as with an up bow. The latter to be started at the point except in the case of short strokes, which can be played either at the point or in the middle. For crisp and sharp notes the point will be preferable, while the middle is more adapted for lightness.

When beginning with a down bow, Nos. 1, 3, 4, and 5, when played with long bows, should always be started right from the nut, while No. 2, and the Nos. 3-5, when played with short bows, should be started more towards the middle.

When sufficient facility has been acquired in playing example *a*, the same bowings should also be practised on examples *b* and *c*, and then in the same way on the A and D, and C and G strings. After these preliminary exercises the student can prepare for the two fundamental bowings of the arpeggio in the following manner. Start the "B" in Fig. 1 in the first position on the A string with a down bow, and draw the bow with an even tone nearer to the point, then take the D, by a slight downward turn of the hand from the wrist, and pull the bow right down to the point.



Turn the hand still a little more downward until the point of the bow touches the G string. Now start the up bow as shown in Fig. 2, pushing the bow nearly up to the nut, and using the smallest portion for sounding the D by slightly raising the hand from the wrist.

Raising it still a little more when arrived at the nut, the hand and bow return to the original position which they took when starting at Fig. 1. Continue this practice without a break between the two figures until it can be executed with absolute ease. Let me in this place once more impress upon the student what I have said on page 29 with regard to the position of the shoulder and the upper arm. There is a tendency in

studying the arpeggio, to raise the shoulder and bring out the upper arm, which is absolutely pernicious. Perfect ease and freedom of all movements and a natural position of the whole body are indispensable to secure success. A slight tendency to direct the wrist from the forearm a little upwards when starting an up bow will cause the point to retain its downward tendency, while a downward pressure of the right hand during an up stroke is certain to raise the point of the bow and cause it to go upward. In the down bow care should be taken that the elbow does not travel out before the forearm stands at right angles to the body and the upper arm, as shown in Fig. 11, and that the right hand travels in a level line.

The reason for practising the arpeggio in the above manner is that the first note of an arpeggio figure should always receive a little more stress, and, therefore, be kept a trifle longer than the following notes of the same figure.

It is impossible to give a *complete* list of arpeggios, their number, as remarked before, being practically unlimited, but a number of the most important may here follow, with indications for their bowing; after their careful perusal and practice the student will be able to determine the bowing of any other arpeggio figures that may come under his notice.

The image displays six musical exercises, labeled (A) through (F), arranged in two rows of three. Each exercise is written on a single staff in treble clef. The notes are arpeggiated, with stems pointing downwards. Above each exercise, fingerings are indicated by numbers 1, 2, 3, and 4. Exercise (A) has fingerings 1, 2, 3, 4. Exercise (B) has fingerings 1, 2, 3. Exercise (C) has fingerings 1, 2, 3. Exercise (D) has fingerings 1, 2, 3. Exercise (E) has fingerings 1, 2, 3. Exercise (F) has fingerings 1, 2, 3. Each exercise is separated from the next by a double bar line.

The image displays three staves of musical notation for cello exercises, labeled (G) through (P). Each exercise is shown on a single staff with a treble clef and a common time signature. The notes are grouped with slurs and dots, indicating specific bowing patterns. Above the notes, numbers 1 through 5 indicate different bowing techniques. Exercise (G) shows a sequence of notes with slurs and dots, with a '2' above the first group and a '1' above the second. Exercise (H) shows a similar sequence with a '2' above the first group and a '1' above the second. Exercise (I) shows a sequence of notes with slurs and dots, with a '5' above the first group, a '4' above the second, a '3' above the third, and a '2' above the fourth. Exercise (K) shows a sequence of notes with slurs and dots, with a '2' above the first group and a '1' above the second. Exercise (L) shows a sequence of notes with slurs and dots, with a '2' above the first group and a '1' above the second. Exercise (M) shows a sequence of notes with slurs and dots, with a '2' above the first group and a '1' above the second. Exercise (N) shows a sequence of notes with slurs and dots, with a '2' above the first group, a '1' above the second, a '3' above the third, and a '2' above the fourth. Exercise (O) shows a sequence of notes with slurs and dots, with a '4' above the first group, a '3' above the second, and a '2' above the third. Exercise (P) shows a sequence of notes with slurs and dots, with a '4' above the first group, a '3' above the second, and a '2' above the third.

Where one and the same figure can be bowed in different ways, the various bowings are indicated over that figure, and distinguished by numbers.

A 1 shows the figure that was prepared at the commencement of this section by Figs. 1 and 2. It should be practised in slow time with full length of bow, and in quick time with short bows towards the middle. Although arpeggios commencing with a low note begin as a rule with an up bow, it is well for the sake of practice occasionally to reverse the order by commencing with a down bow; and, if the figure begins with a high note, to commence with an up bow. In the following description the customary bowing only will be mentioned. For A 2 use long bows commencing with a down bow. A 3 begin right at the point. Use full length of bow on


the slur and use very little bow on the detached notes, which are played alternately at the nut and at the point.

A 4, as a rule, only used in quick time,* is played with short detached bow at the middle. B requires full length of bow, starting with an up bow, always taking four notes to each bow (after the first two notes). This arpeggio requires great facility of the wrist action in crossing the strings. C 1, commencing with an up bow, requires about half length for the slur, the detached notes being executed at the middle and point alternately with very short bows. C 2, use upper part to middle of bow with equal length for slur and detached note, on which the bow must be drawn very quickly to recover sufficient length for the slur. For D 1, use upper part of bow, playing detached notes at the middle and point alternately. Start with up bow. D 2, when beginning with down bow, to be played in the middle of the bow with equal length for slur and detached note; when commencing with an up bow to be played in the same manner, using the upper half of the bow. D 3, an arpeggio occurring in Bach's Sonata in G for violoncello solo (Alwin Schroeder's edition, Leipzig, Kistner) is to be played in the lower half of the bow. The nature of the figure inverts the order of bowing by its repetition. E 1 should be started at the very point of the bow, with a slight upward tendency of the latter for the slur. The two detached notes are played with the smallest fraction of bow, in the middle. Of the two slurred notes at the end, the first receives only a small fraction of bow, while on the last note the bow is drawn right to the point. Romberg remarks that "The longer the bow in playing six (meaning the sixth or last note of the figure) the more finished is the arpeggio." E 2, to be played in the upper half of the bow, beginning either with an up or down bow. E 3, use half to two thirds of the total length of the bow in its middle part; playing the detached

* See Beethoven's Sonata in A major, op. 69, first movement.

notes at either end of the stroke with little bow from the wrist. This figure plays a prominent part in the Prelude of Bach's G major sonata for violoncello solo, with the only difference that there are four detached notes instead of two, the time being four-four. F 1, start from the point, play the detached notes in the middle and return to the point. In F 2 use a long bow on the first slur and play the detached note and slur of two notes alternately at point and nut. G, to be played throughout with short bows near the nut, using the same amount of bow for the detached note as for the slur. H 1, long bows on slurs; detached notes with very little bow at point and nut respectively. H 2 will be explained under Spring-bow arpeggio. I 1, to be played in the middle of the bow, with short bows, beginning with an up bow. I 2, upper part of bow near middle. I 3, lower part of bow near the middle, starting with a down bow. I 4 and 5 belong to the spring-bow arpeggio, of which anon. K, long down bow on the slur, then rush back through the same length of bow on the detached note and start the second slur again on the down bow near the nut. L 1, take long bows on the quaver and the semiquavers, with very little bow alternately at the point and at the nut. L 2, play the slur in using lower half of bow, from nut to middle, and rush back to the nut on the detached note. There is a similar arpeggio when the second group of three notes start on the bass notes like the first group, instead of on the higher notes (*b, d* in this case). This arpeggio is bowed exactly like L. An important but more difficult arpeggio is the

SPRING BOW ARPEGGIO

which shall therefore be explained more fully. The spring-bow on two or more slurred notes  has been previously explained, and it was then mentioned that the crossing of a string in a slur presented a special

difficulty. This crossing of strings is of course what constitutes the arpeggio. In order to arrive at a satisfactory production of this effective kind of bowing, tighten your wrist and hold the bow well suspended over the middle strings. Then let the bow drop on to the string, and when it rebounds turn your hand just sufficiently to cause the bow to touch the next string when it falls down again. On its rebounding turn the hand still a little more so that it touches the next string again when falling. It is best to begin by taking only two notes in one bow, and in that case the bow must be changed after rebounding the second time, but of course the hand is *raised* all the same if a higher string be touched. After rebounding from that string the bow will be led back over the former string by the necessary turn of the hand from the forearm. It is advisable to practise this bowing first on two strings only in this way:



and then proceeds to exercise M. Always begin with a down bow when starting on the lower note, and vice versa. H 2, which illustrates an arpeggio of frequent occurrence, will also be found to form a useful preparatory exercise for the spring bow arpeggio. To give the *exact* spot of the bow for these arpeggios is not possible, for the same reason as in the case of the spring bow. The student must find out the spot where his bow will rebound best, while still remaining under his control. As a rule this will be found towards the middle in the lower half of the bow. In H 2 the legato slurs and the slurred spring-bows must of course be of exactly the same length. The same applies to I 4 and 5 which will, after what has been said, require no further comment, neither will O 3 and 4, except that the difficulty in the execution of the spring bow will be found to increase with the number of the strings.

The arpeggios on four strings are essentially the same as those on three strings as far as the principle of their bowing is concerned, but naturally they require as a rule more length of bow. O 1 should be executed with the full length of bow from nut to point, beginning with an up bow. O 2 should be executed with less bow according to speed, the bow returning to its starting point on the detached note. To prevent the latter from receiving too much tone, and thus becoming too prominent, the bow must touch the string very lightly in its execution. P must be played in a manner similar to that of the "Pricked Bow," using about five sixths of the length of the bow on the first three notes; then stopping short, start the last note on the remaining part, thus :



There is one more arpeggio that requires special mention. It is one in which stopped notes and open strings are intermixed in positions that seem to suggest that the latter notes should also be stopped. Baillot called this kind of figure "Bariolage," which literally translated means "colour mixture." Fig. N gives a specimen of one of its most frequent forms. N 2 should be executed with long bows, preserving great equality of tone on all strings. N 1 may be played more in the middle of the bow with about half length.

So far I have tried to explain the various kinds of bowing, and the result which the perusal of this little work will produce must prove how far I have succeeded in that difficult task. Now it remains to show how far the different kinds of bowing can be diversified by combination and rhythmical development. If the figural design of arpeggios is already practically inexhaustible, the wealth of combinations of different kinds of bowing and rhythms is still greater. To try and give them all would be fruitless endeavour, the more so as it will soon be found that, after giving a certain number of these

combinations, the rest, though different in detail of outline and effect, will prove themselves so closely based upon the specimens already given, that the careful student will never be at a loss to know what kind of bowing he will have to employ in their case. Each number in the following bowing instructions refers to a specimen in the annexed table, bearing the same number.

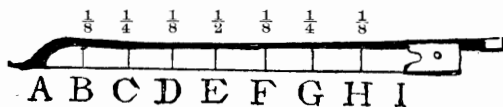
In order to practise the different bowings the student should take a simple exercise and practise it right through in each particular manner here indicated, until he can execute it with perfect ease. He should then try and add fresh combinations of his own invention, practising them also in the same way.

Any exercise consisting of diatonic passages in equal notes with few or no breaks are suitable for practising bowing exercises. The specimen bar in annexed table is taken from an excellent little study in the first part of Kummer's Violoncello School (Leipzig, Hofmeister). It is especially written for the purpose. Very suitable are also "Dotzauer," Op. 47, No. 2 (Breitkopf and Härtel's popular edition) and "Büchler," Op. 21, No. 3 (Leipzig, Rühle). We commence with

THE VARIOUS KINDS OF LEGATO OR NOTES TIED
BY SLURS IN DIFFERENT WAYS.

(See annexed Table).

To simplify the description of the part of bow to be used for each exercise, the figure of a bow is here subjoined, whose sections are marked by letters, which will be used in the text for reference :



To save space and unnecessary repetition let it be said here that all the following exercises should be practised

(Various kinds of Legato) (Various Combinations of Slurred and detached notes.)

Facing page 64.

Table of Natural Harmonics.

A String

D String

10

11

12

commencing with a down bow as well as with an up bow, and that the capital letters indicate the length of bow to be used in accordance with the divisions given in the above illustration. The numbers refer to the respective specimens in the table.

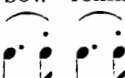

THE VARIOUS KINDS OF LEGATO OR NOTES SLURRED IN DIFFERENT WAYS.

No. 1 at first A—I, afterwards short bows D—F; No. 2 and 3, A—I; No. 4 and 5, long slur A—I, short slurs A—C and G—I alternately; No. 6, A—G on all three slurs; No. 7 and 8, A—I on long slur; rush back through same length on short slur; No. 9, 10 and 11, first slur A—I, second and third A—D and G—I alternately; No. 12 and 13, A—F; No. 14, E—G or A—C; No. 15, A—F.

VARIOUS COMBINATIONS OF SLURS AND DETACHED NOTES.

The Detached Bow has been explained in a previous chapter. It will be shown here in conjunction with slurs of various length and number. The length and part of bow to be used are indicated by letters as before. Nos. 1 to 10, Slurs A—I, detached notes A B and H I alternately. In practice, and in quick movements, the slurs should be played from A to E and the detached notes A B and D E alternately. Nos. 11 and 12, slur A—I, detached notes A B and H I alternately. Nos. 13 to 18 inclusive, long and short slurs A—I, detached notes A B and H I; also to be practised in upper half (as indicated for Nos. 1 to 10) for quick time. Nos. 19, 20 and 22, equal amount of bow for slur and detached note, A—I or A—E. No. 21, slurs A—I, detached notes A—B and H—I. Nos. 23 and 24, slurs A—I, detached notes A—B and H—I, or half bow as for Nos. 1 to 10. No. 25, first two notes E—F slur (three notes) F—A, sixth note and last slur A—B. No. 26, first slur and detached note E—F, second slur F—A, two last notes A—B, the next bar beginning A—B and finishing E—F. Nos. 27 and 28,

slurs A—E, detached notes A—B and D—E respectively. Nos. 29 and 30, first and last bow A—F, two middle bows A—B. No. 31, detached note and first slur A—F, second and third slur D—F. Nos. 32 and 33, A—I. No. 34, if beginning with down bow take B—A for the first note, if beginning with an up bow take H—I, then take A—I on slur and A—B or H—I respectively for the last two notes. Nos. 39 and 42, as all others beginning with a short detached note followed by a slur, are to be bowed in a similar manner, while for all following specimens up to 58 inclusive the one rule holds good that the length of bow on slurs should be in proportion to the number of notes tied together, playing groups of short notes with little bow at the end of up or down stroke alternately. From Nos. 58 to 75 inclusive, except the Nos. 66 and 75, we have combinations of slurs and slurred staccato notes.

