

respected friend  
Mr Black

A TREATISE  
(Explanatory of the Principles constituting  
THE  
Practice and Theory  
OF THE  
**VIOLONCELLO;**  
AND OF  
a Systematic method of Fingering,  
Fully Exemplified in  
Every Compass of the Instrument;  
with a  
Description of the Harmonics  
throughout its whole Extent;  
Illustrated by delineated Figures, and Experiments  
ascertaining the nature of the  
**HARMONIC SYSTEM;**  
AND  
Containing also a short account of the  
RISE, PROGRESS, and GENERAL ELEMENTS OF  
**Music**  
as far as the Work  
necessarily requires such Illustration.  
) By John. Macdonald Esq. F.R.S. F.A.S.  
late Lieut. Col. Engineer, and Author of several Works.

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TO  
HIS ROYAL HIGHNESS  
**GEORGE PRINCE OF WALES,**  
PRINCE-REGENT

OF THE  
UNITED KINGDOM OF GREAT BRITAIN AND IRELAND.

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SIR,

THE gracious condescension experienced by all who have the happiness of approaching your Royal Highness, enables me to offer my most grateful acknowledgments for the solicited honour of this Dedication.

In the classical literature of ancient Greece and Rome, equally as in the languages and belles lettres of modern Europe, it is well understood that your Royal Highness is among the first proficient: and in studying sciences essentially connected with the interests of the exalted empire whose sceptre you are destined to wield, that of Music attracted your attention at a very early period.

Its leading influence over the human mind, and its effects in gradually promoting general civilization, have been duly appreciated by your Royal Highness: and you are known to have paid a particular attention to national airs, songs, and martial music, from a sense of the enthusiastic and patriotic ardour which they are calculated to inspire. During a long residence in India, I have observed this effect; and when I visited France with a view of unfolding the state of tactics and discipline of that country, I marked the powerful application of music to warlike purposes.

The British Navies and Armies are fully apprized that their PRINCE REGENT is not only a superior judge in these cases, but that he is the

constant Patron and Encourager of every other art and science practically connected with their welfare and discipline; and with the happiness, glory, and prosperity of Britain, not less distinguished by arts and arms, than celebrated for the continued practice of the virtues of philanthropy and benevolence.

As it is an axiom in the first of sciences, that “the whole is equal to its parts;” so any attempt to improve a detached department, may ultimately tend to ameliorate the general subject. It is under this consideration principally, that I humbly presume to present the present work to your Royal Highness; fully sensible that I can convey no instruction to a Prince of acknowledged taste in music, and highly skilled on the superior instrument, the theory and powers of which I have feebly attempted to illustrate.

I cannot permit myself to close this imperfect address, without recording my admiration of the wisdom of your Royal Highness’s Administration, so forcibly and justly impressed on the public mind.

I have the honour to subscribe myself,

With the utmost deference, duty, and respect,

YOUR ROYAL HIGHNESS’S

Very faithful and devoted Servant,

JOHN MACDONALD.

## CONTENTS.

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	Page.
<b>PREFACE</b> . . . . .	v
<i>A short Account of the recorded Origin of Music, and of its State among the Ancients</i> . . . . .	1
<i>On the State of Music in the Middle Ages; with a Sketch of the general Principles which regulate it in modern Times, and some Notices of Instruments</i> . . . . .	5
<i>A Delineation and Explanation of the Whole of the Finger-board of the Violoncello, and of the Harmonic System of the Instrument, including the Diatonic and Chromatic Scales, to the Extremity of the Fourth Octave of each String; and the numerical Divisions corresponding to the Positions of the Tones and Semi-tones within the Compass of the relative Octaves of the general Scale</i> . . . . .	15
<i>A new System of Fingering the Violoncello; offering Facilities of teaching, to the Instructor; and to the Scholar, a ready, easy, and natural Mode of executing any Description of Passage, in all the Keys, and in every Position of the Hand and Compass of the Instrument; accompanied with Music of figured Illustration</i> . . . . .	25
<i>A compendious Dictionary of the principal Musical Terms</i> . . . . .	51
<i>To hold the Instrument</i> . . . . .	27
<i>To hold the Bow</i> . . . . .	28





## P R E F A C E.

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**ACCORDING** to the statements of ancient authors, it appears that Music was made an incitement to moral action. The distinguished achievements of illustrious characters constituted, through the medium of melody, the strongest inducement to virtue : and stimulated mankind to a meritorious course of heroic conduct, and to those patriotic deeds which embellish the pages of ancient history. Many of the eminent philosophers of antiquity, however much their various systems might differ in other respects, have uniformly recommended the practice of Music, as conducive to purposes of the highest public utility. Plato and Aristotle have expressed the most decided approbation of this sublime science, which they justly considered as efficacious in forming a beneficial national character, and in producing a patriotic attachment, proof against "treasons, stratagems, and spoils." While gymnastic exercises rendered the body hardy and robust, the influence of "sweet sounds" softened and humanized the general manners, and substituted regulated feelings, and correct habits, in lieu of unrelenting ferocity, and the barbarity which marks the savage state. Eminent as have been the services rendered to the cause of society, in former times, by the power of Music, it is only at later periods that it has assumed the form of an art, and attained to the dignity of an established science. There is reason to conclude, that it arrived at no inconsiderable degree of refinement among the Greeks : but of this the distinct traces and records are lost, though much ground for reasonable conjecture remains, from a due consideration of what has escaped the ravages of time, and has been transmitted in a genuine form. During the dark and middle ages, the practice of Music was principally confined to the Church, and was as imperfect as that era was rude and unpolished. In the present age, Composition, under the guidance of abstract science, has arrived at a state deemed by many almost a *maximum* ; but from the multiplicity of refinements (many of them equally capricious and fastidious) which have been introduced, it is much to be feared, that truth and nature are too frequently lost sight of ; and when such a case becomes applicable to a science founded on feeling and cultivated taste, its degeneracy is at no great distance. We sincerely deprecate this evil, and trust that the great Composers of the day will look to what Music was, when Handel and Corelli corrected the exuberance of fancy, and confined it within those legitimate limits, beyond which imperfection must commence. The cause to which this noble science owes its most attractive, powerful, and universal charms, lies

deep in Nature herself; and while this impression continues to prevail in the mind of a Composer, his harmony will retain its empire over the mind, because the sources from which he derives it will be permanent and pure.—Of all the gratifications of human life, that yielded by Music is probably, that alone which is without alloy. Sense is indulged with the approbation of reason; and though the delight may be fugitive, it may be perpetually renewed without any dereliction of innocence, provided it be not made the business, instead of the recreation of life, from which neither splendour nor obscurity can remove vexations wisely incident to a state of probation, thus tempered by the fascinations of a soothing science. There is sacred, as well as profane authority in abundance, for believing, that the practice of Music was made subservient to the general cause of virtue and of public morals. Harmony was, always, made a symbol of the order and symmetry prevalent throughout the whole compass of material and intelligent nature; and its value in influencing political conduct and general motives, was duly appreciated by the wisdom of antiquity.

If what is stated, thus briefly, be fact, let no one, who has not intimately weighed this momentous and important subject, yield so far to unworthy prejudices and misconceptions, as to disapprove of any attempt to elucidate or improve what may be calculated, however indirectly, to meliorate the condition of Society. Whoever has not taken a philosophical view of the general subject, has yet to consider it in its primary aspect. The practice of a science, and the influence it is capable of producing in a moral point of view, are distinct considerations, which, united, lead to consequences connected with the best interests of social order, which is in itself analogous to Harmony.

It is unnecessary to anticipate here, in almost any degree, the account which it was judged eligible to give in the following small work, of the origin of Music, and of its state among the ancients. As the work, however, is rather of an uncommon description, a general sketch of its features may be expected in this introduction.—The present instrument may be traced to various modifications of the Cithara. It resembles many stringed instruments which we have seen, on a less scale, among several Eastern nations. Egypt is the fertile source of this, as well as of almost every other description of knowledge; and the construction of stringed instruments, probably, originated in that inventive quarter of the world. Subsequent to the conquest of Egypt, two obelisks were brought to Rome by order of Augustus. By tradition, they were said to have been erected by Sesostris, about four hundred years previously to the siege of Troy. In the sacking of Rome, in the year 1527, one of these celebrated obelisks was thrown down and broken. It lies in the Campus Martius, under the name of the *guglia rotta*, or the *broken pillar*. There is distinctly represented on it, in basso relievo, the figure of a musical instrument *with a neck and two strings*. By tuning these strings fourths to each other, the tetrachord of four notes was produced; and if tuned by fifths, an exact diatonic octave of successive notes could, at once, be obtained. The moderns have doubled the number of strings, and have enlarged this instrument, seen on the obelisk of Heliopolis; and thus, at once, we have the source to

which the Violin, the Tenor, the Violoncello, the Double Bass, and such instruments, may be traced, without having recourse to more fanciful origins. The system of fingering, so amply detailed and exemplified in this work, is founded on just and simple principles, containing an easy and ready transition of the hand from one position to another, in every compass of the instrument. The examples might have been fingered, in many instances, in lower situations, or nearer the nut; but to this there will ever remain a standing objection, *viz.* the want of softness and sweetness of tone there, compared with the contrary effect, in positions somewhat higher on another string. The successive running of the notes being similar, as fully explained, the passage may be played with the same fingering, in general, in a lower position; *but the effect will not be adequate*, independent (particularly in slow movements) of introducing, frequently, the very fine *harmonics*, at the middle of the three back strings, which, with a little practice, can be readily *touched off*; also, in more rapid passages. If examples are found fingered differently from what appears in other works of repute, no disapprobation is intended; as the reasons, which it is trusted are well founded, are fully assigned.