Of the execution of these latter I have spoken before in the chapter on the "staccato." It remains to be said that the division of the bow will be the same as in the "Various Kinds of Legato," while the division of the bow in No. 66 is the same as in No. 27, and in No. 75 the same as in No. 11 of the combinations of slurs and detached notes. Nos. 71 to 75 contain legato and staccato notes tied together. They are played as if the legato notes consisted of one long note, the division of bow remaining the same whether we have to play  or the groups in No. 71. In Nos. 76 to 80  inclusive will be found some specimens of syncopated notes in various combinations. The divisions are the same as in previous specimens. Nos. 81 to 90 inclusive comprise a number of "Rhythmical Combinations," which will tend to show how manifold are the means of varying a given subject, by different bowings and rhythmical alterations. Nos. 81 and 82 require A—I on all slurs. No. 83, A—E on first and fourth note, A—B and D—E respectively for semi-quaver groups. No. 84, A—C for quavers and slurs. These short groups of slurred staccato notes are usually

executed with the *saltato* (springing bow), which has been previously explained.

No. 85 links the quaver to the semiquaver by a slur. In this case all three notes have to be played *saltato*, and the quaver is shortened to a semiquaver, leaving a rest of a semiquaver during which the bow is held suspended over the string. The most suitable part of the bow has to be found by experience, as in the case of the "Spring Bow." As a rule it will be found from about the middle of F—G to that of D—E. Nos. 86 to 88 show a combination of two different species, viz., the group of the first five notes and that of the second five notes, each of which might, of course, be used alone throughout the exercises. No. 86 requires G—H for semiquavers or H—C (in slower time) for quavers. No. 87, G—H, respectively C—D for semiquavers, H—C for detached quavers, and the two dotted, slurred quavers. No. 88, G—C on all detached notes and slurs alike. Nos. 86 to 88 are modifications of 83 to 85, and so are Nos. 89 to 91, where the triplets take the place of the semiquaver; they have to be bowed in the same manner as the relative Nos. 83 to 85. Nos. 92 and 93 reverse the order of triplets and quavers of Nos. 90 and 91 respectively, and consequently have to be bowed in the same manner, with the exception that while Nos. 90 and 91 are usually commenced with a down bow, Nos. 92 and 93 will as a rule be commenced with an up-bow. A parallel to No. 89 may of course be constructed in the same way, by inverting the order of triplets and quavers. No. 94, short detached bow B—C or E—F. Nos. 95 and 96, *saltato* about the middle of the bow E—F.

To show how much even the character of a figure may be altered by changing, or rather varying it in the above manner, figure No. 99 may serve, which can of course again be bowed in all possible ways, the one here given being very useful for practice. It will be best done with a firm *staccato* and *legato* mixed, using from about the middle of F—G to that of D—E. Nos. 100 and 101 are slurred *détaché* notes, but less pointed

and of somewhat longer duration than actual staccato notes. A—I is to be used for each slur.

To invent new combinations of different bowings will be found a useful practice.

DOUBLE STOPS.

In playing double stops, viz., two notes on two different strings (as, for instance, when tuning the instrument, see page 23), let the bow rest on both strings with an absolutely even pressure. If one of the two notes sounds stronger than the other, it is a sign that the string on which it appears receives more pressure than the other. When the pressure is perfectly even and the notes stopped well in tune, they will sound very full, with an almost chordal effect, arising from the appearance of the overtones, which are only audible in this case.

In the foregoing lines the attempt has been made to give an exhaustive description of all the various kinds of bowings. Hoping that the student may find all the information which he requires (except such as needs personal demonstration) we shall proceed to explain the art of fingering.

PART II.
THE LEFT HAND.

CHAPTER V.

Attitude and Action of the Fingers, &c.

BEFORE entering upon the application of the fingers of the left hand, it will be advisable to investigate the functions of that hand and arm, and to fix their position with regard to the fingerboard and the neck of the instrument. In doing so we shall find that the left shoulder is the only stationary point, and that the movements of the other parts of the arm augment in proportion as they approach the fingers. The latter have to move quickest, and in a double sense, viz., horizontally, in stopping and releasing the strings, and perpendicularly in changing from one position to another. The upper arm should therefore be kept as steady as possible, so as to allow perfect freedom to the left hand and its movements.

To find the proper position of the left hand and arm, stretch out the latter straight from the shoulder. Then stretch out the fingers of the left hand and bend the first and second joints, as if for the purpose of scratching. Now turn the forearm towards you from the elbow joint, and, without altering the relative distance of the fingers, place their *tips* on the A string, the first finger standing

about three inches below the nut, and the left hand standing almost at right angles against the fingerboard. The thumb, forming a pivot, supporting the hand and fingers, should rest lightly on the neck of the violoncello opposite the open space between the first and second fingers, its point just touching the middle of the neck (as shown in Figs. 13 and 14.)*

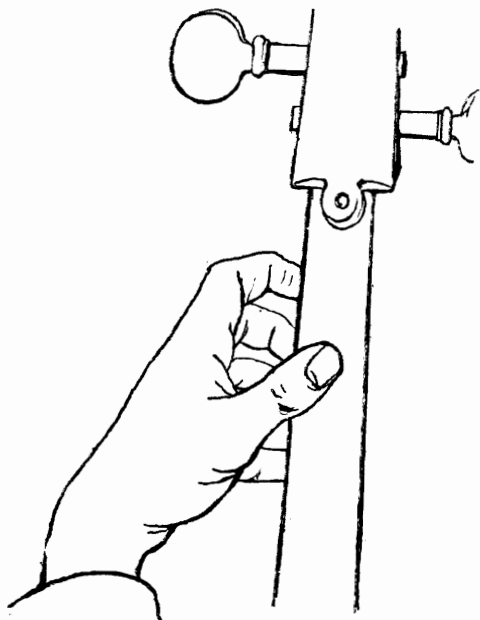
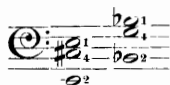


FIG. 13.

* Duport in his "Essay on fingering" advises the pupil to stop these chords: in order to arrive at a correct position of the commanding hand. That is tantamount to re-dancing as a preliminary exercise to walking.



The position of the left arm must of course be modified for comfort's sake; but on no account should the elbow hang quite down, as that would cause the left hand to turn too much sideways, and when shifting beyond the fourth position, the arm would have to be brought forward, which should be avoided as causing delay. If the left arm and hand are placed in the proper manner, as above described, the latter can shift right up the fingerboard without the least change in the position of the upper arm. The finger nails must be kept short so that they do not touch the fingerboard.

The fingers being kept *well arched* must move lightly from the knuckles, and when stopping a note, they should drop from the third or knuckle joint down on to the string like hammers. When lifted they should stand only about one third of an inch above the string, and *exactly* over their respective notes. There is a strong tendency on the part of most pupils to bring the fingers closer together as soon as they are lifted from the string, and it is even a frequent occurrence to see beginners put the second finger on the top of the first when it is not required to stop a note. These are faults which should be carefully avoided. The fingers, when stopping a note, should press the string firmly and always with the very tip of the finger. The fingers should all remain on the fingerboard as much as possible to facilitate accurate and clear stopping. For instance, when the third finger stops a note, the first and second should both be on the strings, and in the case of the fourth finger stopping, *all* are put down, whereas only the first finger can assist the second. Clearness and roundness of tone depend as much on a firm pressure of the fingers of the left hand as on the proper use of the bow.

In the following lines the finger to be used on any particular note is indicated by a corresponding number: the first finger by 1, the second finger by 2, the third finger by 3, and the fourth finger by 4. The open string is marked by 0. The thumb is also used in violoncello playing, but as it will have to be treated in a separate

chapter we shall reserve till then all information with regard to its use.



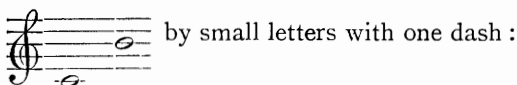
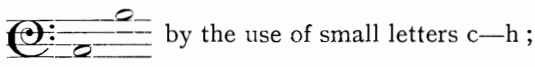
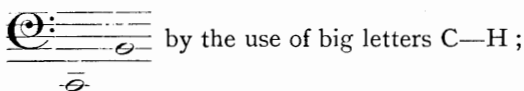
FIG. 14.

If we place our first finger on the A string exactly three inches from the nut we shall stop B natural, and, holding the fingers about half an inch apart from each other, the second finger, when put down, will stop C, the third C sharp and the fourth D. By stretching out the fourth finger it will stop D sharp, while the first finger, stretching back, will stop B flat. From the above remarks it will be seen that the natural interval between each succeeding two fingers is a semitone, while the four fingers in their natural* position compass a minor third ;

* Some call it *close* position, but that term appears incorrect, as it might suggest that the fingers were close together, which they are not, except in the higher positions.

also that by stretching either the first finger back or the fourth finger forward we get a major third. The whole range of notes which can be stopped by the four fingers, without moving the hand itself, is termed a "position." This term applies to each successive range of notes which can thus be covered by shifting the hand. When shifting, the hand should move up and down the finger-board like a mechanical appliance, *without altering the relative position of the fingers.* The student will experience some difficulty at the beginning to keep the second and third finger well asunder. To overcome this he may use an ordinary thick cork and place it between the fingers right up to the hand, and leave it there when practising. He will soon find the effect.

In order to avoid any possible misunderstanding as to the exact pitch of any particular note, I have adopted the rule of the German theorists for distinguishing the octaves :



c'—b', adding one dash for each succeeding octave. The four strings are indicated by the letters A, D, G, C, and the positions by a "P," preceded by the respective number in Roman characters. For instance 1 P = first position, $\frac{1}{2}$ P = half position. The adaptation of letters in lieu of the ordinary staff notation has been found expedient to save space. It will be advisable however for the student to write out the examples in the following chapters in ordinary staff notation, conforming to the above explanation.

CHAPTER VI.

Concerning Semitones.

BEFORE entering on our subject, it will be necessary to say a few words with regard to semitones.

On all instruments giving acoustic semitones (according to the laws of acoustics), we shall find that the latter differ slightly from those of the tempered scale, as applied to the piano or organ. The reason lies in the difference between chromatic and harmonic semitones, which, for their correct production, would require so large a number of keys that the instruments would become unmanageable. By equalising that difference, the number of semitones in the octave has been reduced to twelve. This equalisation of semitones is called "temperament," and the scale, played according to that system, "the tempered scale." To give the *exact* intervals of the various semitones cannot be our object here in this place, as it is of no practical importance; those who are desirous of obtaining full information upon the subject, will find it in any theoretical work on acoustics. Suffice it to say that, when playing in the orchestra, especially in accompanying voices, which, if well trained, will make the difference between the various kinds of semitones more keenly felt, we shall observe the following facts: All semitones are

played in such a manner as to suggest the direction in which they resolve. Take for instance F sharp and G flat. In the tempered scale these two semitones are represented by one and the same note (same key on the piano). As, however, F sharp has a leaning towards G, and G flat towards F, those two semitones are each played a little nearer the note in whose direction they point, instead of being both stopped exactly in the middle between F and G (except when playing with the piano, when the latter is done on account of the temperament). Thus F sharp is stopped nearer G, and G flat nearer F. (This is curiously the reverse from the rule prescribed by science, for the laws of acoustics teach us that for instance F sharp is nearer F, and G flat nearer G. But we have only to deal with *praxis*, which dictates the former.)

CHAPTER VII.

The Neck Positions.

I.—THE FIRST POSITION.

NOW let us regard the notes under our hand in the first position, and the manner in which they are stopped. The fourth or lowest string suggesting the fundamental scale of C major, we shall make that key the basis of our investigations.

Starting with our first fingers at a distance of three inches from the nut, we obtain the following diatonic notes of the C major scale in the first position :

tone	{	C 0	tone	{	G 0	tone	{	d 0	tone	{	a 0
		D 1			A 1			e 1			b 1
tone	{	E 3	tone	{	B 3	semi-	{	f 2	semi-	{	c' 2
		F 4			c 4	tone	{	g 4			d' 4
semi-			semi-			tone			tone		
tone			tone						tone		

From this schedule we see that the four strings of the violoncello group themselves in two and two with regard to fingering as well as to their outward appearance.

Two points however are common to all, and these are the starting point for the first finger, which in the scale of C major is at a full tone distance from the open string, and the position of the fourth finger, which *in that key* is on all four strings at a distance of a minor third from the first finger. But while on the C and the G string the whole tone of that minor third precedes the semitone, thus necessitating the use of the third finger for its production; it *follows* the semitone in the case of the two upper strings where the second finger is consequently employed. By the assistance of the open strings we have thus in the first position a C major scale of two octaves and one tone:

C D E F;	G A B c;	d e f g;	a b c' d'
o 1 3 4	o 1 3 4	o 1 2 4	o 1 2 4

THE FINGERING OF INTERVALS.

SECONDS being the consecutive notes of the scale, are of course played by the fingering above indicated, *i.e.*, minor seconds (semitones) by two consecutive fingers, and major seconds by two alternate fingers.

THIRDS are fingered in the following manner:

C String	C—E	D—F	E—G	F—A
	o—3	1—4	3—o	4—1
G „	G—B	A—C	B—d	C—e
	o—3	1—4	3—o	4—1
D „	d—f	e—g	f—a	g—b
	o—2	1—4	2—o	4—1
A „	a—c'	b—d'		
	o—2	1—4		

N.B.—In the following examples the strings appear in the same order as above.

As will be seen from the above, the C and G string, and the *d* and *a* string (the latter as far as the first position allows us to proceed) again are, naturally, fingered alike.

FOURTHS are fingered thus :

C—F	D—G	E—A	F—B
o—4	1—o	3—1	4—3
G—c	A—d	B—e	c—f
o—4	1—o	3—1	4—2
d—g	e—a	f—b	g—c'
o—4	1—o	2—1	4—2
a—d			
o—4			

FIFTHS thus :

C—G	D—A	E—B	F—c
o—o	1—1	3—3	4—4
G—d	A—e	B—f	c—g
o—o	1—1	3—2	4—4
d—a	e—b	f—c'	g—d'
o—o	1—1	2—2	4—4

When stopping two strings by one and the same finger, press the first joint inward (this should be done on no other occasion) so that the ball of the first joint stops the higher string, and the tip the lower one.

We have only one fifth in this case which, being diminished, is stopped by *two different* fingers, viz.,

B—f*
3—2

SIXTHS are fingered in the following manner :

C—A	D—B	E—c	F—d
o—1	1—3	3—4	4—o
G—e	A—f*	*B—g	c—a
o—1	1—2	3—4	4—o
d—b	e—c'	f—d'	
o—1	1—2	2—4	

From this table it will be seen that the sixth is produced by the next following finger on the higher string, which *returns* to the lower string to start the following sixth (the interval between the last note of one sixth and the first note of the one following being a fifth), but again

* Diminished Fifths.

with the exception of the *diminished fifth* B—f (see page 78*). Notice also the skipping of one string from the fourth finger to the second next open string.