The words *shift*, *back shift*, and *full shift*, are avoided in this work; as it appears that these expressions are perpetually liable to equivoques and mistakes on the part of the learner, and to much misunderstanding and trouble on that of the teacher. A word from the latter, is immediately followed by *instant* conception of meaning by the former; and thus, equally, in *alto*, in the *tenor*, and *lower compass*. The simplicity of this must appear quite obvious, when it is considered that there are *two* species of back shifts, *four* descriptions of half shifts, and *four* kinds of full shifts. We leave it to the reader to judge, how far the scholar must be embarrassed in referring, instantly, to the intended *shift*, under such an equivocal meaning.

The mode of giving the scales is intended to impress their relative characters strongly on the mind. *Each scale* rises by successive notes, and by the notes of the common chord, on two strings, and on one only; and descends to the fundamental note, by a closing chaunt. The scholar, or any player, may thereby readily habituate his ear to run a scale in ascent or descent, with accuracy of stopping, in any key or compass of the instrument. Any example, on any string, and in any position or compass, is equally illustrative of a different key in the same position, on contiguous strings, with precisely the same fingering; as is amply explained. This mode of giving the scales, by a *representative instance*, saved much exemplification.

The analyzation of the finger-board, by the projection of a *figure of its whole extent*, gives not only a complete view of the entire diatonic system of the instrument throughout, but elucidates the *harmonic* doctrine almost without any other explanation than mere inspection. The whole is apparent by a slight examination of *Fig. 1.* which has exactly the effect of what the French mean by the expressive phrase of, *sauter aux yeux*. This, however, was not alone trusted to; for a minute detailed account is given of the *harmonics*, and of their sameness, or correspondence throughout the entire extent of the Violoncello. Allowing for difference of size, and appellations of notes, the detailed explanation of the

finger-board, of the *harmonic* system, and of the notes, is also applicable to the Violin and Tenor; excepting that the *higher harmonics* cannot be brought out on these instruments. Fine *harmonics*, are too frequently omitted in playing, though those acquainted with their nature, and positions, well know how superior they are, in general, to the *same note* obtained by stopping, or pressure. In order to call the attention to the *harmonics*, they are notified by a *strong dot* placed to the left of the finger figured. The string meant is always indicated by the lowest figure under the relative notes; and the position, by the figure or notification under the fingering. One principle in fingering requires, in any system, a strict attention, because it is *founded in nature*. On account of the conformation of the hand, the fore-finger and middle finger open from each other with great facility; while, on the contrary, the third finger cannot, without great constraint, be extended above the distance of a semi-tone from the middle finger. On this account, the taking of a full note by the third finger, from the second supposed on the note below, is uniformly avoided. On this circumstance, principally, is established the doctrine of close and extended positions in the lower compass of the instrument. What is meant *only* holds while the thumb remains behind the neck: for if it is brought on the finger-board, in any situation, the unwillingness of the middle and third fingers to separate, no longer remains, and it (the third finger) may be extended with ease, as far as two notes, and more, from the situation of the middle finger. This shews how cautiously things should be disapproved of, without a thorough examination of the principle on which the *rationale* of the thing may be founded.

The short account of common practices, and musical terms given, is inserted, merely because the omission would be a chasm or defect, thus avoided. Errors have been guarded against. If any may have inadvertently crept in, the liberal-minded will readily make a due allowance for such casual circumstance, liable to happen in works of this didactic description, more than in other cases of a less complex character.

The sketch drawn up on the leading elementary principles of Music, is only addressed to those whose avocations and habits have been such, that no time could be afforded for this study. It may stimulate others to a farther pursuit of the subject.

The writer of these sheets has read much of what is printed on the subject of Music in general. How far he may have benefited by the perusal of a multiplicity of authors, he will not presume to decide. One thing he finds little hesitation in advancing; which is, that much as may be understood on the subject of *harmonics*, much more evidently remains to be demonstrated. Discoveries in science ought to be claimed with much caution; more especially when it is a recorded fact, that philosophers in different countries, at nearly the same period, have made the same discoveries, involving similar scientific improvements.

It has been long known, that if a string, in vibration, should be lightly touched (we have found the touch by the smallest point sufficient) at certain aliquot points of division of the string, such string will immediately divide itself into vibrations corresponding with the point so touched. The half, or third, of the string has been generally thus experimented on. In these cases, a *harmonic* sound is heard; that of the octave, when the middle of

the string is touched; and that of the twelfth major, when the third part from either end is touched lightly.

A *harmonic* is produced by touching lightly, at *any* aliquot division or point marked off *harmonically* in Fig. 1. It has been hitherto an unsatisfactory conjecture, or rather an absolute uncertainty, what action the whole of the lower part of a string may be in, while the upper small portion is vibrating any certain *harmonic*; such, for instance, as the nineteenth major, given *harmonically*, by one sixth part of the string from the bridge. It is with deference presumed, that the series of new experiments related in this work, *completely ascertains the action throughout the whole length of the string*: or, in other words, that *each aliquot part is, at the same time, sounding one and the same harmonic*, while the intermediate points remain *at rest*, and are bridges, over which the concatenated general and divided vibration is conveyed from one division of the string to another. The experiments detailed *prove* this curious, and, it is presumed, additional, and very interesting fact, which tends to account, in a great measure, for the whole doctrine of *harmonics*.

To the practical player on the Violoncello, and not to those deeply skilled in the science of Music, this work is addressed. With those who, on a perusal of the work, derive no degree of information from it, we should be glad to communicate, for the sake of farther insight on so interesting a subject: and with due deference we address to those the words of a favourite poet: "*Si quid novisti rectius istis, candidus imperti.*"



*A Minute Delineation of the whole Extent of*  
**THE FINGER-BOARD OF THE VIOLONCELLO;**  
*of the Harmonic System to the extremity of the Fourth Octave; of an improved method of fingering, & of the aliquot divisions of Strings referring to described Experiments;  
& to the Diatonic and Chromatic Scales, with a figured & written exposition of these subjects.*  
By LIEUT. COL. MACDONALD, &c. &c.

FIGURE 2<sup>d</sup>

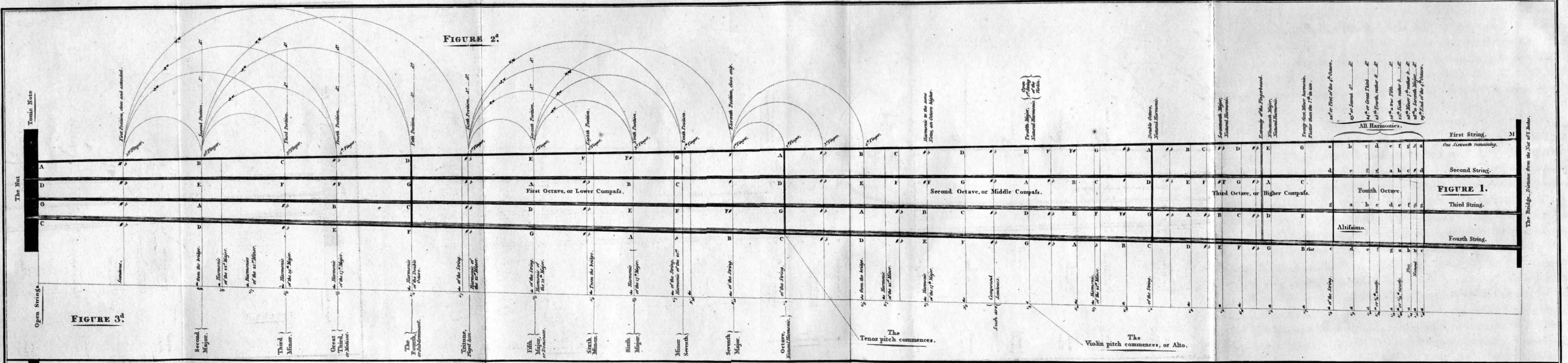


FIGURE 3<sup>d</sup>

FIGURE 5<sup>d</sup>

The Fundamental Note, the 12<sup>th</sup> Major, and the 17<sup>th</sup> Major, sounding at once, on the same String.

Six Simultaneous Vibrations of the Twentieth Major on one String; each 6<sup>th</sup> part sounding that Note.

FIGURE 4<sup>th</sup>













notes arranged by rules for the various instruments, the ancients do not seem to have possessed. Seneca writes, "Non vides quam multorum vocibus chorus constet? Unus tamen ex omnibus sonus redditur: aliqua illic acuta est, aliqua gravis, aliqua media. Accedunt viris fœminæ, interponuntur tibix, singulorum latent voces" (no particular voice is distinctly perceivable) "omnium apparent." Cassiodorus writes, "Symphonia est temperamentum sonitus gravis ad acutum, vel acuti ad gravem, modulamen efficiens, sive in voce, sive in percussione, sive in flatu"—*Symphony, in vocal or instrumental music, is an adaptation of grave and acute notes constituting a modulation.* All this proves nothing farther than that they sung and played in *choirs*, in probably octaves, and an unvaried junction of common concords, devoid of the multiplied and scientific intervals, demanding so much of that genius and cultivated taste apparent in modern composition.

The instrument termed *Pandora*, had four strings struck by a *plectrum*, or quill attached to the fore-finger. These strings furnished a fundamental, the octave, a fourth, and fifth. This was little better than *unison*; and was incapable of the compass and variety furnished by the comprehensive *modern style, in parts*. The public laws of Greece discountenanced every thing like innovation in their primitive and simple music: and this greatly accounts for the little knowledge possessed by the ancients in the art of *harmony and composition*, which may be, probably, too complex and elaborate, substituting too frequently a wild and unmeaning rapidity, or trick of finger, for a pathetic harmony addressed to the feelings, and calculated either to soothe or agitate the passions. It is highly probable, that modern composition, which so frequently steps out of nature into mere frivolous movement, captivating only to the eye, will, ere long, undergo an advantageous change; and thus lose the reproach of scientific nonsense applicable to a large portion of modern music. We are falling fast, in these respects, into a vitiated taste of admiring only what we deem difficult, while we forget the legitimate ends of music, *viz.* its charming effect in exciting the finest emotions of the mind, on subjects involving the best interests of virtue, and human happiness.

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## ON THE STATE OF MUSIC IN THE MIDDLE AGES;

WITH

A SHORT SKETCH OF THE GENERAL PRINCIPLES WHICH REGULATE IT IN MODERN TIMES,  
AND SOME NOTICES OF INSTRUMENTS.

IN all ages, Music seems, very properly, to have formed no unimportant part of religious worship. About three hundred and fifty years after Christ, St. Ambrose introduced the *chaunting of the Psalms* into the Western Church. These *chaunts* were composed from four, to eight parts. Instrumental music was soon afterwards added. In the year 757,

Constantine sent an Organ, as a present, to Pepin King of France. In the dark ages, literature and refined studies were confined chiefly to the Court of the Roman Pontiffs: hence, in music, Italy has been to Europe, what Greece was formerly to Rome. The invention of counterpoint is given to Guido Aretinus, a Benedictine monk of Aretium in Tuscany, about the year 1024. It was called *contra-punctum*; because notation in music was first marked by dots. Counterpoint was used in secular music in the thirteenth century. In this century, John de Muris, or rather his master, Magister Franco, invented the *Time-Table*. The spaces and lines determining the relative positions of notes, are generally ascribed to Guido above-mentioned, early in the eleventh century. These Notes, marked by letters, he termed *Clefs*, or *Keys*. He is also supposed to be the inventor of *Spinets* and *Harpsichords*. The first Treatise on Composition in Parts, was published at Valladolid in the year 1570, by Thomas à Sancta Maria. It related principally to the composition for five instruments, called *Fantasia*, having four crotchets in a bar. The *Sonata*, and *Concerto Grosso*, followed soon afterwards: and, indeed, nothing superior to the Concerto Grosso, in point of real harmony, has appeared in the last or present century. The *Jongleurs* and *Menestrels* were privileged performers in the dark ages: they sung and played the poetic and musical compositions of the Troubadours. From the misconduct of these descriptions, they afterwards fell into disgrace. The principal instruments were the Harp and Viol, which latter was furnished with frets. It had six strings; these were reduced to four; and this instrument evidently gave rise to the modern *Violoncello*, called originally *Violone*. The *bow* derived its origin from the Arabs, who had it from the Eastern nations, among whom its use had been known from time immemorial. The *bow* must have been used by the ancients, in producing notes from the monochord. The *Double Bass* of our time, resembles, on an increased scale, the *Rebec* of three strings, which preceded the *Violin*. In the legendary life of St. Christopher, as early as the year 1200, the *Fiddle* is mentioned. On account of its imperfect construction, its tones did not establish any favourable character for it, till a more perfect form rendered it a concert instrument, early in the sixteenth century\*. The Violins were termed Treble, Contra-alto, Counter-tenor, and Bass-violin. Our present Second Violin takes the part of the contra-alto. The part of the counter-tenor is now given to the tenor: and the part of the original

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\* James the First, of Scotland, was the inventor of a species of music which continues much admired at the period we live in. Alessandro Tassoni, and other authors, bear testimony to the musical talents of James. Tassoni writes;—"and among the moderns we may reckon King James of Scotland, who not only composed many sacred pieces of vocal music, but also of himself invented a new kind of music, plaintive and melancholy, different from all others; in which he has been imitated by Carlo Gesualdo, Prince of Venosa, who in our age has improved music, with new and admirable inventions."—James introduced Organs and Choir Music into abbeys and cathedrals in Scotland. It is highly probable that the beautiful and loyal national air of "God save the King," was composed by James. It was published in a book of Anthems at Aberdeen, in the year 1632. It is decidedly, in style and pathos, very similar to the affecting melodies of Scotland.

tenor is given, differently arranged, to the modern tenor and Violoncello. *Sonatas* were originally composed for the church. They afterwards became, under a lighter construction, the favourite music at concerts, till Guiseppe Torelli, of Verona, invented the *Concerto Grosso*. His Concertos were published in 1709; and those of Corelli, in 1712. Charles II., in imitation of the numerous performers in the concerts at the French Court, conducted by Lulli, introduced a similar practice in England; where the number of performers has gradually increased to what we now witness.—Stanley and Avison in England, and Geminiani and Tartini in Italy, excelled in the composition of the *Concerto Grosso*. Handel followed a similar plan in his *Grand and Hautboy Concertos*, with this difference, that he added wind instruments, and increased the number of performers. Handel's Overtures, so justly admired, have their ground-work in Corelli's compositions, though the plan and construction are very similar to the works of the celebrated Lulli. A wonderful change took place in musical composition, about the middle of the last century. The majestic and beautiful style of the eminent composers enumerated, was succeeded by what is called, with great propriety, *Modern Music*. It is very shewy, and abounds with difficulties of execution, the conquering of which requires a life-time, and seems to be almost the only reward it confers on its indefatigable and assiduous scholars. Whether this gratification of unwearied labour compensates for the evident frequent absence of the pathos and affecting harmony of past times, we leave it to more adequate judges to determine. At the same time, it is far from being meant, that *Modern Music* does not number among its composers men equally celebrated by the science of their works, and the beauty and taste displayed in their various styles. It may not, probably, be too much to say, that the rapidity of the *Modern Music* has attained its acme; and that this invention of a man of the name of Stamitz, may undergo some modification, calculated to re-conduct it to the approved and confirmed standard from which it has gradually departed.

It is not the intention here, to give any detailed account of the *Elements and Principles of Music*. It will, however, be necessary to state the doctrine *generally*, and as far as it may be connected with the *Theory and Practice of the Violoncello*, the nature of which cannot be thoroughly understood, without some description of the Harmonics of Strings. What will be found here, will call the attention of the reader to works where these interesting subjects are handled more at length.

*Melody* is a succession of agreeable sounds. *Harmony* is an union of two or more sounds, bearing such a relation to each other, that all the sounds constitute a coalesced one, termed *harmony*. Various modern authors have endeavoured to account for the nature and principle of Harmony. Rameau and Tartini are among the clearest foreign expositors of this subject, though Rameau is deemed too fanciful in reducing his theory to practice. The former says, that if a string be put in vibration by a bow, the fundamental sound, and its twelfth and seventeenth major, will be heard at the same time. This is a fact, and the experiment is most convincingly made on the third

string of a Violoncello. (See *Plate, Fig. 1.*) The open string sounded is G. The twelfth major D, and the seventeenth major B, will be heard distinctly, if the vibration of the string is *gently* continued. The twelfth major D, is the octave to D, the fifth, to G; and the seventeenth major is the sharp or great third to G, the double octave above G the open string. It is therefore evident, that B and D, the seventeenth and twelfth, are harmonics, which may be reduced to B and D, the great third and fifth to the fundamental, or open note G. If the seventh minor to G, or F natural on the third string, is gently sounded, the experiment will succeed, if possible, better; and the octave F, and twelfth major C (at the extremity of the finger board), will be heard clearly in consonance, and separately, particularly the C.—By proportioning the lengths of strings in the proportion of the fundamental—twelfth and seventeenth—Rameau also ascertained a similar correspondence in a descending gradation. The whole system of Thorough-bass is, in a great measure, founded on Rameau's theory.—Harmonics are notes produced without pressing the string. For instance, divide the third string into *five equal parts*: let the string be put in vibration; and let these points of division be touched by the finger *without pressure*, the seventeenth major B, will be produced by touching at each point, and furnish a fine clear note. The first division from the nut of the instrument, pressed by the finger, is the B, or the sharp third to G, the open note. From this it must follow, that the general vibration of a whole string, must, at the same time, contain within its compass or length, the vibrations of other aliquot parts. For instance, when the whole string is sounding the open note G, the third part of the string from the bridge is sounding or vibrating the twelfth D; and the fifth part from the bridge is vibrating the seventeenth, or B.

Tartini found, that if two different sounds are drawn from two instruments of the same sort, their coalescence will generate a third sound. This experiment is best made by means of two wind instruments well tuned, and placed at an equal distance from the person making it. From this generating principle of two concordant acute sounds, the lowest diapason of organs has been produced, on the Continent, without having recourse to pipes of the length of above thirty feet\*.

Having mentioned Thorough-bass above, it is proper to remark, that this continued bass, is a fundamental bass, whose chords are inverted to adapt it to singing, and to take

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\* Two wind instruments, such as hautboys perfectly tuned, are the most eligible for making this beautiful experiment; and the hearers should be situated at an equal distance between them. Stringed instruments are not equally well calculated for the purpose; because the vibrations of different strings, as well as those of the body of the instruments themselves, intermix too much with the new or generated notes. From the fifth, a sound unison with the lowest generating sound is produced. The fourth produces a new sound, an octave lower than the highest note used. The third major produces a note an octave lower than the lowest note made use of. By this wonderful means, sounds, or perfect notes, are produced, that are double and triple octaves below the lowest generating original note.

off the monotony of a plain bass. A continued, or thorough bass, constitutes in fact a treble, in reference to the bass, which is too simple to form a modulation.

Monsieur Perreault, by making experiments with very long strings, ascertained, that while the whole string is vibrating, its various aliquot parts vibrate at the same time. In the sound of the fine notes termed *harmonics*, a delicate and well-cultivated ear will discover a considerable difference between the same note sounded harmonically, and produced by the pressure of the finger. (See *Plate, Fig. 1.*) The twelfth major, or note D (the third string is exemplified, on account of the clearness of its notes) is a fine harmonic sound, at one *third part* of the string measured from the bridge. By pressing the finger on this point (or rather somewhat below it, on account of the obtuse shape of the top of the finger) the same note D is produced; but it is inferior in sweetness and softness, to the same note harmonically sounded. In producing the note harmonically, the third part between the finger and the bridge, and the other two thirds between the finger and the nut, vibrate each at the same time. The vibrations of strings have been luminously treated of by Dr. Brooke Taylor, and the two celebrated mathematicians, the Bernouellis; and the former particularly, has clearly established the properties and nature of the harmonic curve, which has been farther illustrated by Dr. Smith, in his "Philosophy of Musical Sounds."