SEVENTHS finger thus :

C—B	D—c	E—d	F—e
o—3	1—4	3—o	4—1
G—f	A—g	B—a	c—b
o—2	1—4	3—o	4—1
d—c'	e—d'		
o—2	1—4		

Notice the inversion of fingering in alternate sevenths. OCTAVES finger in the following manner :

C—c	D—d	E—e	F—f
o—4	1—o	3—1	4—2
G—g	A—a	B—b	c—c'
o—4	1—o	3—1	4—2
d—d'			
o—4			

The repetition of fingering here occurs in groups of four octaves.

STRETCHED POSITIONS.

From the foregoing remarks we have seen that the fingers of the left hand in their natural position (with an interval of one semitone between each two fingers) will compass a minor third between first and fourth. In this position we can only play the C major scale from C to c' (or d'), and G major upwards from the open G string with this fingering :

G	A	B	c	d	e	f \sharp	g	a	b	c'	d'
o	1	3	4	o	1	3	4	o	1	2	4

All other scales, as well as the G major *downwards* from G, compel us to compass a major third between the first and fourth finger, at least on one of the four strings, and this is what is called a "stretched position."

Take for instance the A major scale, starting on A (G string), and we get the notes, A, B, C sharp. A is stopped by the first finger, and if we take the third on B,

the fourth would have to stop the C sharp, thus placing a full tone between third and fourth finger. If the third finger is kept down, as it should be (also the first and second as stated in the beginning of this chapter), this will, to any hand of the ordinary size, present an insurmountable obstacle, whereas the first and second finger can stretch that interval quite easily.

We make it therefore a rule that if we have to stop two full tones in succession, the one is stopped between the first and second, while the second is taken between the second and fourth fingers, viz., A, B, C .*

1 2 4

We have two different kinds of stretched positions, of which *one* is produced by sharps and the other by flats; the former taking the semitone higher than the natural position (as shown above), the latter taking the semitone lower. For instance F major (the first flat key) would require the following fingering on the A string :

a, b \flat , c, d.

0 1 2 4

The second and fourth fingers, in this case, keep their natural position, while the first one leaves it to stretch the lower semitone; in the former case, the *first* finger remains in its natural position, while *both* second and fourth finger stop one semitone higher. The *stretch* itself occurs therefore *always* between the first and second finger. The same can of course occur in all positions as we shall see later on. A stretched position is regarded as belonging to that in which the first or second and fourth fingers remain stationary. The reason for this is that the stretching is executed *by the fingers only*, while the *hand* remains *absolutely* in the same place. A change of position, on the contrary, is always marked by a *shift* of the left hand.

* If the student cannot stop these notes without great trouble, he may conclude that the instrument on which he is playing is too big for him, and he should, without delay, procure one of a smaller size, in proportion to the size of his hand.

If the student will remember this fact, he will not be induced, as is often the case, to mistake the stretched position for that of which we shall treat next. He should also remember that all diatonic scales and passages in the neck positions are composed of three groups of notes, repeated in various order and fingered 1 2 4, 1 3 4 or 1 2 4 stretched. A careful observation of the manner and places in which they appear will materially enhance progress.

THE HALF POSITION.

While in the stretched position one finger leaves its place to stop a higher, respectively lower semitone, the half position is marked by a distinct shift of the hand, all fingers retaining their natural distance (of one semitone), and thus following the first or fourth finger (which ever it may be) for the space of the said interval. By this it will be seen that we have two half positions to each natural or full position, relative to the above-named stretched positions.

Some of these half positions are rarely used as such, as they will be generally supplanted by their enharmonic relative (for instance B sharp by C natural). It will be of importance for the student, however, to thoroughly acquaint himself with all enharmonic changes so as to give him perfect command over all the resources of the fingerboard.

The term "half position" has been used by most professors of the violoncello to indicate the first position of the above order, which commences at a distance of about an inch and a half from the nut. To avoid adding to the confusion which already exists in some quarters, with regard to the nomenclature of the positions, we shall follow their example, naming the other half positions, "raised" or "lowered" positions, which has also the advantage of more precisely defining the relationship towards the natural position.

The following are the notes in the half position, their fingering being indicated at the beginning of each line :

	A	D	G	C
1.	a \sharp b \flat	d \sharp e \flat	G \sharp A \flat	C \sharp D \flat
2.	b c' \flat	e f \flat	A B \flat	D E \flat
4.	c \sharp d' \flat	f \sharp g \flat	B C \flat	E F \flat

	A	D	G	C
1.	a \sharp b \flat	d \sharp e \flat	G \sharp A \flat	C \sharp D \flat
3.	b \sharp c'	e \sharp f	A \sharp B \flat	D \sharp E \flat
4.	c \sharp d' \flat	f \sharp g \flat	B C \flat	E F \flat

The first position and its fingering have been explained first, as the half position is only an outcome of the former, although it precedes it locally, viz., on the fingerboard.

We shall now explain its "raised" and "lowered" tributaries, letting the other positions follow in succession, up to the eighth. The order of the positions is ruled by the diatonic notes of C major on the first or A string, viz., b, c', d', e', f', g', a'.

The lowered first position is identical with the half position as given above, while the raised position gives the following notes:

	A	D	G	C
1.	b \sharp	e \sharp	A \sharp	D \sharp
2.	c' \sharp	f \sharp	B	E
3.	c' \times	f \times	B \sharp	E \sharp
4.	d' \sharp	g \sharp	c \sharp	F \sharp

This latter position enharmonically changed will give us:

THE SECOND POSITION,

of which, as also of those following, we shall give all the varieties.

Natural Position.

	A	D	G	C
1.	c'	f	B \flat	E \flat
2.	d' \flat	g \flat	c \flat	E
3.	d'	g	c \sharp	F \sharp
4.	e \flat	a \flat	d \flat	G \flat

Stretched Positions (backward and forward).

	A		D		G		C	
1.	c' \flat	c'	f \flat	f	B $\flat\flat$	B \flat	E $\flat\flat$	E \flat
2.	d' \flat	d'	g \flat	g	c \flat	c \sharp	F \flat	F
4.	e' \flat	e'	a \flat	a	d \flat	d \sharp	G \flat	G

Raised Position.

	Natural					Stretched			
	A	D	G	C		A	D	G	C
1.	c \sharp	f \sharp	B	E	1.	c' \sharp	f \sharp	B	F
2.	d'	g	c	F	2.	d' \sharp	g \sharp	c \sharp	F \sharp
3.	d' \sharp	g \sharp	c \sharp	F \sharp	4.	e \sharp	a \sharp	d \sharp	G \sharp
4.	e'	a	d	G					

Lowered Position.

	Natural					Stretched			
	A	D	G	C		A	D	G	C
1.	c' \flat	f \flat	B $\flat\flat$	E $\flat\flat$	1.	c' \flat	f \flat	B $\flat\flat$	E $\flat\flat$
2.	d' $\flat\flat$	g $\flat\flat$	c $\flat\flat$	F $\flat\flat$	2.	d' \flat	g \flat	c \flat	F \flat
3.	d' \flat	g \flat	c \flat	F \flat	4.	e' \flat	a \flat	d \flat	G \flat
4.	e $\flat\flat$	a $\flat\flat$	d $\flat\flat$	G $\flat\flat$					

On closer examination the stretched Lower Position will be found to be only an enharmonic change of the upward stretched *First Position*.

The Lower Position *stretched backward* would in the same way be an enharmonic change of the backward stretched *First Position*, and as the following up of such forms would lead to endless repetition, we shall pursue them no further.

THE THIRD POSITION.

<i>Natural Position</i>				<i>Stretched Position</i>					
	A	D	G	C		A	D	G	C
1.	d'	g	c	F	1.	d'	g	c	F
2.	e' b	a b	d b	G b	2.	e'	a	d	G
3.	e'	a	d	G	4.	f [#]	b	e	A
4.	f'	b b	e b	A b					

Raised Position.

	A	D	G	C
1.	d [#]	g [#]	c [#]	F [#]
2.	e'	a	d	G
3.	e [#]	a [#]	d [#]	G [#]
4.	f [#]	b	e	A

Lowered Position.

<i>Natural</i>				<i>Stretched</i>					
	A	D	G	C		A	D	G	C
1.	d' b	g b	c b	F b	1.	d' b	g b	c b	F b
2.	e' b b	a b b	d b b	G b b	2.	e b	a b	d b	G b
3.	e' b	a b	d b	G b	4.	f'	b b	e b	A b
4.	f b	e b b	e b	A b b					

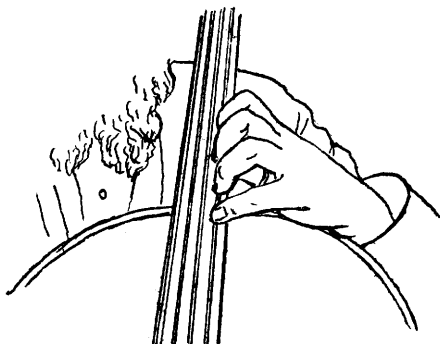
Of the Stretched Position only the forward form has been given; the backward form (d flat, e flat, f on the A string) is absolutely identical with that of the Lowered Position, while that position in its natural form is only an enharmonic change of the stretched form of the Raised Second Position.

THE FOURTH POSITION.

The Fourth Position is the last in which the thumb rests on the neck of the fingerboard, and by placing it right into the groove of the neck (where it ends in the block which fixes it to the body of the instrument), one can always make sure of putting the hand exactly in the

right place. This position is of great importance, as it is the first whose lowest note is already one tone above the first position, while the second and third ones are only intermediate positions between the first and fourth. The two latter positions cover the lower half of the strings entirely as from the fourth position by stretching the third finger forward, we can reach the harmonic which gives the octave of the open string, and halves it.

By carefully observing the above remarks the student will always be able to reach the fourth position from any other one with perfect safety, as long as he sees that the thumb goes at once in the groove of the neck, while the first finger rests opposite the upper side of the thumb, and the second finger opposite the lower one. It will be seen that the notes in this position are already appreciably closer together than they appear in the first position.



<i>Natural Position</i>				<i>Stretched Position</i>					
	A	D	G	C	A	D	G	C	
1.	e'	a	d	G	1.	e'	a	d	G
2.	f'	b \flat	e \flat	A \flat	2.	f' \sharp	b	e	A
3.	f' \sharp	b	e	A	4.	g' \sharp	c' \sharp	f' \sharp	B
4.	g'	c'	f	B \flat					

Raised Position.

	A	D	G	C
1.	e \sharp	a \sharp	d \sharp	G \sharp
2.	f \sharp	b	e	A
3.	f \times	b \sharp	e \sharp	A \sharp
4.	g \sharp	c \sharp	f \sharp	B

Lowered Position.

	Natural				Stretched				
	A	D	G	C	A	D	G	C	
1.	e \flat	a \flat	d \flat	G \flat	1.	e \flat	a \flat	d \flat	G \flat
2.	f \flat	b $\flat\flat$	e $\flat\flat$	A $\flat\flat$	2.	f \flat	b \flat	e \flat	A \flat
3.	f'(g $\flat\flat$)	b \flat	e \flat	A \flat	4.	g'	c'	f	B \flat
4.	g' \flat	c' \flat	f \flat	B $\flat\flat$					

The *backward* form of the stretched natural position is identical with that of the forward stretched Lower Position, while the backward stretched Lower Position (e \times , f flat, g flat on A) is only an enharmonic change of the forward stretched natural Third Position.

THE FIFTH POSITION.

	Natural				Stretched				
	A	D	G	C	A	D	G	C	
1.	f'	b \flat	e \flat	A \flat	1.	f'	b \flat	e \flat	A \flat
2.	g' \flat	c' \flat	f \flat	B $\flat\flat$	2.	g'	c'	f	B \flat
2 (3).	g'	c'	f	B \flat	3.	a'	d'	g	c
3 (4).	a' \flat	d' \flat	g \flat	c \flat					

Raised Position.

	Natural				Stretched				
	A	D	G	C	A	D	G	C	
1.	f \sharp	b	e	A	1.	f \sharp	b	e	A
2.	g'	c'	f	B \flat	2.	g' \sharp	c' \sharp	f \sharp	B
2 (3).	g' \sharp	c' \sharp	f \sharp	B	3.	a \sharp	d \sharp	g \sharp	c \sharp
4 (4).	a	d'	g	c					

The Lowered Fifth Position is identical with the Natural Fourth Position:—

(f \flat , f', g \flat , g' = e', f', f \sharp , g')

and the backward stretched Fifth with the forward stretched Fourth Position.

From the Fifth Position upwards we use only the first three fingers, although in *exceptional* cases (four notes in rapid succession, beginning with the first note of the position), all four may be used even as far as this position, but not beyond, unless the thumb is used also, of which we shall speak later on. In the former case the third finger is used for the third note, which as a rule appears only as an alternate note with the second, and is then stopped by the second finger.

THE SIXTH POSITION.

Natural				Stretched					
	A	D	G	C		A	D	G	C
1.	g'	c'	f	B \flat	1.	g'	c'	f	B \flat
2.	a' \flat	d' \flat	g \flat	c \flat	2.	a'	d'	g	c
2.	a'	d'	g	c	3.	b'	e'	a	d
3.	b' \flat	e' \flat	a \flat	d \flat					

Raised Position.

Natural				Stretched					
	A	D	G	C		A	D	G	C
1.	g \sharp	c \sharp	f \sharp	B	1.	g \sharp	c \sharp	f \sharp	B
2.	a'	d'	g	c	2.	a \sharp	d \sharp	g \sharp	c \sharp
2.	a \sharp	d \sharp	g \sharp	c \sharp	3.	b \sharp	e \sharp	a \sharp	d \sharp
3.	b'	e'	a	d					

Lowered Position.

Stretched.

	A	D	G	C
1.	g' \flat	c' \flat	f \flat	B \flat \flat
2.	a' \flat	d' \flat	g \flat	c \flat
3.	b' \flat	e' \flat	a \flat	d \flat

Of the Lowered Position we give only the stretched form which will be found an enharmonic change of the Fifth Raised Stretched Position, while the natural forms of the same relative positions are also identical.

THE SEVENTH POSITION.

Natural Position.

	A	D	G	C
1.	a'	d'	g	c
2.	b \flat	e \flat	a \flat	d \flat
2.	b'	e'	a	d
3.	c''	f'	b \flat	e \flat

Stretched Position.

Backward				Forward					
	A	D	G	C		A	D	G	C
1.	a \flat	d \flat	g \flat	c \flat	1.	a'	d'	g	c
2.	b \flat	e \flat	a \flat	d \flat	2.	b'	e'	a	d
3.	c''	f	b \flat	e \flat	3.	c'' \sharp	f \sharp	b	e

Raised Position.

Natural				
	A	D	G	C
1.	a \sharp	d \sharp	g \sharp	c \sharp
2.	b'	e'	a	d
2.	b \sharp	f'	a \sharp	d \sharp
3.	c'' \sharp	f \sharp	b	e

Lowered Position.

Stretched				
	A	D	G	C
1.	a \flat	d \flat	g \flat	c \flat
2.	b \flat	e \flat	a \flat	d \flat
3.	c''	f'	b \flat	e \flat

The Stretched Raised Position is the enharmonic form of the Lowered Eighth Position and the Natural Lower Position, while the Natural Lower Position stands in the same relationship to the Raised Natural Sixth Position. The Backward Stretched Natural Position is absolutely identical with the Stretched Lowered Seventh Position, as shown above.

CHAPTER VIII.

Thumb Positions.

THE note which gives the higher octave of the open string divides it into two equal parts. It forms, therefore, a kind of landmark in the art of violoncello playing, being also the last note which can be reached from the neck positions: (1) in stretching the third finger forward and placing it lightly on the string* while the hand remains in the fourth position, or (2) as top note of the fifth position. The latter is but an intermediary position, like the second and third, and the production of that middle octave from the fourth position by means of the third finger, is the more important and more frequent. This same note forms also the normal starting point for the use of the thumb. Although the latter is used sometimes in lower positions, its employment becomes indispensable in all passage work from the middle of the string upwards. When used for this purpose, the outer edge of the thumb is placed across two strings in such a manner that the higher string is stopped by the middle joint, and the lower string at the root of the nail. In this way it performs the functions of a movable nut, enabling the hand to play full scales across the strings, without leaving the position, in the same way as it can be done in the first position by means of the fixed nut using the open strings. The left arm should be brought a little forward, so that the hand can move up and down the fingerboard by the aid of the fore arm, without

* A tone thus produced is called "harmonic," which will be dealt with latter on.

changing the position of the upper arm. The left hand should be turned in the wrist joint a little sideways from left to right, thus bringing the thumb a little more towards the nut of the instrument, and the little finger more over the string, thereby facilitating its use.

It is a curious fact that down to Romberg's time the little finger was scarcely used at all in the higher positions, and Michel Corrette in his "Méthode . . . pour apprendre en peu de temps le violoncelle dans sa perfection," etc., which appeared in Paris in 1741, declares that although the little finger might be used in these positions in a few exceptional cases, it was practically useless, on account of its shortness.

Since Romberg's time it has become an essential item of the thumb position, although it is not as a rule required in ordinary scale passages in that position; the thumb and the first three fingers being sufficient for their execution.

In placing the thumb on the strings it is necessary to be careful that it stops perfect fifths. This it *should* do when placed parallel to the nut, provided the strings are perfectly true. As the latter is very often not the case, one must ascertain how much they differ at any given point. If the difference is much, nothing remains but to take other strings, or, if one string appears particularly good, to find another which will give perfect fifths with it.

At the beginning of this work, in a section headed "The Strings" (page 13) there will be found the means to test a string with regard to fifths. If, in stopping a fifth straight across two strings, the player should find one of the two notes only *slightly* flat or sharp, the difference may be adjusted by placing the thumb a little slanting one way or the other, according to either the A or the D string having to be stopped higher than the other.

It is of course always best, especially for the beginner, to select strings that will give perfect fifths in the true position, as it gives more certainty with regard to intonation.

The best means of obtaining a true set of strings is to try various sizes together until they give perfect fifths all the way up, between all four strings. If those have been found they should be carefully measured with a good string gauge. For this purpose I recommend Weichold's Patent Gauge, or a screw wire gauge, which gives the finest gradations obtainable. As the measurement of those test strings will not always tally with the marks on the ordinary gauge, mark the exact place with a knife. In the case of the Weichold as well as the screw wire gauge this is unnecessary.

When buying new strings they should correspond exactly with those marks, and if they also stand the test given above, as to being true, they will always be found to give perfect fifths throughout their whole length.

The various thumb positions, with their fingerings added, present themselves in the following manner :

FIRST THUMB POSITION.

Natural Position.

	A	D	G	C
0.	a'	d'	g	c
1.	a'♯ = b'♭	d'♯ = e'♭	g♯ = a♭	c♯ = d♭
1.	b'	e'	a	d
2.	c''	f'	b♭	e♭
2.	c''♯ = d'♭	f'♯ = g'♭	b	e
3.	d''	g'	c'	f

Stretched Positions.

	Forward				Backward				
	A	D	G	C	A	D	G	C	
0.	a'	d'	g	c	0.	a'♭	d'♭	g♭	c♭
1.	b'	e'	a	d	1.	b'♭	e'♭	a♭	d♭
2.	c''♯	f''♯	b	e	2.	c''	f'	b♭	e♭
3.	d''♯	g''♯	c''♯	f''♯	3.	d''	g'	c'	f

Raised Position.

Natural.

	A	D	G	C
0.	a \sharp	d \sharp	g \sharp	c \sharp
1.	b'	e'	a	d
2.	c' \sharp	f \sharp	b	e
3.	d' \sharp	g' \sharp	c' \sharp	f \sharp

Stretched (forward).

	A	D	G	C
0.	a \sharp = b \flat	d \sharp = e \flat	g \sharp = a \flat	c \sharp = d \flat
1.	b \sharp = c''	e \sharp = f'	a \sharp = b \flat	d \sharp = e \flat
2.	c'' \times d''	f \times = g'	b \sharp = c	e \sharp = f
3.	d'' \times e''	g \times = a'	c \times = d	f \times = g

Lowered Position.

Natural				Stretched					
A	D	G	C	A	D	G	C		
0.	a \flat	d \flat	g \flat	c \flat	0.	a \flat	d \flat	g \flat	c \flat
1.	b \flat	e \flat	a \flat	d \flat	1.	b \flat	e \flat	a \flat	d \flat
2.	c'' \flat	f \flat	b \flat	e \flat	2.	c''	f'	b \flat	e \flat
3.	d'' \flat	g' \flat	c \flat	f \flat	3.	d''	g'	c	f

SECOND THUMB POSITION.

Natural Position.

	A	D	G	C
0.	b'	e'	a	d
1.	c''	f'	b \flat	e \flat
2.	d''	g''	c'	f
3.	e''	a''	d'	g

Stretched Position.

	Forward			The Backward Stretched Position		
	A	D	G	C	tion is like the natural, with the	
o.	b'	e'	a	d	exception that the thumb com-	
1.	c''#	f#	b	e	mences at a full tone from the	
2.	d''#	g''#	c''#	f#	first finger, viz., on b' \flat , e' \flat , a \flat , or	
3.	e''#	a''#	d''#	g''#	d \flat respectively.	

The Raised Second Thumb Position is identical with the Natural Third, as in the case of the relative Neck Position.

The Lowered Position, which on the A string would give: b' \flat , c'' \flat , d'' \flat , e'' \flat , is enharmonically changed the same as the first "Raised Position." As the case with regard to raised and lowered positions is very similar with the following, it will not be necessary to describe them except in cases where they are distinctly different from the following and preceding ones. For the student it will be advisable however to work them out for himself, as he will thereby considerably increase his acquaintance with the fingerboard, especially with regard to enharmonic changes, which will be of great assistance to him when reading compositions in extreme keys.

THIRD THUMB POSITION.

Natural Position.

	A	D	G	C
o.	c''	f'	b \flat	e \flat
1.	d''	g'	c'	f
2.	e''	a'	d'	g
3.	f''	b' \flat	e' \flat	a \flat

Stretched Position.

Forward

Merely affects the third finger, there being already a full tone between each two previous fingers. The former is raised one semitone to f'' \sharp b' e' a respectively.

Backward

Enharmonic change of Second Forward Stretched Position.

Raised Position.

Natural.

	A	D	G	C
0.	c'' \sharp	f'' \sharp	b'	e
1.	d'' \sharp	g'' \sharp	c'' \sharp	f'' \sharp
2.	e'' \sharp	a'' \sharp	d'' \sharp	g'' \sharp
3.	f'' \sharp	b'	e'	a

Stretched.

Forward

Only the third finger is raised one semitone to f_x
b \sharp e \sharp a \sharp

Backward

Same as Natural Third
Stretched forward.

FOURTH THUMB POSITION.

Natural.

	A	D	G	C
0.	d''	g'	c'	f
1.	e''	a'	d'	g
2.	f''	b' \flat	e' \flat	a \flat
3.	g''	c''	f'	b \flat

Stretched.

	Forward		Backward	
	A D G C			
o.	d'' g' c' f			Enharmonic of Third Raised
1.	e'' a' d' g			Position stretched forward.
2.	f'' \sharp b' e'			
3.	g'' \sharp c'' \sharp f \sharp b			

Raised Position.

	Natural		Stretched	
	A D G C		A D G C	
o.	d'' \sharp g \sharp c'' \sharp f \sharp		d'' \sharp g'' \sharp c'' \sharp f \sharp	
1.	e'' \sharp a'' \sharp d'' \sharp g \sharp		e'' \sharp a'' \sharp d'' \sharp g \sharp	
2.	f'' \sharp b' e' a		f'' \times b'' \sharp e'' \sharp a'' \sharp	
3.	g'' \sharp c'' \sharp f \sharp b		g'' \times c'' \times f \times b'' \sharp	

FIFTH THUMB POSITION.

Natural.

	A	D	G	C
o.	e''	a'	d'	g
1.	f''	b' \flat	e' \flat	a \flat
2.	g''	c''	f'	b \flat
3.	a''	d''	g'	c'

Stretched.

	Forward		Backward	
	A D G C			
o.	e'' a' d' g			Only the first finger recedes by one semitone.
1.	f'' \sharp b' e' a			
2.	g'' \sharp c'' \sharp f \sharp b			
3.	a'' \sharp d'' \sharp g'' \sharp c'' \sharp			

The Raised Position is identical with the Sixth, and the Lowered Position with the Fourth Raised.

SIXTH THUMB POSITION.

Natural

	A	D	G	C
0.	f''	b'♭	e'♭	a♭
1.	g''	c''	f'	b♭
2.	a''	d''	g'	c'
3.	b''♭	e''♭	a'♭	d'♭

Stretched

Forward

Only the third finger advances one semitone.

Backward

Enharmonic of "Fifth Position" stretched forward.

Raised Position.

Natural

	A	D	G	C
0.	f'' \sharp	b'	e'	a
1.	g'' \sharp	c''	f'	b
2.	a''	d''	g'	c'
3.	b''	e''	a'	d'

Stretched

Forward

	A	D	G	C
0.	f'' \sharp	b'	e'	a
1.	g'' \sharp	c'' \sharp	f' \sharp	b
2.	a'' \sharp	d'' \sharp	g' \sharp	c' \sharp
3.	b'' \sharp	e'' \sharp	a' \sharp	d' \sharp

Backward

Same as Natural Position stretched forward.

Lowered Position same as Fifth.

SEVENTH THUMB POSITION.

Natural.

	A	D	G	C
0.	g''	c''	f'	b \flat
1.	a''	d''	g'	c'
2.	b''	e''	a'	d'
3.	c'''	f''	b' \flat	e' \flat

Stretched.

Forward

Same as above only the third finger is raised one semitone.

Backward

Same as Sixth Raised Position stretched forward, enharmonically changed.

Raised Position.

Natural.

	A	D	G	C
0.	g'' \sharp	c'' \sharp	f' \sharp	b
1.	a''	d''	g'	c'
2.	b''	e''	a'	d'
3.	c''' \sharp	f'' \sharp	b'	e'

Stretched Position.

Forward

	F	D	G	C
0.	g'' \sharp	c'' \sharp	f' \sharp	b
1.	a'' \sharp	d'' \sharp	g' \sharp	c' \sharp
2.	b'' \sharp	e'' \sharp	a' \sharp	d' \sharp
3.	c''' \times	f'' \times	b'	e'

Backward

Same as Natural Seventh Position.

Lowered Position.

Natural

A D G C

- | | | | | | |
|----|------------|------------|----------------|----------------|---|
| 0. | $g''\flat$ | $c''\flat$ | $f'\flat$ | $b'\flat\flat$ | The Stretched Position affects only the third finger which advances one semitone. |
| 1. | $a''\flat$ | $d''\flat$ | $g'\flat$ | $c'\flat$ | |
| 2. | $b''\flat$ | $e''\flat$ | $a'\flat$ | $d'\flat$ | |
| 3. | $c''\flat$ | $f''\flat$ | $b'\flat\flat$ | $e'\flat\flat$ | |

EIGHTH THUMB POSITION.

Natural

A D G C

- | | | | | | |
|----|-------|-------|-----------|-----------|--|
| 0. | a'' | d'' | g' | c' | The fingering of the "Stretched," "Raised" and "Lowered" Eighth Position is the same as for the First, with the exception that the fingers are much closer together. |
| 1. | b'' | e'' | a' | d' | |
| 2. | c'' | f'' | $b'\flat$ | $e'\flat$ | |
| 3. | d'' | g'' | c'' | f' | |

CHAPTER IX.

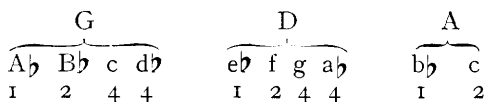
The Fingering of Scales.

IT has been stated before that this work is not destined to serve as a tutor for the instrument. The various items forming its technic have therefore been collected and exhaustively discussed each under its particular heading, so that any special subject may be easily referred to. That would not be the case if they were brought, intermixed, in the manner required for an actual course of primary tuition.

For this reason the present chapter has been reserved until the fingering of all the ordinary, and thumb positions have been explained, although the practice of scales ought to be commenced at a much earlier stage. The usual system is to begin with the first position *only*, and to proceed to the second and third consecutively, after the former has been thoroughly practised. The study of different scales in the first position involves, however, in some instances fingerings which are more or less monstrosities, and would never be used *in praxis*.

I am inclined therefore to advocate the system adopted by Alwin Schroeder, and I believe also by Julius Klengel, to teach the whole of the first four positions (neck-positions) after a few preliminary lessons, and *then* proceed with the study of scales in a proper and systematic manner, avoiding all the awkward proceedings of the older system. The latter are glaringly exemplified

in several scales, as for instance $A\flat$ major, which in the first position has to be fingered thus :



Instead of going into this matter any further, which is of little practical value, we shall at once proceed to the fingering of the scales, using the whole of the neck positions as required.