The nature of harmonic notes produced by the aliquot divisions of the string of a musical instrument, will be briefly animadverted to in a subsequent part of this small work; but, for a full demonstration of this interesting subject, the reader must be referred to the above writers.

Rameau has founded a system of harmony on the ground of concordant harmonics; and though late writers have treated his positions as visionary and impracticable, others are ready to allow, that thorough-bass and counterpoint may be reduced in a great measure to the principles laid down by Rameau. A sound from a bell, or a note from a string, will be still the same tone, whether produced by a greater or less stroke of a bow, or clapper. The only difference will be, a varying degree of loudness. On this is founded, the continued increase or decrease, termed *diminuendo*, and *crescendo*, which have so fine an effect in animating, or softening passages in music. Stringed instruments only are capable of giving fine harmonics. Their effect is destroyed in applying a violent *crescendo* to them; nor can their fine tone be much improved by any attempt to swell them beyond their natural and inherent fulness of tone.

Sounds are either *equal* or *unequal*\*.—When *equal*, they are called *unisons*.—When

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\* The connection between any note and its octave, is sufficiently evident from their perfect coalescence, when well sounded or tuned. Another very striking circumstance indicates this surprising and pleasing analogy. If a person possessing a good voice, but not habituated to music, intends to change from some pitch taken too much either above or below his voice, he will *naturally* take the octave, either higher or lower than he originally attempted. To take his pitch at any intermediate note, will demand a considerable effort or degree of attention. In joining in singing any tune, the



*unequal*, the difference between them, or their *distance*, is called an *interval*. A *concord* is that which, heard in succession of sounds, or in consonance or compound sound, has an agreeable effect. A *discord* in all its relations, shocks the ear, and has, in the above respects, a contrary effect. Concord and harmony, are in general, synonymous terms. A *compound interval* includes within itself two or more *simple intervals*. For instance, the difference between G and A, third string, is a tone major; between A and B, a tone minor; between B and C, a semi-tone; between C and D, a tone major; between D and E, a tone minor; between E and F sharp, a tone major; and between F sharp and G, a semi-tone. These notes, in their order, are the great second, the great third, the fourth, the fifth, the great sixth, the great seventh, and octave; and any one of them contains as many intervals as it is distant from the key note, G. These notes, respectively, may be yielded by a string divided as follows, reckoning from the bridge. Lay off  $\frac{8}{9}$  for the point of the great second;  $\frac{4}{5}$  for that of the major third;  $\frac{3}{4}$  for that of the fourth;  $\frac{2}{3}$  for that of the fifth;  $\frac{3}{5}$  for that of the great sixth;  $\frac{8}{15}$  for that of the great seventh; and  $\frac{1}{2}$  of the string for the position of the octave. Take  $\frac{5}{6}$  of the string from the bridge, and the position of the minor third, B flat, will be had. Take  $\frac{4}{7}$  of the string from the bridge, and the position of the minor seventh, F natural, is had. This minor seventh is perfectly conformable to the *harmonic* (F natural) sound, above described, at one seventh part of the string from the bridge, being a double octave above F, the minor seventh to the key G. This minor seventh is, however, played a little different from the harmonic pitch of its double octave. It is the medial point between concord and discord; and is the favourite chord of Modern Music. It is, however, but a chord of substitution and borrowed harmony. Take  $\frac{5}{8}$  from the bridge, and that point will be the position of E flat, the lesser sixth to G. The fourth, C, is also sharper than it is generally played. This *harmonic* fourth C, as it appears in the *Figure*, is  $\frac{3}{32}$  parts of the string from the bridge. It is, however, played flatter in the proportion of 3 to 2.9.—The greater sixth E, is also played rather flatter than its harmonic position in the fourth octave indicates. It lies at a point in the first octave  $\frac{3}{5}$  parts from the bridge. The next octave E, is  $\frac{5}{10}$  from the bridge; the next octave, or third octave, lies at a point  $\frac{3}{30}$  from the bridge; and the highest octave is at a point  $\frac{3}{40}$  parts from the bridge. This great sixth is played a little lower down, or flatter, than at its real harmonic point, in the proportion of nearly 3 to 3.07.—No other answer than the predominance of custom, can be given to the question, why the reduced seventh is played sharper, and the fourth and sixth greater, flatter than the real

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octave above, or below, is frequently taken; and the person so taking it, thinks he is singing in unison. There is also a singular analogy between male and female voices, which farther shews the natural affinity of the octave to its fundamental. If a man is singing, and a woman present joins in the song, she will quite naturally sing an *octave higher* than the man. In common church music, this effect is readily observable.

harmonic divisions authorise. Probably an easier rule for temperament of instruments with keys might be found, by restoring these notes to their just positions in the scale\*. The notes instanced above, are referred to one string; but they may be drawn from strings disposed according to the following rule. *The number of vibrations made in the same time, by two chords of the same matter, differing in length, thickness, and tension,*

\* Various divisions of the diatonic scale have been calculated by eminent musicians, with a view to form as perfect a chromatic scale as can possibly be constituted. On account of the inequality of the ratios of the scale, there ever must remain some notes false in a small degree. If the fifths and fourths are tuned perfect, the thirds and sixths will be somewhat false; and it is found that the flattening of the fifths is the most tolerable procedure. A scale divided according to the following ratios, is, probably, the most perfect that can be formed.

G.—G sharp.—A.—A sharp.—B.—C.—C sharp.—D.—D sharp.—E.—F natural.—F sharp.—G.

In this division of the scale, the fifths and fourths, except three, are true. Of the thirds less, and sixths greater, there are as many false as true; and both, thus, in a very small degree. As to the thirds greater, and sixths less, there are five false, and seven true. All these differences are so small, that the ear will easily bear them, more especially in the imperfect concords of sixths and thirds. But if several of these inequalities occur near to each other in a composition, the effect on a nice ear will be, that the instrument will seem to be out of tune, as the melody will appear broken, or interrupted. It is well known that some pieces run better on keyed instruments, than the same pieces taken on a different key. The reason of which is, that the inequalities of the semi-tones must necessarily be less in some keys, than in others.

The above imperfections are remedied, in a great degree, on stringed instruments, by *varying* the touch, or pressure on the string, under the guidance of a well cultivated ear. For instance, on the Violoncello, if A, the second note on the third string, be stopped a true sixth to C the open note of the fourth string, the A will not be a true fourth to D the open note of the second string, or the ninth to the note C. In this case, the finger must be moved forward *a little beyond* A; and the very small space it has moved over is termed *comma*, or about the fourth of a note, which, though an interval scarcely distinguishable by a common ear, still gives rise to the error in the general scale, which requires a subdivision of it, termed *temperament*, on keyed instruments. The Violin has only four fixed sounds, or the notes sounded open on the four strings; as *g* on the fourth, *d* on the third, *a* on the second, and *e* on the first string. These are tuned perfect fifths to each other. Here the interval from *d* to *a* is a true fifth; but in the diatonic scale it wants a comma. In stopping *a*, the second note on the fourth string, a greater tone 8:9 is placed between them, in order that there may be a true octave from *a* on the fourth string, to *a* the open note on the second string; but in the scale, the intervals have a fixed character. It is however a query, how far the stopping of the Violin is as accurate, as this amounts to, particularly in the more rapid passages; for it is found, that even on stringed instruments, some pieces of music answer better in some keys, than in others. This would seem to imply, that the notes are almost in all cases taken nearly in the same manner.

In the delineation of the finger-board of the Violoncello, given in *Fig. 1.* the chromatic divisions might have been marked according to some one or other of the theories regulating the subdivisions of a musical string: but for simplicity's sake, and to render the positions of the semi-tones distinct, they are marked as usual, or nearly at the semi-distances between the diatonic full notes.—It must, however, be always recollected, that G sharp, and A flat, are not exactly one and the same note. There is a proportional difference evident from the little that could be here said on the subject; and a good ear, aided by practice, and some knowledge of the *rationale* of the subject, will soon learn to take the notes very nearly in tune.

are in the compound ratio of the diameters, and lengths inversely, and the square root of the tensions, inversely. (See Malcolm's Treatise on Music.)

Within the octave there are seven concords, and two discords. The concords are the result of frequent (nearly) *union* vibrations, and *coincidences* of vibrations; and the discords of a rarity of coincidence. *Simple* harmony is produced by the combination of the concords within the octave. The harmony is *compound*, when the concords of two or more octaves are conjoined. The seven concords of the octave afford *eighteen combinations*: the fifth and octave: the fourth and octave: the sixth and octave: the third greater, and octave: the third less, and octave: the sixth less, and octave: the third greater, and fifth: the third less, and fifth: the fourth, and sixth greater: the third greater, and sixth greater: the third less, and sixth less: the fourth, and sixth less: and these last six pairs of concords sounded, respectively, with the octave.—Of these combinations, the last six are the most harmonious; and those where the fourth is found, the least pleasing. It is on this account, that Descartes calls the fourth *infelicissima*; and says it loses its sweetness by being so near the fifth, which is most perfect next to the octave. If the fundamental and fifth are sounded in consonance, the fourth above the fifth (being the octave to the fundamental) will also resound. On this account, the fourth is not admitted next the bass, but all the other concords are, because they answer their primary purpose of varying the fifth, which the fourth, from its natural alliance to the fifth, could not effect, and would be thus misplaced, and produce an unpleasing harmony.—Sir Isaac Newton happily discovered that the breadths of the seven primary colours in the sun's image produced by prismatic refraction, are proportional to the differences of the lengths of the eight musical strings; and it is remarkable, that the fourth colour in the order has the least pleasing effect, when compared, in contiguity with the others, respectively, or with their combinations.