There are two different ways of starting scales. One is by using the first finger on the tonic of all scales, the other by using *that* finger on the tonic which would stop it when played in the first position. The use of either system is determined by the rhythm of the scale. When playing in triple time, it will be best to start with the first finger on the tonic, thus covering always one whole group of three notes by the fingers of the left hand. When playing in common time it is better to start with that finger which would stop the tonic in the first position, as the former fingering would break up the groups of four notes in awkward places. The scales beginning with a note stopped by the fourth finger in the first position, form an exception to this. Their first note or tonic is usually taken by the second finger.

The use of open strings should be avoided as much as possible in scale passages. Where all the notes ought to be absolutely even in quality and quantity, those produced by an open string would receive undue prominence, as their difference in tone from notes stopped by the fingers can never be quite concealed. The highest tonic on which a scale passage finishes should always be taken by the third finger, whenever that note is above the fourth position. This rule applies to all four strings. For instance, if the scale of D major is to be played on the D string through two octaves, the d'' must be taken by the third finger.

This will be accomplished by taking the preceding

supertonic with the first finger, using the first and second fingers alternately, which will assign the leading note to the second finger, and consequently the third to the next tonic. If *two* octaves are to be played by the alternate use of the first and second finger, the tonic of the first of these two octaves should be taken by the first finger, which will bring the second on to the next tonic. Taking the supertonic with the first finger, the third will then finish on the highest tonic as shown above. This fingering applies of course only to the higher positions from the commencement of the fourth upwards.

In order to make himself thoroughly acquainted with the fingering of scales up to five octaves, the student will find in the three tables* all that he may require to enable him to impress upon his mind a clear and graphic picture of the whole system, which, when properly studied, will make him so familiar with the *nature* of the various scales and their fingering, that extreme keys should present no more difficulty to him than those with only two or three flats or sharps. In order to arrive at this, he must keep steadily before him the fact that there are properly speaking only *two* scales, viz.: The major scale (consisting of the following intervals: tone, tone, semitone, tone, tone, tone, semitone), and the minor scale (consisting of tone, semitone, tone, tone, semitone, augmented second, semitone). The minor scale has received a modification on account of the augmented second between sub-mediante and leading note (which is regarded as unvocal). This modified form is what we call the "melodic minor scale," which avoids the objectionable interval, by raising the submediante one semitone when ascending, and lowering the leading note one semitone in descending, resolving the submediante to its original place.

These two scales (major and minor) are varied only by applying them to the different steps of the fundamental

* These three tables have been printed separately on stout paper and may be had from the "STRAD" Office. Published at 1s. 6d. the set, post free.

scale. The rules by which this is done belong to the sphere of harmony, and cannot therefore be discussed in this place. It must occur, however, to the observant student, at first sight, that as the intervals in each of the two classes of scales are the same throughout *all* keys, their fingering must naturally be analogous in most cases except for the open strings which enter at different places, or the beginning in a different position, or with a different finger. If we classify them in this manner the following may be observed with regard to the major keys: C and G, starting on an open string (I am speaking here always of the lowest tonic available on the violoncello) show an analogous fingering in the first three groups: 0134, 0134, 0124. D and A prove a similar relationship in the first three groups, while E, B, F \sharp and C \sharp continue it throughout four groups. All the flat keys correspond with the latter in their first two groups. B \flat and E \flat are alike in the fingering of their first four groups, which is also the same in A \flat , D \flat , G \flat , and C \flat , which among themselves add a fifth group to the point of resemblance, while A \flat and C \flat show the same fingering throughout the two first octaves.

The "harmonic minor keys," with the exception of A, D, G and C, if started with the first finger, are all fingered alike for one octave and a half, viz.: twice 1, 3, 4 and twice 1, 2, 4. A and D, if the latter from the second octave upwards is played on the D string, are fingered alike throughout. If the scale of D is continued on the A string, they differ from the commencement of the latter string.

G and C show the same relationship towards each other as the two previous keys, but differ from them as they start on open strings, while the latter start with the first finger on the G and C string respectively. The scales of E \flat , B \flat , E, B, F and F \sharp minor, can also be started with the second finger, when the first four and the last two again show great similarity.

The melodic minor scales show similar affinities,

although their different fingering for ascending and descending scales introduces a few more exceptions, which the observant student will soon discover on comparison.

In the before mentioned tables the numbers marked by a dot indicate the first note on each string in ascending, and the last in descending, except in the melodic minor scales, where the fingerings for descending scales are separately marked in the second column. In these the first notes of the new string are marked in the same way as in the case of the ascending scales. All the notes between two dotted numbers have therefore to be played on one string.

In ascending scales the thumb of the left hand rests on the neck of the instrument, up to, and including, the fourth position. When proceeding beyond this it leaves the neck, and is placed on the string, as explained in the chapter on thumb positions. Although it is not actually used in these scales, it follows the first finger throughout at the distance of one tone, forming a support for the left hand. At the same time that the thumb is placed on the strings the alternate use of the first and second finger begins in the ascending scale. In scales of four octaves this takes place as follows :—

In the keys of E \flat and F with the third tone of the third octave.

In the keys of C, D \flat and D with the fifth tone of the third octave.

In the keys of E and F \sharp with the sixth tone of the third octave.

In scales of three octaves it begins :—

In the keys of D \flat , D, E \flat , E, F, F \sharp , G and A \flat at the second tone of the third octave.

The fingering of scales should be done as much as possible in accordance with the nature of the rhythm in which they are to be played. If that be common time, the use of four or two notes in one position should be adhered to as much as possible, while the shifting from three to three notes is the most suitable for triple time.

Alwin Schroeder has already directed attention to this fact in his "Neue Tonleiter Studien" (New Scale Studies, Leipzig, E. Rühle), which may be recommended for the use of students. A scale starting with a longer note than the rest, must again be fingered differently to one consisting of equal notes entirely.

When playing scales in four octaves, the last octave can be added, after closing the third with the third finger on the tonic and taking the super tonic of the fourth octave with the first finger. It is of great importance that the student should thoroughly master all the different ways of fingering, which will all be called into requisition some time or other. The starting of a scale passage on other notes than the tonic will often modify the fingering, in the selection of which much may be left to each individual player, who will be guided in this by the construction of his hand. He should, however, proceed systematically and adhere strictly to one way of fingering, when once decided upon. If he plays a scale passage once in one way of fingering, and anon in another, he is bound to come to grief some time or other by suddenly forgetting which way he should follow.

The practice of scales, starting on other notes than the tonic (for instance on the dominant, subdominant or mediant), will greatly assist the student in playing all kinds of rapid passages at sight.

SCALES WITH THE USE OF THE THUMB POSITION.

The actual use of the thumb in playing scales is two-fold. One way applies to scales beginning in the lower registers. When these proceed above the fourth position either the last note of that position, or the first of the following, may be stopped by the thumb according to rhythm and key. It is advisable to use it on the octave of the open string, whenever that is possible, as that note requires less pressure for its production than other notes, by reason of its being the principal harmonic.

A few examples will explain our meaning, and enable the student to apply it to any other scale :

c' d' e' f' g' a' b' c''
2 4 1 2 4 0 1 2 (for 4 octaves from C)
0 1 2 3 (for 3 octaves ,, ,,)
d' e' f' g' a' b' c'' d''
4 1 3 4 0 1 2 3
e' f' g' a' b' c'' d'' e''
2 4 1 2 0 1 2 3

JA

The second manner in which the thumb is used, applies to scales beginning in the higher positions. In these the first tonic is taken by the thumb in the following manner :

G	D	A
g a b c' d' e' f' g' a' b c'' d''	g a b c' d' e' f' g' a' b c'' d''	g a b c' d' e' f' g' a' b c'' d''
0 1 2 3	0 1 2 3	0 1 2 3

The chromatic scale in the thumb position is fingered thus :

d' d'' e e'' f f'' g g'' a a'' b c c'' d d'' e''
0 1 1 2 2 3 3 0 1 1 2 2 3 3 4
or 0 1 2 3 1 2 3 0 1 2 3 1 2 3 4

returning in the same manner.

Although many players prefer the first manner, the second is preferable, as it avoids the constant *glissando* produced by using each finger for two consecutive notes.

EXTENSION OF THE THUMB POSITION.

By stretching the hand forward, while the thumb remains in its position we can extend the latter by three, or even four notes. This mode of playing is indicated

by the word *restez* being placed over the notes which immediately precede the extension :

D	A	<i>restez</i>							
g'	a'	b'	c''	d''	e''	f'' \sharp	g''	a''	
3	0	1	2	3	1	2	3	4	

The fourth finger is never used on the last note of a thumb passage, although it often serves as turning point on the highest note of an ascending and descending scale or run.

CHAPTER X.

The Fingering of Chords.

I.—DOUBLE STOPS.

UNISONS.—Apart from three unisons, produced with the help of an open string, viz :



they can only be played in the higher positions on account of the great distance. In the above three unisons the note which is stopped in unison with the open string, and which is the first note of the fourth position on the lower string, may be taken with any finger, according to preceding or following passages or notes. In the higher positions unisons are produced by stopping the note required on the higher string with the thumb, and on the lower string with the third finger, or with the first finger on the higher string, and the fourth on the lower one, or both fingerings may be used alternately, viz :



SECONDS.—These can only be produced with the aid of the thumb except three, which can be played with the help of open strings; the stopped note in that case being the last note of the first position, which may be played with any finger, according to preceding or following notes. With the assistance of the thumb, seconds can be played in any position. Major, minor, and augmented seconds are fingered alike. Minor seconds are the most difficult, especially in the lower registers, on account of the great stretch, which may be more than a small hand can accomplish, while every player should be able to stop major and augmented seconds, the latter requiring the smallest stretch. The student should remember that in all intervals from the unison to the fifth (inclusive), the distance between the two notes on the strings stands in retrograde proportion to the size of the interval, so that while a "second" can only be played with the help of the thumb (if both notes are stopped), the major third can be stopped without its assistance, and the fifth is stopped by one and the same finger. From the fifth upward the reverse is the case, and interval and distance of stopping augment in proportion.

THIRDS.—There are, like in the previous and all the following intervals, *three double stops* that can be played with the use of open strings, so that in future we shall omit to mention these. Any finger may be used for the stopped note. All other thirds are played in the neck positions with the first and fourth finger, the minor third requiring the greater stretch, which is the same as that of a stretched position, only that the fourth finger stands on the lower string. The major third reduces the stretch to that of the natural position. From the fourth position upwards thirds are played either with the thumb on the higher note, and the second finger on the lower one; or by the thumb and second, and first and third finger alternately. In this case the second and fourth finger may even be used on the highest third.

FOURTHS in the neck positions are played thus: the "perfect fourth" with the first and third, or second and fourth finger, the diminished fourth, either with the same fingering, or the first and fourth, while the *augmented* interval can be played either with the first and second, second and third, or third and fourth fingers. In the thumb position all fourths are played either with the thumb and first, or any two successive fingers (1 and 2, 2 and 3, or 3 and 4).

FIFTHS.—The perfect fifths are played with one finger or the thumb straight across one string, while the augmented and diminished fifths are played by two successive fingers like the augmented fourths.

SIXTHS.—In the neck positions major sixths are played either with the first and third, or second and fourth finger: and minor sixths with two successive fingers as in the previous intervals, with the difference that in all double stops, from the fifth upward, the first finger takes the *lower* note, while in the smaller intervals it takes the higher one. For instance:

Third Sixth Augmented Sixth



The augmented sixth is fingered 1-4. In the thumb position major and minor sixths are fingered with the thumb and first fingers or any two successive fingers, while the augmented sixth is stopped by the thumb and second, or any two alternate fingers (1-3, 2-4).

SEVENTHS, minor or major, are stopped by the first and fourth finger, in the neck positions, or by the thumb and second, *or* first and fourth finger in the higher positions.

OCTAVES, except the three octaves with one open string (C—c G—g d—d'), are played throughout the whole compass of the instrument by taking the lower note with the thumb and the upper note with the third finger.

In the higher positions, runs of octaves are sometimes played by the alternate use of thumb and third, and first and fourth finger.

NINTHS are seldom used in double stops, and except those with open strings, can only be produced in the higher positions when they are taken by the thumb and third finger.

TENTHS are more frequently used and are played in the higher positions with the thumb and fourth finger.

Wider intervals are never used, and practically impossible.

II.—CHORDS OF THREE AND FOUR NOTES.

These chords are almost inexhaustible, especially in modern music, where the various chords of the eleventh and thirteenth are of very frequent occurrence, and have practically done away with the "suspension" theory, as these suspensions can usually be taken as distinct chords.

To give the fingering for all possible chords would fill a small book by itself, and would be an unnecessary work, as every student will be able to do this for himself when once the system has been clearly explained. As we have already seen how all the possible intervals are to be fingered in double stops, the addition of another note will give but little trouble. It may be useful, however, to give the student such chords, which occur frequently in violoncello compositions, in their harmonic classification, instead of constructing them with the help of one or two stationary notes in an erratic fashion. To save space and repetition the chords of three and four notes are given together under their respective headings.

TRIADS.

ROOT POSITION.

The usual form in which these chords appear is in open harmony. Close harmony is scarcely ever used,

but as it is *possible* in some instances, its fingering will be given for the sake of completeness.

The only note doubled in these chords is the tonic (the fifth *might* be doubled in a few instances only!). This is done by taking it as the highest note of the chord on the A string, and all the chords of *four* notes, as given below, can therefore be reduced to complete chords of *three* notes by the omission of the highest note on the A string).

The fingering for chords of three notes applies equally for the three upper strings, as for the three lower ones. The following is the fingering for all keys :

Major triads, three notes : 1—1—3
or 2—2—4

„ „ four notes : 1—1—3—4

C major with open strings (3 or 4 notes) 0—0—1—2
No other triads with open strings are possible in the root position in this key.

G major with open strings (3 notes only) 0—0—1.

Close harmony (G and D major only possible in neck position) 4—1—0.

THUMB POSITION.

Wide harmony 0—0—1

0—0—1—2

Close harmony (only in higher positions) 4—2—0

Minor triads, three notes : 1—1—2

2—2—3

3—3—4

„ „ four notes : 1—1—2—4

C and G minor with open strings, 3 notes : 0—0—1

C minor only with open strings, 4 notes : 0—0—1—3
(or 0—0—1—2 stretched).

Minor triads thumb position : 0—0—1

0—0—1—2

Minor triads close harmony, neck position : 4—1—0
(G and D minor only possible).

Minor triads, close harmony, thumb position : 4—2—0

Diminished triads, neck position : 2—1—3

or 3—2—4

„ „ thumb position : 1—0—2 (—3)[‡]

Diminished triads, higher positions without thumb :
2—1—3 (—4) or 3—2—4

(The latter is generally used in combination with the former).

The fingering for the chord in close harmony 4—2—0 is scarcely ever applicable, as the stretch is rather wide and the effect doubtful.

Augmented triads, neck position : 1—2—3 (—4).

Augmented triads, thumb position : 0—1—2 (—3).

Augmented triads, positions without thumb : 1—2—3 (—4).

FIRST INVERSION (CHORD OF THE SIXTH.)

The following are only given in wide harmony with the fifth as highest note.

Major chord (all keys) neck positions, or higher positions without thumb, 3 notes :

0—1—1†

1—2—2

2—3—4

3—4—4

Major chord, 4 notes : (doubling tonic) : 2—3—3—0

Major chord, thumb position, 3 notes : 0—1—1

Major chord, thumb position, 4 notes : 1—2—2—0

Minor chord as above : 0—1—1

1—3—3

2—4—4

„ „ (doubling third) : 0—1—1—2

1—3—3—4

„ „ doubling tonic) : 0—1—1—0

1—3—3—1

„ „ thumb position : 0—1—1

* The number in parenthesis completes the chord of four notes.

† A♭ (C, a♭, e♭) and E♭ (G, e♭, b♭) only possible.

Minor chord, thumb position (doubling third):	0—1—1—2
Diminished chord, neck positions :	1—3—2
	2—4—3
" " (doubling third) :	1—3—2—4
" " thumb :	0—2—1
" " (doubling third) :	0—2—1—3
Augmented chord neck position :	1—2—3
" " " " " "	2—3—4
" " (doubling tonic) :	2—3—4—1
" " thumb position :	0—1—2
" " (doubling tonic) :	1—2—3—0

SECOND INVERSION (CHORD OF THE FOUR-SIXTH).

Major chord, neck position :	0—1—2 (—2)
	1—3—4 (—4)
" thumb position close	
harmony :	3—2—0
" wide harmony :	0—1—2 (—2)
Minor chord, neck position :	0—1—3 (—3)
	or 1—2—4 (—4)
" thumb position = same fingering as major chord, with first finger nearer the thumb.	

Diminished chord, neck position (4—6 on F and C only) in close harmony 4—3—0.

All others wide harmony 1—2—4 (stretched position).

Diminished chord, thumb position, close 3—2—0, wide 0—1—3 (—2).

Augmented chord, neck positions, wide 1—2—4 (three notes only).

Augmented chord, thumb position, close 3—2—0, wide 1—2—3—0.

CHORDS OF THE SEVENTH.

(a) Major Seventh.

To explain the nature of this and the following chords falls to the task of the elements of "harmony,"

with which every player of a musical instrument should acquaint himself. For the benefit of those of our readers who are not quite clear in the matter, let it be said that the chord of the major seventh consists of a major third on its root, surmounted by a minor third, and another major third. Each of its four notes can appear in the bass, thus giving Root position, and three different inversions. The notes over the bass note can again be inverted in various ways. In order to save numerous illustrations in staff notation, the chords are given hereafter by cyphers, indicating the intervals from the bass note, which is marked by an "I." For instance: C, e, g, b = I, 3, 5, 7, or in wide harmony: c, g, b, e = I, 5, 7, 10.

The chord of the major seventh is less frequent than those of the minor, or the diminished seventh, and only a limited number of its various forms can be played on the violoncello. Without trying to give every possible form of the chord the student will find hereafter only those that he is most likely to come across *in praxis*.

When appearing as a chord of only three notes, either the third or the fifth of the fundamental chord is omitted.

The following are the fingerings for the chord of the major seventh in any key. The fingerings for the thumb positions is added to that of the neck position.

Form of chord indicating intervals:	Fingering relative to the intervals, as given.
(a) Root position	
I, 3, 7	$\left\{ \begin{array}{l} 4-1-1 \\ 2-0-0 \end{array} \right.$
I, 7, 10	$\left\{ \begin{array}{l} 1-4-2 \\ 0-2-1 \end{array} \right.$
I, 5, 10, 14	$\left\{ \begin{array}{l} 1-1-3-3 \\ 0-0-2-2 \end{array} \right.$
(b) 1st inversion	
I, 5, 10, 13	$\left\{ \begin{array}{l} 3 \quad 3 \quad 4 \quad 2 \\ 1-1-2-0 \end{array} \right.$

(c) 2nd inversion	I, 4, 10	{ 2—1—4 1—0—2
(d) 3rd inversion	I, 6, 9	{ 3—4—2 or 2—3—1 1—2—0

These chords form mostly harsh dissonances in themselves and appear only as passing chords which are resolved immediately.

(b) *Minor Seventh.*

The chord of the minor seventh on the dominant is one of the most important of all, and therefore of frequent occurrence. One of these, the dominant seventh in the key of f (c, e, g, b \flat), affords an opportunity for the use of two open strings as follows :

	Form of Chord	Fingering
Root Position	I, 5, 10, b14	0—0—2—1
	I, 5, b14, 17	0—0—2—1

The same chord with only one open string in the root position :

I, 10, b14	0—3—2
In the 2nd inversion : I, 11, b17	0—1—3

The dominant seventh in the key of C with one open string, Root position :

I, 7, 10	0—2—1
I, 10, 14	0—3—2

Also the first inversion of the dominant seventh of E \flat (a \flat , c, e \flat , g) with the open C string :

I—b10—b13—19	0—2—1—4
--------------	---------

Other chords of the minor seventh, with and without the use of open strings, can be played in the following manner :

Intervals	Fingers
Root Position : 1—5—10—14	{ 1—1—3—2 0—0—2—1
1—7—10	{ 1—4—3 0—2—1
1—3—7	0—1—3

	Intervals	Fingers
1st Inversion :	I—6—12	I—2—4
	I—6—10—12	3—4—4—1
	I—3—6—12	3—I—0—2
2nd Inversion :	I—4—10	3—I—4
	I—4—10—13	I—0—3—2
	I—6—11—17	0—I—2—4
3rd Inversion :	I—6—9	2—4—2
	I—4—9—13	{ 2—I—3—3 I—0—2—2
	I—6—9—12	I—3—2—0
	I—4—9	I—0—2

DIMINISHED SEVENTHS.

Although the diminished seventh is not a fundamental chord, but has to be looked upon as an incomplete form of minor ninth with omission of the generator, it is one of the most useful chords with regard to the violoncello, as it can be easily played in its fundamental form as well as its inversions. In most cases, however, we have to content ourselves with three notes of the chord, the complete chord being impossible except in broken chords.

Fundamental Position.

	Intervals	Fingers
Neck Positions :	I— \flat 7—10	I—3—2
	I—4— \flat 10	2—I—3
	I—5—10— \flat 14	2—I—3—4
	(rather cramped, but possible).	
Thumb Positions :	I—3— \flat 7	3—I—0
	I— \flat 7—10—12	I—3—2—0

First Inversion.

Neck Positions:	I—6— \flat 12	I—2—4
	I— \flat 5— \sharp 13	2—1—4—3
	I— \sharp 6—10— \flat 12	3—4—4—1
Thumb Positions:	I— \sharp 6— \flat 12	0—1—3

Second Inversion.

Neck Positions:	I—6—10	I—3—2
	I— \sharp 4—10	2—1—3
	I— \sharp 4— \flat 10—13	2—1—4—3
Thumb Positions:	I—6—10— \sharp 11	I—3—2—0
	I—6— \sharp 11— \flat 16	0—1—2—3
	I— \sharp 4—10— \sharp 13	I—0—3—2

Third Inversion.

Neck Positions:	I— \sharp 4— \sharp 9	2—1—3
	I—6— \sharp 9	I—3—2
	I— \sharp 4— \sharp 9—13	2—1—4—3
Thumb Positions:	I— \sharp 2—6— \sharp 11	3—1—0—2
	I—6— \sharp 9— \sharp 11	I—3—2—0

CHORD OF THE MAJOR NINTH.

With three open strings

Root position

I—5—9 0—0—0

With two open strings

I—5—11 0—0—2

I—7—9 0—2—0

With one open string

I—10—16 0—1—3

With one open string

Root position

I—5—11 0—1—3

With one open string

First Inversion

I—6—7 1—2
2—3 } —0
3—4 }

With one open string

Second Inversion 1—4—5 3—1—0

With one open string

Third Inversion 1—3—9 2—0—3

(second and third finger stopping at same interval from nut.)

These chords are all based upon the ninth on C.

Other chords of the ninth, with and without the use of open strings, are :—

Root position: 1—7—9 1—4—1

1—5—9—14 1—1—1—2

1st Inversion: 1—6—10—14 1—2—2—2

(or any two consecutive fingers.)

2nd Inversion: 1—5—10 { 1—1—4

{ 0—0—2

3rd Inversion: 1—3—9 2—0—3

4th Inversion: 1—7—11 { 1—4—4

{ 0—2—2

1—4—9 { 4—2—1

{ 0—1—3

CHORD OF THE MINOR NINTH.

This chord can be played only in a very few of its minor forms, on account of the intervals either being too small or too big to be reproduced on the violoncello. Moreover, its character becomes somewhat ambiguous when it is represented by three notes of the chord only, and four notes of this chord are scarcely possible on the violoncello, except in a few instances in the thumb position.

The minor ninth of C with the open strings presents itself as follows:

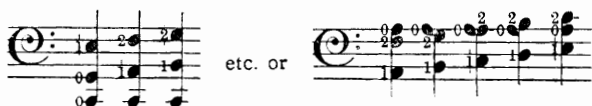
Intervals of Chord	Fingering
1—10—♭16	0—2—4
1—10—14—♭16	0—3—2—0
1—5—♭16	0—0—4

Without open strings, chords of the minor ninth can be played in the following forms :

Root position :	1—5—7—9	}	2—2—1
			3—3—1
			4—4—3
4th position :	1—7—11		1—4—4
do. with one open string :			0—2—2

To attempt to play chords of the eleventh or more is useless, as the number of notes and distance of intervals which is necessary for their intelligible rendering, cannot be produced on the violoncello.

An almost unlimited number of chords can be produced by adding sixths to either a higher or lower open string, viz :



or by playing tenths with an open string in between, like this :



It is advisable for the student to write out in ordinary staff notation the chords given above in figures, and to add the fingering as described.

THE ARPEGGIO

is a designation generally applied to such chords as have been described in the chapter on Bowing, under the above heading. Their fingering will present no further difficulty to the student, as the arpeggio is formed merely by the breaking up, in various ways, of such chords as those whose fingering has been described in the above lines.

the chord through three or more octaves, to remain as long as possible on the lower strings in order to be able to preserve a uniform fingering throughout. This would naturally be interrupted if the A string is reached too soon. For instance, take the D major triad beginning on the C string. You will find the following fingering the most practicable for an arpeggio through four octaves:—

C string		D	F \sharp	A
	Fingers	1	1	4
G „		d	f \sharp	a
	„	2	1	3
D „		d'	f' \sharp	a'
	„	2	1	3
A „		d''	f'' \sharp	a'' d'''
	„	2	1	1(3) 3

If the A string is reached too soon, a different fingering becomes inevitable. This can as a rule be accomplished by the alternate use of the first and third fingers:

C string		D	F \sharp	
	Fingers	1	4	
G „		A		
	„	1		
D „		d	f \sharp	
	„	0	3	
A „		a	d' f' \sharp	a' d f \sharp etc.
	„	0	4 1	3 1 3

These arpeggios are to be fingered alike in ascending and descending. There is, however, another way of descending with a different fingering. Take, for instance, the common chord of C major in the following way:

	<i>Ascending.</i>			
C string		C	E	.
	Fingers	o	3	
G „		G	C	
	„	o	4	
D „		e	g	
	„	1	4	
A „		c'	e'	g' c''
	„	2	1	4 2
	<i>Descending.</i>			
A string			c''	
	Fingers		2	
D „		g'	e'	c'
	„		3	1 2
G „		g	e	c
	„		3	1 2
C „		G	E	C
	„		4	1 0

There is still another way of playing these arpeggios with the assistance of the thumb position. This is done in the following manner. Take the chord of A major:

G string	A c#
	Fingers 1 4
D „	c
	„ 1
A „	a c# e' a' c# e'' a'' c# e''' a'''
	„ 0 1 4 0 1 2 0 1 2 3

and back in the same way.

In some cases the thumb may be used twice running. Take for instance the C major chord downward from c'''. It presents itself thus:

A string		c'''	g''	e''	c''	g'
	Fingers	3	2	1	0	0
D „		e'	c'	g	e	
	„	2	0	4	1	
G „		c				
	„	4				

and from e'' \flat downward :

A string		e'' \flat	b' \flat		
	Fingers	o	o		
D "		g'	e' \flat	b \flat	
	"	2	o	o	
G "		g	e \flat	B \flat	G
	"	2	o	2	o
C "		E \flat			
	"	2			

CHAPTER XI.

Graces or Ornamentations.

THEY used to form the subject of long dissertations and discussions in theoretical works of the older masters, while at one period of the present century they were treated with too much indifference, especially by the average teacher, and also, of course, by his pupil. The confusion arising therefrom has in recent years caused several excellent artists to devote special attention to the subject. One of the most complete books is that which E. Dannreuther published a few years ago through Messrs. Novello, Ewer and Co.

The basis of most of these ornamentations is

THE SHAKE OR TRILL.

It consists in the alternate playing of two notes, within the compass of a second, in more or less rapid succession. One of these two notes is the principal note, which forms part of the melody, or progression, while the second is either the next higher or the next lower note.

In the early eighteenth century music the shake was varied in a great many ways, and each had its particular designation, some of them being very amusing. But the

study of this subject belongs to musical history, and not to violoncello technics. Therefore the enumeration of a few specimens which are still of practical value in the reproduction of the compositions of that time, will suffice in this place.

Before we enter upon the different forms of the shake it will be necessary to say a few words about the way in which it can best be practised.

The player must be careful to avoid all stiffness in the finger which makes the shake, while the finger which remains stationary must stop the string very firmly. There are unfortunately still those who assert that to give crispness and brilliancy to a shake, great force is absolutely required. The poor student who follows their advice stands the greatest chance to get the fiddler's cramp, but none whatever to get a good shake. To obtain this, place the finger which remains stationary very firmly upon the string, hold all the fingers well arched, and drop the finger which is to make the shake *quite loosely* from the third joint, lifting it rapidly as soon as it has touched the string. There are three more things which are of importance for the finger which makes the shake. (1) That it should be lifted as high as possible, which renders the shake more distinct; (2) That it should always fall exactly into the same spot to ensure purity of intonation, and to obtain this the tip of the finger should be dropped *perpendicularly* from the third joint; (3) That the beats of the shake should be exactly of the same value, so that they may be clearly distinguished from each other, thus producing brilliancy. The beats should not be made so rapid in a slow movement as in a quick one, and not *too* rapid in any case lest they become confused. It is, of course, impossible to lay down hard and fast rules for this, as one man will be able to obtain speed with evenness to a far higher degree than another.