The *harmonical intervals*, constituting concords, would not afford a sufficient variety in musical composition, without the use of what are termed *concinuous intervals*; for, otherwise, a movement from one concord to another, would be little better than a repetition of the same thing. The *concinuous intervals* principally used, are the ratios 8:9, a greater tone; 9:10, a lesser tone; and 15:16, a semi-tone. These are called *degrees*, or steps that agreeably connect the greater intervals with every advantage of variety, and without having recourse to the harsh *inconcinuous intervals*. Positive discords are admitted, where a strong contrast, or a surprising effect, is required in the general harmony; and the passages where they are used, are immediately resolved, or re-conducted into the harmonical intervals. The two thirds and the two sixths, have too small a ratio to each other, as 25:26, to be admitted both together into divisions of the octave; and, therefore, the following is the allowed arrangement. (See Plate, Fig. 1.)

G fundamental; B flat  $\frac{5}{6}$  or third less; C fourth  $\frac{2}{3}$ ; D fifth  $\frac{3}{2}$ ; E flat sixth less  $\frac{5}{6}$ ; and octave  $\frac{1}{4}$  of the string.

G fundamental; B third greater  $\frac{4}{3}$ ; C fourth  $\frac{2}{3}$ ; D fifth  $\frac{3}{2}$ ; E great sixth  $\frac{3}{4}$ ; and octave  $\frac{1}{6}$  of the string.

These degrees, sounded in various consonances, are good harmony ; but the third less, and sixth greater, would together make very nearly, a discord. Every note is a discord to the one following it ; but by substituting an interval, concordance is produced. The second A, and seventh greater F sharp, though agreeable as successive notes, are discords in combination ; but are still efficient in many situations, from what has been stated : and the discord does not offend the ear, on account of its immediate contiguity to preceding and following concords.

The above arrangements of the octave form *modes* in music, or the internal constitutions of the octave ; and the *fundamental note* in which a *close* is made, is termed the *key note*. The fundamental G, the third minor B flat, or the third major B, and the fifth D, are called *essential notes*. The other notes are denominated *dependent*. The fifth D is called the *dominant*, as having the most perfect affinity to the key. The third is called the *mediant*, from its situation between the *final* and *dominant*. The seventh is common to all the modes. Flat keys admit of both species of the seventh. The greater seventh makes a smooth passage into the key ; and is applied in making transitions from one key into another, particularly contiguous to *cadences*, when the subject is prepared to undergo a change. From its expressive utility, it is sometimes called the *sensible note*. The twelve intervals of musical sounds are (See Fig. 1.) : second lesser A flat, or G sharp ; second greater A ; third lesser B flat ; third greater B natural ; fourth C (called also *subdominant*, being under the *dominant*) ; false fifth, or tritone, C sharp, or D flat ; fifth D ; sixth lesser E flat, or D sharp ; sixth greater E natural ; seventh lesser F natural ; seventh greater F sharp, and octave G. The octaves of these are, simply replications, or repetitions of the same sounds, all commencing from the fundamental G.

The octave and fifth are called *perfect concords*. The two thirds, and two sixths, are called *imperfect concords*. The false fifth, the two seconds, and two sevenths, are discords. The fourth, on account of its situation between the third and fifth, can seldom be used as a concord, excepting when joined to the sixth. It is generally classed with the discords, though in modern music, it is used frequently in deviation from its legitimate description. It is a singular fact, that the human voice rises from the fundamental, to the second greater ; the third less, or greater ; the fourth ; fifth ; sixth less, or greater ; and greater seventh, into the octave ; and that if it has taken the *third less* in ascending, it never fails to take the *sixth less* in passing on to the octave. On these accounts, these seven notes are termed the *natural notes*, or *scale*. The key is denominated sharp, or flat, according as the third and sixth may be greater or lesser. Melody is the produce of imagination ; but harmony is founded on approved rules, and depends on the exercise of a cultivated judgment. The intervals in the treble, ought to be as small as possible. The bass may proceed by larger intervals. Ascending by a false fifth is harsh in effect, and is therefore to be avoided. To proceed by a spurious second, or from a note that is sharp, to the one immediately above or below, that is flat (and the reverse), is extremely offensive to the ear. The key may have its octave, third, or fifth. The fourth and fifth fundamental may have their respective thirds or fifths. The

sixth fundamental may have its third, fifth, or sixth. The second fundamental, third and seventh fundamental, may have their relative thirds or sixths. When the bass *ascends*, the treble must generally *descend*; and contrarywise. When the parts move the same way, upwards or downwards, two octaves, or two fifths, must not follow immediately. Two lesser sixths must never follow each other. Thirds and sixths are admitted repeatedly, and in immediate succession. *Simple counterpoint* admits of nothing but concords. In *figurate counterpoint*, the discords are admitted. The discord prepared, is applied to the unaccented parts; but the accented must have a full harmony. This, by foreign composers, is called *supposition*; because the transient discord supposes a concord to follow, to take off the effect of the discord. The discords are in music, what strong shades are in painting,—they make the concords appear to better effect. Discords must be followed by concords, and are called the *resolution of the discords*. The discord is first a concord to the bass note immediately preceding that to which it is a discord; and this is termed, *preparing the discord*. The discord is resolved, by being immediately followed by a concord descending from it in a small interval.

Every piece of music has a particular key, on which, or in which, it commences and terminates; but musical variety requires that the harmony should be frequently changed into other keys, to be re-conducted into the primary key. If the composition be long, medial cadences are used, previously to the termination by a final cadence in the key. In these transitions, there must always exist an analogy or harmonic connection between the assumed, and the original key. This is termed *modulating* in composition. Any key has seven natural notes, and the remaining five notes of the scale are deemed extraneous, and in general not adapted to purposes of modulation. In general, any of the seven natural notes may be constituted a *modulating key*, provided the third to it is some one of the original natural notes. This rule holds generally, but there are exceptions; particularly in modulating into a flat key. In a sharp leading key, the cadence is made on the key itself; then may follow, according to the nature and length of the piece, cadences on the fifth, third, sixth, second, fourth; concluding with a cadence on the principal key. In a flat principal key, the medial cadences are made on the third, fifth, seventh, fourth, and sixth. The greater seventh is the third greater to the fifth fundamental of the key; and by means of it, the cadence into the key is effected; for after the seventh is heard, the octave is expected to follow in natural order. On this account, a transition into another key is generally made, by introducing its greater seventh, which forms a smooth passage into the key to which the modulation is to be made. By an attentive inspection of the works of the most eminent composers, as Corelli, Handel, Haydn, Mozart, &c. &c. the nature of modulations and cadences will be best perceived, as exemplification here would lead far beyond proposed limits.

A DELINEATION AND EXPLANATION OF THE WHOLE OF THE FINGER-BOARD OF THE VIOLONCELLO; AND OF THE HARMONIC SYSTEM OF THE INSTRUMENT, INCLUDING THE DIATONIC AND CHROMATIC SCALES, TO THE EXTREMITY OF THE FOURTH OCTAVE OF EACH STRING: AND THE NUMERICAL DIVISIONS CORRESPONDING TO THE POSITIONS OF THE TONES AND SEMI-TONES WITHIN THE COMPASS OF THE RELATIVE OCTAVES OF THE GENERAL SCALE.

FIGURE 1. exhibits a proportioned delineation of the tones and semi-tones of the harmonic and natural divisions of each string, up to the termination of its fourth octave. This (reckoning tones and half-tones) gives in all forty-two. The finger-board extends nearly to the note marked *nineteenth major*. This note is E, third octave on the first string. The next notes F, and F sharp, are not expressed; because they cannot be played in that position, by reason that the finger-board does not extend to them. If it did, the whole of the four octaves would afford forty-four divisions expressive of the notes of the general scale, considered either as tones or semi-tones, on each string.

The dotted line, *Fig. 3d*, has marked on it the harmonical divisions of the string corresponding with the natural position of each tone and semi-tone. The description of the notes in this figure, is adapted to the note of the open string considered as a *fundamental tone*. Were the lowest semi-tone (for instance, C sharp on the fourth string) taken as a tonic note, the position of the second major, third major, and of all the described notes, would be removed higher, or to the semi-tone immediately above, or in reference to C sharp, the new tonic.

The semi-tone minor, or F natural on the third string, is, by natural position, situated at  $\frac{9}{16}$  of the string from the bridge; but a delicate ear always takes it *a little lower*, or on the line nearly half way between  $\frac{9}{16}$  and  $\frac{4}{7}$  of the string. There is even some inclination to take it at the harmonic point  $\frac{4}{7}$ , corresponding to the twenty-first minor seventh of the third octave. There is also an inclination to take the tritone a little lower than usual, or at the harmonic point  $\frac{5}{7}$ . The same remarks hold in the second octave. The position of the sixth minor is  $\frac{5}{6}$  from the bridge: nevertheless, it is well known, that a cultivated ear, from force of habit, takes it somewhat lower, or on the line on which the semi-tones are marked. It is to be observed, in general, that in stopping the notes and half-notes, the finger is to be applied near to, and rather below, the various *diatonic* and *chromatic* divisions; as otherwise, there would be a liability of stopping *too sharp*, on account of the shape of the top of the fingers. This is particularly to be attended to when playing the *harmonics*. For instance, the *twelfth major* E, on the first string, is a *natural harmonic*; and is so called, because it can be sounded either *harmonically*, or by *pressure* on the point E. When, however, it is played by pressure, the finger must be pressed on the string a *little lower* than the point E. This remark is applicable to harmonics compared with the note at their position, got by pressure.

The situations of the *octaves* to the *fundamental note*, are marked by a heavy line drawn across the strings of *Fig. 1*. The situation of the *fourth* to the open note, is also marked by a heavy line. It is to be observed, that each octave is half of the extent of the octave



immediately below it. For instance, from the lowest *second major* D, on the fourth string, to its octave D, in the second octave,  $\frac{1}{9}$  of the string are included; and from D in the second, to D its octave in the *third octave*, is included the half of this distance, or  $\frac{2}{9}$ . The numerical line, *Fig. 3d*, shews that this rule is applicable throughout the entire extent of the finger-board, and to the extremity of the fourth octave.

The vibrations of the aliquot parts of the string, yielding the seven concords of the octave, will stand thus:

Unison	1	:	1	Sixth greater	5	:	3
Octave	2	:	1	Third greater	5	:	4
Fifth	3	:	2	Third lesser	6	:	5
Fourth	4	:	3	Sixth lesser	8	:	5

To explain this, let a string be divided into two equal parts, as at A the middle of the first string, the whole string A M will make *one vibration*, while its half A A (*ceteris paribus*) will vibrate *twice*. A similar remark applies to the vibrations of the parts of strings of equal substance, kinds, and thickness, measured off in the above proportions, as shewn by *Fig. 3d*.

The following simple experiment will prove, that the aliquot parts of a string vibrate the same harmonic note, while the intermediate points are at rest, and produce no sound. Let the second string of a violoncello be divided, as per *Fig. 4th*, into six equal parts. If the fourth finger is gently applied at A in the third octave, the *harmonic nineteenth major* will sound. Keeping on the fourth finger, let the thumb be applied at A (an octave below), another sixth of the string, the *nineteenth major* will still sound. Let a second person apply a finger at the middle of the string, being another sixth of the string farther down, the *nineteenth major* will still sound. If, at the same time, the assistant applies a finger at A, the position of the fifth major, and another finger at F, the position of the third minor, still the *nineteenth major* will sound. The fingers, as described, being kept thus on each aliquot, or sixth part of the string, if the bow is applied successively, *between* the position of *each finger*, the same *nineteenth major* will sound on *each* sixth part of the string experimented on thus separately. It must be quite evident, that the positions of the fingers, or the points they rest on, including that of the thumb, must be at rest, while the intermediate portions of the string vibrate the *nineteenth major*: for if the bow be applied to the string, at *any* of the positions of the fingers (moved off to make room for the bow) there will be no vibration or harmonic, because the point the bow is applied on, is a *point at rest*\*. Supposing the fingers and thumb to remain as described, let all be

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\* In making the above experiment, a curious fact discovered itself; and from this it appears quite possible to play on stringed instruments, or on a monochord, without the use of a finger-board. All vibrations are made in a *straight line*. If the finger is pressed against the point of the string marking any note, so as to make the string form a small angle there, the vibration below that point is as completely interrupted as if such point were pressed on the finger-board. The reader will find, that a tune may be perfectly played without stopping a single note, by actual pressure. Harp players may, probably, avail themselves of this circumstance, not, we believe, hitherto noticed.

removed from the string excepting the thumb, and the finger placed at A the fifth major, or  $\frac{1}{5}$  part of the string from the nut. In this state of things, let the bow be drawn, and instead of the *nineteenth major*, the *twelfth major* A in the second octave, will immediately sound; because the string is now harmonically touched, at each *third part of its length*. If in this state of things, the bow is drawn, successively, between the bridge and the first third part A from that end; between the nut and the first third part A from that end; or between A and A; in each of these cases, the same *twelfth major* A, will sound. If the thumb is removed from A, it will also sound. If the thumb is put down again at A, and the finger raised from A, it will equally sound the *twelfth major*. Suppose the thumb and finger down as described, and that the *twelfth major* is sounding, should the string be designedly, or accidentally touched, the note sounded will immediately stop, which affords the clearest proof, that, though each *third part* of the string is, *at the same time*, vibrating the *same note*, the separate vibrations are connected, or concatenated through the points A and A relatively at rest. If the same experiment be made relative to the *seventeenth major*, and its corresponding divisions, as marked, at each *fifth part* of the string, the result will be similar. It is well known, that in this instance, the fundamental or open note sounds: therefore, it must be concluded, that while the aliquot parts separately and conjointly sound a harmonic, the whole string, or fundamental of that harmonic, is also sounding, however faintly: for the points mentioned to be at rest, are so only in reference to the vibrating aliquot parts, as they have a movement occasioned by the simultaneous vibration of the whole string\*. The double octave, and all the harmonics of the fourth octave, vibrate on the principle thus reduced to a simple and beautiful experiment. The fourth octave might be equally had at the end of the strings next the nut, were a bridge placed there in lieu of the nut. But on account of the closeness of the strings to the finger-board, the harmonic of the twenty-second major D, is the last that can be brought out distinctly at that extremity of the instrument.

When the Violoncello, Tenor, and Violin are properly tuned, the harmonic A, at the middle of the Violoncello first string, is unison with the open first string of the Tenor; and the twelfth major E on the first string, is unison with the open first string of the Violin. A very accurate mode, therefore, of tuning the Violoncello, is, to screw up its first string, till the harmonic E sounds unison with the open E, first string of the Violin. The principle of this is, that the ear judges more accurately of unisons, than of octaves†.

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\* Let a long string be covered with thin silver wire. Let it be put in vibration. If *gently* interrupted at the two third parts of its length, the string will divide into three similar vibrations, while the whole will continue to have a general vibration; and thus, *at the same time*, the *fundamental* and *twelfth major* will be sounded sensibly to the ear. If a twelfth be sounded near an open string, it will resound to it, and also to a fifteenth or seventeenth major.

† Independent of the division of the Violoncello strings into consecutive octaves, it appears from this, that still more distinct divisions may be supposed. The first octave being *under* the tenor



In making the experiment with the aliquot divisions of sixths (any other harmonic divisions, as fourth or eighth parts, might be equally used) of the string, if the exact middle points between the sixth parts are touched by assistants, while the sixth parts remain also gently touched, the action of the bow will bring out the fifth major *a*, of the fourth octave, of the second string, being an octave above A the nineteenth major. In this case, the points of the string stopped, are twelfth parts of the string, corresponding to the position of the harmonic note *a*, one twelfth part of the string from the bridge. All the other harmonic notes of the fourth octave depend on a similar principle. As the aliquot parts of a string sound in unison, with isochronous vibrations of each; and sound, each, the *same note*; it may be supposed that the harmonic note ought to sound louder than the same note arising from pressure. Though the vibrations are isochronous, there is still a *diminuendo* in the effect downwards from the aliquot division where the action of the bow is applied. The note sounded harmonically is certainly louder, but the increased sound is so tempered and softened by the blended and progressively softened sounds of the aliquot parts, that the difference in loudness is not immediately perceivable. If a note is sung, and is sounded in unison by a few other weaker voices, the absolute degree of sound is increased, while, at the same time, the hearers are scarcely sensible of this, at least in any degree proportioned to the additional voices.—The limits of this short work will not admit of explaining the harmonic system more at large; and it is hoped that the Violoncello player will fully comprehend its nature from the experiments stated, and which he can repeat in a variety of ways leading to the same conclusion. He must always recollect, that the twelfth and seventeenth major, when reduced, are the great fifth and third of the fundamental note; and that in applying these to practice, in accompanying keyed instruments, the imperfection in them arising from *temperament*, must be strictly attended to; as the same piece played alone, must be played somewhat differently when keyed instruments are introduced. This truth every violin player is equally sensible of.—The most scientific treatises on Music have been written to produce a system of mean tones, to render the harmony equal in all keys, so that the sharp of the note below, may be the flat of the note above. This is the most difficult proposition in music; and the most advantageous division of the inequalities of intervals, has exercised the genius of the most eminent writers on the subject. It is well known, that four consecutive fifths compose a greater interval than two octaves and a third major, by the difference called *comma*; and no better mode of equalizing the scale has been hitherto found, than that of diminishing each fifth by the fourth part

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pitch, is properly denominated the *lower compass*. The first note of the second octave, being unison with the tenor open strings, is called, in the following system of fingering, the *tenor pitch* of the instrument. This continues through four notes, or up to the twelfth major unison with the open strings of the Violin, and termed *Violin-pitch* in the account of fingering. This pitch contains an octave. The fourth octave may be termed *Altissimo*.

of this comma\*. It is on this account, that some compositions answer better in some keys than in others; and that some keys, such as A, appear brilliant, while others, like F, appear more simple. These are unavoidable defects, or imperfections in keyed instruments; and the Violoncello, to be heard to advantage, must be adapted to such circumstances.

We shall now proceed to explain the system of Notes of the finger-board of the Violoncello, specifying distinctly the various positions of the same note, and how often it can be found both by *pressure*, and *harmonically*, in different situations on the four strings. This is so much the more necessary, as many tolerable bass players are not in habits of considering this; and confine their common accompanying practice to the lower compass of the instrument, when the same passage might be played with a finer expression and effect in the middle compass, and at the extremity of the lower compass. This species of knowledge of the finger-board, is more especially requisite for the Solo player, and in cases of compound accompaniments, where rapid transitions of the hand must be made along the whole extent of the finger-board. The harmonics beyond the fourth octave are so faint, that they are not marked off; besides, their coincidence of vibration with the notes below, is so distant, that their concordant use would have a harsh effect.

See Fig. 1. The note *c* at the extremity of the fourth octave on the fourth string, is C of the third octave of the first string. In the same manner, *g*, the last note of the second string, is unison with G a fifth above the last mentioned C. Also *d*, the last note of the third string, is *d* in the fourth octave of the fourth string, or a fifth above the last mentioned G. This shews, that the notes *c*, *g*, and *d*, the last of their respective strings, are situated also, respectively, at the distance of an octave and a sixth; an octave and a second; and a fifth from *a*, the extreme note of the first string. This consideration furnishes a ready reference to the relative situations of lower notes, according as they may be situated on the different strings.