The most difficult shake is that between the third and the fourth finger, the latter being shorter and weaker than the rest. Moreover it does not receive the assistance from any of its neighbours, as in the case of a shake

between the second and fourth. The only way to overcome this difficulty is to hold the third finger well arched, perpendicular, and to stop the string with the very tip of it, close to the nail, so that the fourth finger can reach the string more easily in spite of its shortness. The third and fourth fingers must be exercised much more than the other fingers to obtain the necessary freedom and facility. Begin by practising the shake very slowly, playing strictly in time, and taking care that there is an equal number of turns in the shake to every beat in the bar. The best way to proceed is by beginning with four crotchets in a bar in *moderato* time, then taking two triplets in the bar, then quavers, then four triplets, followed by semi-quavers, and so on.

When absolute freedom and ease in the execution of that practice has been acquired, using each two fingers alternately, the student may begin to acquaint himself with the different varieties of the shake.

In order to enable students of the works of the eighteenth century composers to play the graces in accordance with the intention of the old masters, a few hints with regard to their execution may be acceptable. They did not always finish a trill with a turn, as is now the custom, but they had a great many different ways of playing it which were designated by different names, and indicated in the music by various signs. Two of the most important forms were the *battement*, which was played thus:—



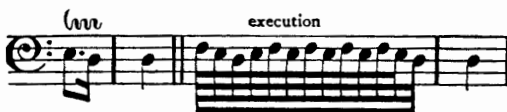
and the *ribattuta*, or backfall:



is indicated by a small note placed before the principal note :—



The shake commences sometimes by what is called a "prefix." This can be of a twofold nature, viz., an upper or a lower prefix. The former occurs only in the works of Bach, Handel, and their contemporaries. It is indicated by a tail turned upwards from the beginning of the ordinary trill mark, and it is executed in the following manner :—

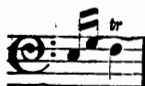


The lower prefix consists of a single lower subsidiary note preceding the first note of a shake which begins with the principal note, or of two notes, viz., the lower and principal note preceding the first note of a shake beginning with the upper note. It is marked thus :—



In order to learn a composer's intention with regard to the execution of a shake, without prefix, as to whether it should begin with the principal or subsidiary note, much may be gathered from his way of writing the prefix, whenever he makes use of it. If the latter be composed of two notes, it indicates a beginning of the shake with

the subsidiary note, while the prefix of three notes points to a commencement on the principal note, as does also the prefix of only one note. In some cases the prefix consists of two notes, one below and one above the principal note:—



The subsidiary note forms (as before stated) the next degree in the scale to the principal note. In the case of a modulation the shake must conform with regard to its subsidiary notes with the *new* key, independently of the signature. In many cases such modulations are indicated by placing an accidental above, below, or aside of the sign of the trill.

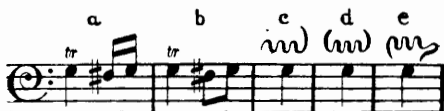
For instance \sharp tr, \flat tr, tr \sharp . These accidentals refer to the subsidiary note, whose position they indicate in the first two instances. They must always be applied when a modulation takes place, even if not indicated in the said manner.

A shake at a commencement of a phrase, or after a rest, or a leap, should always commence with the principal note. Also when the anticipating note is marked staccato, for instance:—



Immediately before the final note of a shake a new subsidiary note is generally introduced which is found one degree below the principal note. This, with the concluding principal note, forms what is termed "the turn." That name has been sanctioned by practice, although strictly speaking it belongs to another species of embellishments which will be explained later on, and of which the turn of a shake forms only the second half. It is generally indicated by two small grace notes (*a*),

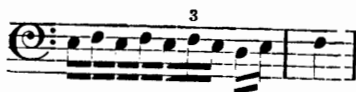
sometimes by notes of ordinary size (*b*), and in ancient music by a vertical stroke, a small curve in a downward direction, or a *regular turn* added to the ordinary sign of the trill:—



'c' = same as "a"; "d" = with prefix from above (p. 128), ending like "c"; "e" prefix from below (p. 128), and full back turn (p. 136).

The turn must be preceded by the principal note, which, of course, is always the case when the higher subsidiary note commences the shake as in most of the older works.

In modern music an extra principal, or trill-note, has to be added before the turn, forming a triplet with the last beat of the shake, thus:—



If the shake precedes an accented note it is always of a more or less cadenceal character, and must end with a turn.

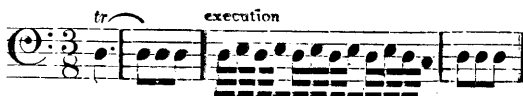


If it is followed by an unaccented note, the triplet formed by the repetition of the principal note will suffice to give it a smoother finish. When the shake is followed by a rest, the turn is usually made, although it is not absolutely necessary unless specially indicated.

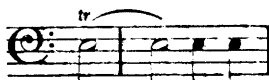


To lay down hard and fast rules for the latter case is impossible. Experience and artistic judgment must decide in each particular instance.

If the principal note is repeated immediately after the shake, the addition of only one lower subsidiary note at the end will be sufficient, as the repeated principal note will serve to complete the turn. This lower subsidiary note is sometimes indicated by a small grace note, sometimes by an ordinary note, and frequently it is omitted altogether; but it must be played all the same. If the repeated principal note is shorter than the trill note, and comes on an accented beat, the shake must be always treated in this manner, even if the second principal note be slurred to the shake.



If the second note is a long note, the two tied notes are considered as one, and the shake continues to the end of the second:—

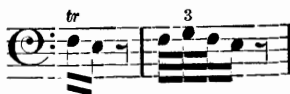


Here the shake continues to the end of the second minim, when it terminates, as above described, by the simple addition of the lower subsidiary note (d); the next crotchet "e" finishing the turn.

In the case of a dotted trill note, the *turn* ends on the dot, which takes the place of a short, repeated, principal note, as above described. The execution of the two following examples is therefore absolutely identical, as the repeated "c" in example "b" merely takes the place of the dot in example "a":—



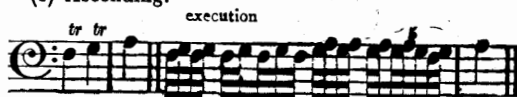
Trills on very short notes consist only of a triplet, without a turn:—



A series of shakes either ascending or descending is called "a chain of shakes." Unless specially indicated, the last shake of the series is the only one which requires a turn. Where the chain ascends diatonically, each shake must be completed by an additional principal note at the end. When it ascends chromatically, however (*i.e.*, by semitones) the same subsidiary note serves for both principal notes. The first of such a pair of shakes requires therefore no extra principal note to complete it.

CHAIN OF SHAKES.

(1) Ascending.



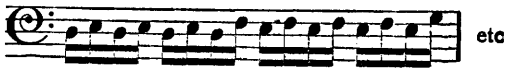
(2) Descending.



(3) Chromatic.



Example "b" of the chromatic chain of shakes shows another variety, where the last subsidiary note of each group advances a full tone instead of a semitone, thus forming at once the subsidiary note of the following group, the last of which receives the usual turn. This manner of execution can be applied also to the diatonic chains when it appears thus :—



Shakes in the thumb position are generally executed with the first and second finger. The second and third fingers are also used occasionally, and an excellent exercise for these, taken from Duport's "Essay on Fingering," may be found in Carl Schroeder's "Schule des Trillers und Staccatos" (School of Trills and Staccato), Op. 39 (Breitkopf and Härtel). The following is a specimen of shakes in the thumb position :—



Long shakes on one note should be started slowly and increase gradually in speed, viz. :—



Double shakes, which appear almost exclusively in the thumb position, are usually played in the following manner :—



In exceptional cases the first and third, and the second and fourth fingers are used for the double shake. In that case the turn can be made with the thumb and the second finger, without change of position, which is unavoidable in the more frequent former manner.

THE PRALLTRILL.

This form of shake, for which the German name has been adopted, is made by a single beat with the upper subsidiary note. It is marked thus:—



THE MORDENT.

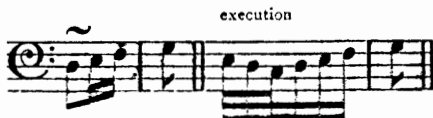
It differs from the former only by the use of the lower instead of the higher subsidiary note, which must be only a minor second, viz., a semitone below the principal note. It appears in the following manner:—



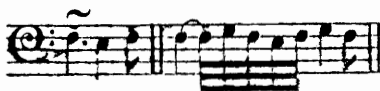
THE "TURN" GROUPELTO.

This is one of the oldest embellishments which is still in constant use. It is indicated by a ~ placed over a note. The notes used for this embellishment are the principal note preceded by the upper second and followed by the lower second, after which the principal note is repeated. If the sign is placed over a short note, those

four notes are of equal value, and cover the whole of its duration. For instance:—



If the turn is made on a dotted note, it covers, as a rule, the full value of the dot:—



If it is indicated over a syncopation it may be executed in two different ways, the first being preferable in quick time, and the second in a slower movement:—



In a figure like the following:—



the turn is treated in the same way as in the previous example on a syncopation. The "Back turn," indicated by an inverted or perpendicularly written sign " \sim " or " \int " belongs chiefly to the older school, although it is not unfrequently met with in modern compositions. In the latter case it is usually written out either in grace notes or ordinary notes. It is played thus:—



beginning with the *lower* subsidiary note instead of the higher one, as in the ordinary turn.

THE VIBRATO OR CLOSE SHAKE.

The latter denomination, which is still casually used, has practically been supplanted by the Italian word *vibrato*; tremolando would be more appropriate. It is produced by pressing the finger which stops the note thus to be embellished, firmly on to the fingerboard, while the left hand performs a trembling up and downward motion which can be modified in speed as the time and phrasing may dictate. The student cannot be warned too earnestly against the abuse of the vibrato, as it is quite as objectionable on an instrument as in a voice. Romberg says that "the close shake was (during the latter part of the eighteenth century) in such repute that it was applied indiscriminately to every note of whatever duration. This produced a most disagreeable and whining effect, and we cannot be too thankful that an improved taste has at length exploded the abuse of this embellishment." It is thus indicated:—



THE APPOGIATURA

consists of a small grace note placed before the principal note. There is a long and a short appoggiatura. The former, which appears in compositions down to the earlier part of this century, has become obsolete, as it

was nothing but a poor excuse for unprepared suspensions which were otherwise forbidden by the old-fashioned laws of the "thorough bass."

This appoggiatura was written as follows:—



The execution of the above example assigns to the appoggiatura its full value, which is deducted from the principal note. The "short appoggiatura," which is now exclusively used, is marked by a little line across the tail of the grace note:—



It is played *on* the beat of the note to which it belongs, but only occupying the smallest fraction of its time. It should on no account be *added* to the previous note, although that erroneous practice is followed by a good many players. Here is a specimen:—



The appoggiatura receives always the accent, and not the principal note. That is also the case when the appoggiatura consists of several notes, as for instance:—



where the "e" of the appoggiatura receives the accent.

THE GLISSANDO AND PORTAMENTO.

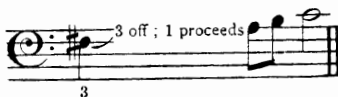
Both consist in connecting two slurred notes with each other, and they are practically one and the same, except that the term "portamento" applies to a more *deliberate* way of sliding from one note to another, than that which is implied by the former term.

The portamento is a favourite ornamentation with singers, and the effect is very beautiful if applied sparingly, and with discrimination. Its abuse gives a whining effect which becomes irritating, and even intolerable. The way in which this embellishment should be executed is to glide with the finger which stopped the last note in one position, to its proper place in the next, when the finger stopping the new note is at once dropped into its place. This must, of course, be done so quickly that no break in the gliding between the two end notes can be heard. The manner here described is subject to the condition that the new note has to be stopped by a finger which is in front of the one performing the slide. The following will make this clearer :



The small grace notes must not be heard separately, they serve only to indicate the spot where the gliding finger stops, when the finger stopping the new note is immediately dropped into its place. If the finger which has to take the new note stands *behind* the one stopping the previous note, the latter commences the slide, but if

released, whilst in the act of gliding, by the former, which thus arrives directly on the new note :—



The case may be that both the new note, and the one previous have to be stopped by one and the same finger. If that should occur, great care must be taken to guard against weak sentimentality accruing from letting the finger travel too slowly. The pace at which the slide has to be executed is ruled and modified to some extent by the tempo of the piece. In any case it must not be too slow, and this rule applies equally to any of the three kinds of fingering above described.

If the upper note is very short, the time quick, and the end note has to be sounded with great force, it is best to slide with the same finger which has to stop that note, even in case it did not stop the previous one. In that case, however, the finger should slide very rapidly, and press down the string very firmly. The effect will be one of great energy, which is exactly the reverse of that obtained by moving it slowly.

THE PIZZICATO.

This word is the Italian equivalent for "plucked," which at once explains its meaning. The strings here should not be sounded with the bow, but by being plucked like those of the harp.

As a rule this is done with the first or the second finger of the right hand, or by using the two fingers alternately, while the bow is held by the third and fourth fingers. In modern music the technic of the pizzicato has been greatly developed, and long and rapid passages have now to be played frequently in this manner, whereas, down to the middle of this century it was, as a rule, only employed for notes or passages in moderate

time. Such passages as the one in Beethoven's B flat trio, Op. 97, were considered as very difficult and quite exceptional. In modern music they are to be met with very often. Jos. Werner, in his "Art of Bowing," recommends the practice in pizzicato of certain running passages like one from Mozart's "Titus" overture.

To make a good pizzicato the strings should be plucked near the end of the fingerboard, but *over* the latter. This should be done with the tips of the fingers and with the fleshy part. The nails should never be used, as the tone which they produce is not agreeable. In rapid time several notes can be played by plucking the string only once, while the fingers of the left hand drop down on one or two more notes after the first note has been sounded. This has been utilised by Mendelssohn in the scherzo of his famous violoncello sonata in D major:—



Here the first two notes are plucked separately, as also the third note (first grace note d'), while the e' and f' sharp are sounded by stopping them quickly and firmly by the second and fourth fingers.

Chords of three notes are played as a rule by using the thumb for the bass, the first finger for the middle note and the second for the upper note.

In chords of four notes the thumb takes the *two* lower notes, while the first and second take the two upper notes respectively.

In slow time or at the end of a piece a good effect may be produced by sounding all the notes of a chord more or less slowly by the thumb only, which gives a kind of harp effect. An excellent exercise for pizzicato is No. 11 of Ferd. Büchler's exercises, Op. 9, where he

also gives a fine arpeggio effect to be executed with the thumb, first and second fingers.