The first four notes on the fourth string, as C, D, E, and F, can be found *only* where they appear. The next four notes, G, A, B, and C, on the fourth string, can be also found as the first four notes of the same appellations on the third string; because the interval between C and G, is a fifth major, corresponding to a similar tuned distance between the strings. The next four notes, D, E, F, and G, on the fourth string, can be played in two other situations;—*viz.* as the fifth, sixth, seventh, and octave of the ~~second~~ <sup>third</sup> string; or as the first, second, third, and fourth notes, D, E, F, and G of the second string. This description carries us as far as the twelfth major, natural harmonic G,

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\* Let a violin be hung on a wall with its neck downwards, with one of its strings tuned unison with the middle C of the Piano. Let another string be tuned unison with this string, by suspending weights to it, till this effect is produced by the application of a bow. Add now to the weight, in the proportion of the square of eighty to the square of eighty-one; the additional part will be nearly a fortieth part. The difference of tones will be now very harsh; and will be precisely that termed *comma*.

on the fourth string. It appears, that this G can be played harmonically, in three situations;—*viz.* in its position as twelfth major; at the point G, one third part of the fourth string from the nut; and at the middle of the third string, at G. It appears, also, that C, the fourth of the third string, can be played as a fine harmonic, at C, the middle of the fourth string. Excepting these two, C and G, none of the notes as yet specified, can be played as harmonics unison to their note.

The next seven notes following the twelfth major G, on the fourth string, *viz.* the notes A, B, C, D, E, F, and G, can be found and played, each, in four distinct situations: that is, in succession on the fourth string; in succession from G, the middle of the third string; in succession from the same note G, the fourth on the second string; and in succession, beginning with the open note A of the first string.—Let it now be ascertained how many of these last mentioned notes can be played *harmonically*, and in what relative situations. A and B, the first two of these seven notes, have no unison harmonic. C, the third minor on the first string, is the double octave of the open note of the fourth string, and is an unison harmonic at that point; and also, as marked, at the point F, a fourth part of the fourth string from the nut. This C, therefore, can be played harmonically in two places. The next note in succession, D, the fourth on the first string, can be played harmonically in three places;—*viz.* at D, the middle of the second string; at D, as twelfth major to G, the open third string; and at D, the octave under this twelfth major, on the third string. The next note, E, or fifth major on the first string, can be played harmonically in four places on the fourth string;—*viz.* at each fifth part of that string, the highest being E, the seventeenth major on that string, and the other three positions on that string, being marked, “Harmonic of the Seventeenth Major.” The next note F has no unison harmonic. The next note, G, can be played as an unison harmonic to itself, in four different places;—*viz.* at the point G, double octave, third string; at the point C, fourth major on the same string; at the point G, nineteenth major, fourth string; and at the sixth part of the fourth string, from the nut, marked, “Harmonic of the Nineteenth Major.” The next note after the nineteenth major G on the fourth string, is A, at  $\frac{3}{20}$  of the string from the bridge; but it is not marked in *Fig. 1*, because the finger-board does not extend under it. It can be played *by pressure* in three places;—*viz.* at A, the middle of the first string; at A, the twelfth major of the second string; and at A in the the third octave of the third string. This note A, is a fine unison harmonic in three situations;—*viz.* at A the middle of the first string; and at A, and A, the fifth and twelfth major of the second string.—We are now arrived at B flat harmonic twenty-first minor on the fourth string. This harmonic is found at each seventh part of the string, as marked, “Harmonic of the Twenty-first Minor.” The B natural, twenty-first major on the fourth string, cannot be played there, because the finger-board does not extend to it. This B natural, however, can be played *by pressure* in three places;—*viz.* as the ninth note of the first string; as the thirteenth note of the second string; and as the seventeenth major on the third string. It can also be played as a fine unison harmonic

at each fifth part of the third string, marked, "Harmonic of the Seventeenth Major." From this it appears, that the B flat can be got in six places harmonically, and in three by pressure: and that the same B, the natural, can be got in three places by pressure, and in four situations as a harmonic unison. The description of the notes is now carried on to *c*, the first note of the fourth octave on the fourth string. This note is also *C*, the third minor-compound of the second octave, first string. The description of the notes will be transferred to this *C* on the first string. This *C* can be sounded *by pressure* in three places;—*viz.* as described, on the first string; at the extremity nearly of the second octave, second string; and at the point *C*, the fourth of the third octave, third string. It can be played *harmonically* as *c*, the first note of the fourth octave, fourth string; and at the eighth part of the fourth string from the nut, marked in *Fig. 1*. "Harmonic of the Twenty-second Major."—The next note, *D*, the fourth of the second octave, first string, is procured by *pressure*, there, and as double octave of the second string. It is had *harmonically*, as double octave of the second string; as nineteenth major of the third string; and as second of the fourth octave of the fourth string. It is had also harmonically at *G*, the fourth part of the second string from the nut, and at the sixth part of the third string from the nut, marked "Harmonic of the Nineteenth Major."—The next note, *E*, the twelfth major of the first string, is had by *pressure* there, and at *E*, second string, third octave. It can be sounded in three places *harmonically*;—*viz.* at *E* as twelfth major, and at *E* an octave below it on the first string; and also as *e*, third major of the fourth octave, fourth string.—The next note, *F* natural, is had by *stopping* on the first string, and also in the third octave of the second string. The same *F* natural is procured *harmonically* at each seventh part of the third string, marked "Harmonic of the Twenty-first Minor." This *F*, as a sharp, is obtained four times *harmonically*—at each fifth part of the second string, marked "Harmonic of the Seventeenth Major;" and also as a harmonic at *f* (rather sharp), the fourth of the fourth octave, fourth string. This note is therefore obtained in seven places harmonically, and in two places by stopping, as a natural; and in four places harmonically, as a sharp: that is, in all, in thirteen situations.—The next note in the scale, *G*, is obtained by *stopping* it on the first string, and in the third octave of the second string. The same note is played *harmonically* at the eighth part of the third string from the nut; as first of the fourth octave, third string; and as fifth of the fourth octave, fourth string.—The following note, *A*, double octave, first string, can be played by *stopping*, only there. It can be played *harmonically* in six situations;—*viz.* at the double octave position *A*, and at the fourth part of the first string from the nut, *D*; at the the position of the nineteenth major *A*, second string, and at the position *F* on the second string, marked "Harmonic of the Nineteenth Major;" and also as *a*, second of the fourth octave, third string; and *a*, the sixth of the fourth octave of the fourth string.—*B*, the next note in succession, can be got by *stopping*, only on the first string. It is obtained *harmonically*, as third of the fourth octave, third string; and as seventh major of the fourth octave, fourth string.

—The following note, C, is only got by *pressure* on the first string. It is obtained *harmonically* in eight places, as C natural;—*viz.* at each seventh part of the second string, marked “Harmonic of the Twenty-first Minor;” as *c* (rather sharp), fourth of the fourth octave, third string; and *c*, the last note of the fourth octave, fourth string. The same note as C sharp, is obtained *harmonically* in four places on the first string;—*viz.* at each fifth part of that string, marked “Harmonic of the Seventeenth Major.” From this it appears, that this note C, considered as natural and sharp, is procured in one place by stopping, and in twelve places harmonically: in all, in thirteen places.—The next note, D, in the scale, is got in one place only, by *stopping* its position on the first string. It is had *harmonically*, as first of the fourth octave, second string; and as fifth of the fourth octave, third string. On a small second string, it may be sounded at an eighth part of the string from the nut.—The following note, E, is nineteenth major of the first string. It is played *harmonically* in three places;—*viz.* as nineteenth major E; at C, the third minor of the first string, marked “Harmonic of the Nineteenth Major;” at *c*, the second of the fourth octave, second string; and at *e*, the sixth of the fourth octave, third string.—The next note, F, in the third octave, first string, cannot be played there, because the finger-board does not extend under its position. It is played *harmonically*, as *f*, the third of the fourth octave, second string; and as *f*, the seventh of the fourth octave, third string.—The next note, G, marked “Twenty-first Minor Harmonic,” on the first string, cannot be played by stopping; but is had *harmonically* in eight places;—*viz.* at each seventh part of the first string, marked “Harmonic of the Twenty-first Minor;” as *g*, the fourth of the fourth octave, second string; and as *g*, the last note marked on the third string.—The next note, *a*, begins the fourth octave of the first string. It is a harmonic, and may be sounded *harmonically*, as *a*, the fifth of the fourth octave of the second string.—The next notes, *b*, *c*, and *d*, are *harmonics*; and are also harmonics as sixth, seventh major and minor, and concluding note of the fourth octave, second string—*e*, *f*, *g*, *g* sharp, and *a*, are also all *harmonics*, terminating the fourth octave of the first string.—Such is a concise account of all the notes and harmonics of the Violoncello.

Before this explanatory subject is quitted, it will prove satisfactory to project a figure, shewing, distinctly, the nature of the experiment before mentioned, and without a reference to the finger-board, excepting naming the notes produced.