Two chords in rapid succession may also be played by firmly gripping them like the notes in the above example from the Mendelssohn sonata, for instance:—



An exercise for this is contained in Carl Schröder's "Eight Caprices," dedicated to Piatti.

In many instances the *left* hand is used in producing the pizzicato. This occurs most frequently when a long shake or a cantilena is accompanied by a few bass notes, for instance:—



Pizzicato passages are sometimes produced by the right and left hand alternately plucking the strings, as the following:—



The *d'* in this passage is stopped with the fourth finger, and plucked with the forefinger of the right hand. The fourth and third fingers of the left hand then pluck the string sounding the *c'*. The second finger in its turn sounds the *b*, and the first finger the *a* in the same way, after which the fourth stops the *g* on the *d* string, which

is again sounded by the forefinger of the *right* hand in the usual way.

Bowed notes are sometimes interspersed with pizzicato notes, in which case the latter are produced with the left hand. The following specimen is the commencement of an exercise of this kind taken from Vaslin's excellent book "L'art du Violoncelle," Paris, Richhault):



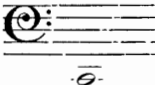
Harmonics can also be played pizzicato, the thumb touching the string very lightly while the tip of the first finger of the left hand makes the pizzicato. A specimen is contained in Carl Schröder's "Mückenspiel" (Cranz).

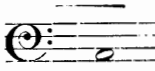
CHAPTER XII.


Harmonics.

EACH note produced by a string is not altogether an elementary sound, as it is formed by a compound of vibrations from the nut (or the place where it is stopped on the fingerboard), to the bridge.

The string vibrates not only throughout its whole length, but also, and simultaneously, in *aliquot parts* of that length, *e.g.*, in halves, thirds, fourths, fifths, etc., and the mutual relation of the tones produced by the vibration of these aliquot parts remains always the same, as explained in Professor Prout's "Harmony."

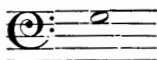
Thus the open C string gives 

each half will sound 

or the higher octave, while each quarter (half of the half) gives  the eighth will give the c'

one octave above the latter, and so on. If the string vibrates in thirds it produces the twelfth of the funda-

mental tone, *i.e.*, the fifth in the second octave on the C string. The sixth gives the higher octave of this,



and the twelfth the higher octave of the

former.

Professor Prout tells us in the above named work that the name Harmonics is not scientifically correct, but has been retained by common usage in preference to the more correct denomination "upper partial tones or overtones."

To a good and well trained ear some of these overtones or harmonics are distinctly audible after striking a bass note very forcibly and watching the sound as it dies away.

If the string is touched *very lightly* in one of its aliquot parts by the tip of a finger, without pressing it down, the relative harmonic will appear *instead* of the fundamental note. So, for instance, if we place our finger over the highest (third) note in the fifth position ("c" on the C string) which exactly halves the string, we obtain the octave of the open string as harmonic. The following table shows all the harmonics thus obtainable, and also the notes over which they appear, that is, the notes which the finger would produce in the same spot by pressing the string firmly on to the fingerboard instead of barely touching it without any pressure. Harmonics produced in this manner are called "Natural Harmonics," in contradistinction to *artificial* harmonics, which will be explained hereafter.

From the accompanying table we see that the middle of each string marks a point of primary elementary division into two halves, showing in their relative subdivisions as they approach the outward extremities (nut and bridge) a repetition of the same notes. This is based of course upon the fact that the subdivision of any part of the string produces a higher harmonic than the whole part. As all divisions of the string which are less than

Musical notation for the first staff, measures 1-16. The staff uses a treble clef and a key signature of one sharp (F#). The notes are: 1: F4, 2: F4, 3: F#4, 4: F#4, 5: F#4, 6: F#4, 7: F#4, 8: F#4, 9: F#4, 10: F#4, 11: F#4, 12: F#4, 13: F#4, 14: F#4, 15: F#4, 16: F#4.

Musical notation for the second staff, measures 1-16. The staff uses a bass clef and a key signature of one sharp (F#). The notes are: 1: F3, 2: F3, 3: F#3, 4: F#3, 5: F#3, 6: F#3, 7: F#3, 8: F#3, 9: F#3, 10: F#3, 11: F#3, 12: F#3, 13: F#3, 14: F#3, 15: F#3, 16: F#3.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

G String

Musical notation for the G String, measures 1-16. The staff uses a treble clef and a key signature of one sharp (F#). The notes are: 1: F4, 2: F4, 3: F#4, 4: F#4, 5: F#4, 6: F#4, 7: F#4, 8: F#4, 9: F#4, 10: F#4, 11: F#4, 12: F#4, 13: F#4, 14: F#4, 15: F#4, 16: F#4.

Musical notation for the C String, measures 1-16. The staff uses a bass clef and a key signature of one sharp (F#). The notes are: 1: F3, 2: F3, 3: F#3, 4: F#3, 5: F#3, 6: F#3, 7: F#3, 8: F#3, 9: F#3, 10: F#3, 11: F#3, 12: F#3, 13: F#3, 14: F#3, 15: F#3, 16: F#3.

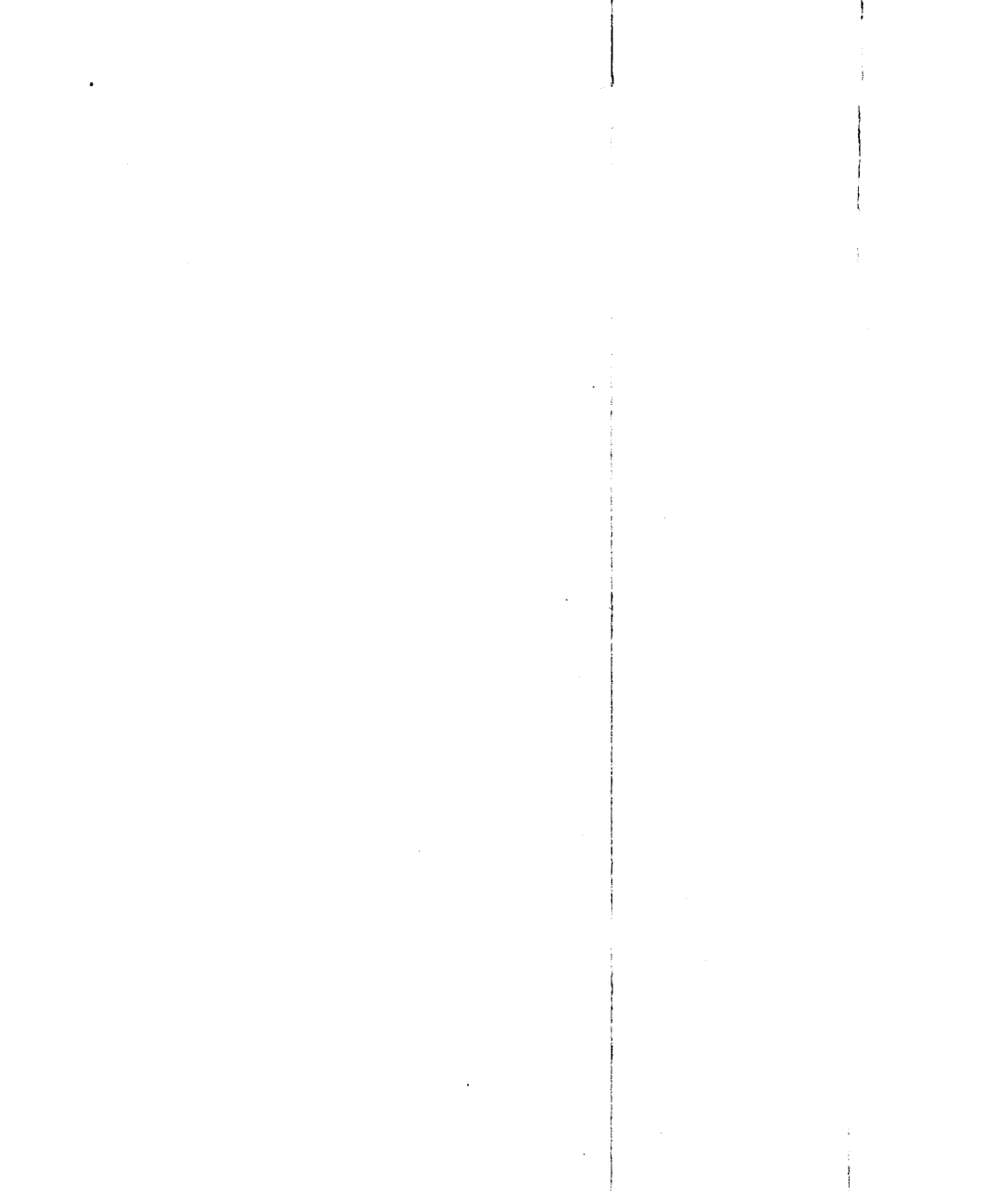
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

C String

Musical notation for the C String, measures 1-16. The staff uses a bass clef and a key signature of one sharp (F#). The notes are: 1: F3, 2: F3, 3: F#3, 4: F#3, 5: F#3, 6: F#3, 7: F#3, 8: F#3, 9: F#3, 10: F#3, 11: F#3, 12: F#3, 13: F#3, 14: F#3, 15: F#3, 16: F#3.

Musical notation for the C String, measures 1-16. The staff uses a bass clef and a key signature of one sharp (F#). The notes are: 1: F3, 2: F3, 3: F#3, 4: F#3, 5: F#3, 6: F#3, 7: F#3, 8: F#3, 9: F#3, 10: F#3, 11: F#3, 12: F#3, 13: F#3, 14: F#3, 15: F#3, 16: F#3.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16



one half occur more than once in the course of its full length, the harmonics which they produce will appear together with them, centralising in the middle. The harmonic here produced—the octave of the open string—is therefore the strongest and most brilliant of all, as it is a compound of all the harmonics of the upper and lower half. Both halves when sub-divided again into equal parts produce the double octave, which coincides in the lower half with the fourth finger in the first position, and in the upper half it will be found in the same spot where that note is stopped in the ordinary way, and the same is the case with *all* harmonics in the *upper* half of the string except one, the fact will not require to be stated again hereafter. The only exception is the double octave of the major third or seventeenth of the open string, which appears at each fifth of the string, and therefore occurs at the distance of one major third above the middle, thus giving the *octave* of the stopped note instead of the unison, as the other harmonics in the upper half of the string. It occurs first at a major third from the open string and is therefore taken by the third finger in the first position, and again it occurs over the major sixth of the open string, thus falling to the third finger in the fourth position. The upper half explains itself by the above remarks. The twelfth or octave of the fifth appears twice:—at one third, and two thirds from the open string, and falls to the first finger of the fourth position in the lower half, where it gives the octave of the stopped note. The double octave appearing at one quarter and three quarters, falls on the neck to the fourth finger of the first position, while the second finger in the same position when taken a little sharp marks a sixth of the length of the string, giving the double octave of the fifth, and the same finger taken a little flat gives, at a seventh of the string's length, the double octave of the minor seventh, which harmonic, however, sounds a little flat. The first finger taken a little sharp gives at one eighth of the string the triple octave or twenty-second. The two last named harmonics are somewhat risky in the

lower half, and are usually only played in the upper half, where they are perfectly safe. Another third, fifth and octave may be obtained in the fourth octave in the open string, quite near the bridge, but they are scarcely ever used.

The afore mentioned notes exhaust the list of the *natural harmonics*. Besides these there are the *artificial harmonics*, which are of very frequent occurrence and are practically unlimited, as they can be produced in any part of the instrument. This is done by placing the thumb firmly on to the string, thus creating an open string of shorter length (the thumb forming the nut), of which the first, second, or third fingers mark the subdivisions. Four different harmonics are thus obtainable in each position of the thumb: the double octave of the major third (from the thumb), by touching the string lightly over the spot where the latter occurs; the double octave from the thumb note by touching the string over the fourth, the twelfth by placing it over the fifth from the thumb, and the octave by touching the string over the spot where that note would occur in the ordinary way. Needless to say, this can only be done in the higher positions on account of the distance. The twelfth and double octave (over the fourth and fifth) occur most frequently, because they speak easily, while the double octave of the major third is a somewhat risky note.

EXPLANATION OF THE PRECEDING TABLE OF NATURAL HARMONICS.

THE "Harmonics" are numbered 1 to 16 as they appear in their order from the nut to the bridge.

The black notes indicate the spot over which the harmonics are produced by touching the string very lightly with the tip of the finger, without even so much pressure as would in the least degree bend down the string. The white note above each black note gives the actual sound of the harmonic produced in that spot.

The first harmonic, "No. 1," gives the triple octave or twenty-second of the open string. The first finger has to be placed over the *b*, but has to take it a little sharp, and the harmonic thus produced is also a little sharp. The harmonic No. 2 gives the double octave of the minor seventh or twenty-first of the open string. The second finger (*c'*) has to be taken a little flat and this harmonic is also a little flat.

No. 3, the double octave of the fifth or nineteenth, has to be taken a little sharp and sounds also a little sharp. No. 4 must also be taken a little sharp. It produces the double octave of the major third or seventeenth.

No. 5 gives the double octave or fifteenth of the open string. It sounds a trifle flat, but so little that it can always be safely used.

No. 6 gives the octave of the fifth or twelfth of the open string.

No. 7 gives the double octave of the major third, or seventeenth.

No. 8 gives the octave of the open string (middle of string).

No. 9 gives the double octave of the minor seventh or twenty-first.

No. 10 gives the double octave of the major third or seventh.

No. 11 gives the octave of the fifth or twelfth.

No. 12 gives the double octave or fifteenth.

No. 13 gives the double octave of the major third or seventeenth.

No. 14 gives the double octave of the fifth or nineteenth.

No. 15 gives the double octave of the minor seventh or twenty-first.

No. 16 gives the triple octave or twenty-second.

ARTIFICIAL HARMONICS.

These are indicated in two different ways. Popper often writes them in this way:—

0 0 0 0 0 0 0 0 0

Sous-harm.

3 3 3 3
0 0 0 0
0 0 0 0

or

Sous-harm.

In both cases the notes in the staff have to be stopped by the thumb while the third finger touches the string at the distance of a fourth. A clearer and more correct way of notation is the following :—

3
2

Harm.

from Vincent d'Indy's "Lied" for violoncello. The black notes are to be stopped by the thumb while the third finger has to touch the string over the open notes.

It will be useful for the student to make himself thoroughly well acquainted with the scales in different kinds of artificial harmonics (twelfth, double octave, etc.), as also by constructing scales of natural and artificial harmonics combined, as for instance :—

Effect.

4 1 4 1 2 4 4 1

2nd str. 3rd. — 2nd. 1st. 2nd. — 1st.

* Strings to be touched over these notes.