See *Fig. 4th*. Let A, B, represent a Violoncello third string divided into six equal parts, as marked by letters. If the finger be gently applied at *m*, the first division from the bridge B, and if the bow be applied between the point *m* and the bridge, a very fine harmonic, D, the nineteenth major, will sound. If the thumb be applied at *n*, the next division (the finger remaining on *m*, as before), the same nineteenth major will sound. If the bow is applied between the points *m* and *n*, thus touched, the same note is still obtained. Let the finger and thumb remain lightly touching the string as before; and let an assistant gently touch the other three points of divisions of the string, *o*, *n*, and *m*; and the same harmonic note will sound, by bowing on *any* of the aliquot parts. From this easy experiment, it clearly follows, that *each sixth aliquot part of the string, is, at the same time, vibrating one and*

*the same note.* The points marked by letters, are *at rest* : for if a finger be taken off, and the bow is applied where the finger was, there will be no harmonic sound heard, but, on the contrary, a jarring harsh sound, arising from forcing the string into some irregular action. If, when the bow is applied on any of the aliquot parts, any point on any part of the others is touched, the harmonic sound will immediately cease. This affords a decisive proof that a concatenated vibration runs from one end of the string to the other, *through the points at rest*.—Let the thumb, and all the fingers engaged, be now raised from the string, excepting the fingers touching the points  $n$  and  $n$ , which mark thirds of the string; and let the bow be applied on any part of any of the third parts; and the sound of the twelfth major  $D$ , will be the predominant one; but evidently accompanied with the sound of its octave, the former nineteenth major, provided that the bow be not applied exactly on the point  $m$ , as that would prevent almost entirely the sound of the octave. If the five points marked by letters, have each a light thread tied round them, and if the finger be gently rested *close* to  $m$ , the nineteenth major, where one of the threads is tied, or close to any of the other points, the harmonic will sound, and the threads *will not* appear to vibrate. If, on the contrary, a small thread is tied on any part of any of the aliquot divisions, it will appear to vibrate strongly, when the nineteenth major is sounding. This experiment again proves, that the points marked by letters, are *at relative rest*, though the progress of the aliquot general vibration runs round them, or through them. If a finger is applied at  $o$ , only, the middle of the string, either lightly or by pressure, the octave to  $G$ , the fundamental note, will sound, accompanied by the nineteenth major, which is at the same time the twelfth major to  $G$  at the middle of the string. By listening attentively, while the bow is used with a slow, uniform, and steady movement, the note  $b$ , the great third of the fourth octave, and the seventeenth major to  $G$ , at the middle of the string, will be heard, as if at a distance. If the bow be applied at the point of the twelfth major, it will still be distinctly heard in consonance with the fundamental note.

If, instead of sixth parts of the string, fifth, or fourth parts of it are experimented on, the effect will be similar. The two fourth parts next to each other being lightly touched, the double octave to the fundamental  $G$  will sound; and when the bow is applied *between* the fingers touching these points, the same double octave will still sound. If each fifth part be bowed on separately, the seventeenth major to the fundamental will sound; or if any two or three (or four of these points of division) be touched simultaneously, the same seventeenth major will sound, wherever the bow may be applied. If threads be tied as before, the effect will prove as mentioned above. This *varied repetition establishes* the fact.

Let  $a$ ,  $d$ ,  $m$ ,  $b$ , *Fig. 5th*, represent the third string of a Violoncello. The dotted harmonic curves,  $a$ ,  $e$ ,  $b$ , represent a vibration of the whole string  $a$ ,  $d$ ,  $m$ ,  $b$ . It is well known, that while the string is vibrating the fundamental note  $G$ , the twelfth major  $D$ , and the seventeenth major  $B$ , are at the same time heard. In this case, while the whole string is vibrating, the third part,  $d$   $b$ , must be vibrating the twelfth major, and the fifth part  $m$   $b$  must be vibrating the seventeenth major. Not



only this, but also the remaining two third parts, and the remaining four fifth parts, must be, also, from our experiment, in vibration, *along* with the third and fifth part of the string nearest to the bridge. What has been explained under *Fig. 4th*, tends to prove, that this must be the case: for in sounding the fundamental note, if the bow is used on any part of the string, the twelfth major and seventeenth major are heard as before. Frequently, also, the octave, and nineteenth major, are heard along with these last mentioned notes. The fact is unquestionable; and whatever may be urged against it, the system of *general accompaniment*, advanced by the Bernouillis, and particularly by one of them, derives no small strength from the present fact, and from our experiment proving the separated and concatenated vibrations of the aliquot parts of strings. It appears, therefore, that much remains yet to discover, in order to establish, on clear principles, the theory of *universal accompaniment*. That lower notes are accompanied by higher ones, is an unquestionable fact. That these higher notes are produced by vibrations of known lengths of the *same string*, is also undeniable. That to produce those higher notes *along* with the fundamental one, there must be vibrations of one description, *within* others of a different description, giving another, or other accompanying notes, *is evident to sense*, by listening to the various notes yielded by the vibration of a long and thin monochord covered with silver wire. On the Piano Forte, the twelfth and seventeenth major are heard to sound when the fundamental note is dying away; and this will be the case if the wires of the twelfth and seventeenth major to the ground note, are prevented from vibrating by the power of sympathy, by applying the finger to them to stop all vibration. In this case, however, the twelfth and seventeenth major will not sound *as loud as before*; because the wires of the twelfth and seventeenth major, though tempered notes, still *sounded by sympathy*, and *increased* the sound of the same notes furnished by the wires of the fundamental note, in consonance with that note. It is altogether a most interesting and curious subject, which, like all complex human knowledge, though partly elucidated, appears to an inquiring mind, almost "past finding out." The controversy between Daniel Bernouillis, Euler, and D'Alembert, on this subject of compound and superinduced vibrations, on a chord considered as a moveable axis, remained undetermined at the death of the parties. The wonderful fact of *vibration within vibration*, or *superinduced vibration on a fundamental note*, is *evident* from a variety of simple experiments with chords kept in constant and strong vibration; but that the *rationale* of this astonishing phenomenon will be fully established, after the efforts of the first mathematicians have succeeded in part only, is more than problematical; and, at least, it must remain a subject of investigation and research, involving no inconsiderable difficulties.

A NEW SYSTEM OF FINGERING THE VIOLONCELLO; OFFERING FACILITIES OF TEACHING, TO THE INSTRUCTOR; AND TO THE SCHOLAR, A READY, EASY, AND NATURAL MODE OF EXECUTING ANY DESCRIPTION OF PASSAGE, IN ALL THE KEYS, AND IN EVERY POSITION OF THE HAND, AND COMPASS OF THE INSTRUMENT: ACCOMPANIED WITH MUSIC OF FIGURED ILLUSTRATION.

IT must be evident, to any person who takes the trouble of studying the finger-board, as delineated and described, that every passage, from G, 12th major, fourth string, to A, the middle of the first string, can be executed in four different positions; and that passages, including the notes above the middle of the first string, may be taken, some in three, and some in two different situations. See examples under letters A, B, C, and D. The notes there, run from C, the lowest *open note* of the fourth string, to A, the middle of the first string. It is evident, that the two octaves and a sixth under letter A, may be all taken by fingering, and thumb-positions, on the fourth string, excepting the last note A, under which there is no finger-board. Under example B, the first four notes must be taken as usual on the fourth string, and the other sixteen notes may be taken on the third string. Under example C, the lowest four notes are to be taken on the fourth string; the next four on the third string, and the remaining twelve notes on the second string. Under example D, the lowest four notes are taken on the fourth string; the next four on the third string; the next four on the second string; and the remaining eight on the first string. Throughout this work, an O, as here, is put under every note sounded, or played on the open string. A x, as under the last note A, always marks the thumb when introduced. Figures, as here, put under the notes, mean, respectively, the finger pressed down on the position of that note. It is obvious, that the teacher must, according to the present mode, frequently point out to the scholar, with considerable loss of time, and labour of explanation, the position out of four, which he may deem the best; and that the scholar, in practising from printed and fingered notes, must guess which of four positions, for the same passage, is meant.

Again, teachers have only *three* distinct appellations for positions of the hand in the lower compass of the instrument. These are, *back-shift*, *half-shift*, and *whole-shift*. In the first, *back-shift*, the first finger is placed on the *semitone* to the open string. In the second, *half-shift*, the first finger is placed on the *great, or less third* to the open string. In the *full shift*, the first finger is placed on the *great fourth* to the open string. There is a *second full-shift*, where the first finger is placed a half note above the fourth note from the open string. In each of these *five* species of shifts, there are two positions of the second, third, and fourth fingers, by an extension of them from the *first*. There being so many positions of the fingers in these *half* and *whole shifts*, it must be manifest, that the practitioner must feel not a



little embarrassed in readily finding the position meant by the instructor, or pointed at in printed works. Relative to the middle and higher compass of the Violoncello, these remarks hold with still greater force: for there, the practitioner's hand must be literally placed where intended; or if left to himself, with even the aid of figured notes, he has a choice of various positions, where, probably, some particular one can only give the smoothness and delicacy of effect required by the spirit and character of the music before him. For the justness of these remarks, we refer to all such as have studied with attention the nature of the Violoncello, and the most advantageous modes of execution. There are works on the science of this instrument, which, in other respects, are masterly; but as indicating the taking of positions of the hand the best adapted to music in various *clefs* and *keys*, it must be acknowledged that they are deficient, and leave this essential subject involved in equal uncertainty and doubt. The writer of these sheets has been long in habits of reflecting on this interesting subject: and he trusts, that the system of fingering unfolded, will be found efficacious; enabling the teacher to name, *precisely*, the position of the fingers intended; and the practitioner to take it, *at once*, without the slightest difficulty or hesitation. It will also appear, that the most natural, simple, and easy transitions of the hand, from one position to another, so as to connect, and as it were condense, the whole fingering of a passage, have been made a primary study. By a close attention to the system of fingering now elucidated, the Violoncello-player will soon find his labour rewarded by a complete knowledge of the whole compass of the Finger-board, and by the most advantageous execution: but he must bear in mind, that continued and unwearied practice can alone give efficacy to theory.

We will now proceed to explain the nature of the *new system of fingering*, the practice of which will be afterwards amply exemplified, in different keys.

See *Figure 2d*. The lower compass of the instrument is told off into *eleven positions*. The first, second, sixth, seventh, and eleventh, are exemplified by four semicircles springing from each. The semicircles refer to the relative positions of the fingers. Each position is twofold; viz. *close*, and *extended*. In the *close position*, there is a finger placed on *each semi-tone in succession*. In the *extended position*, the first finger remains in its place, and each of the other three fingers is *moved forward a semi-tone*; leaving, of course, an uncovered, or unoccupied, semi-tone between the first and second finger. Such is, distinctly, the whole of this simple principle of fingering in *ten* out of the eleven positions. The *close position* only is applied in the *eleventh*, because, the fourth finger cannot conveniently be thrown forward there, as far as C natural.

The positions specified, are exemplified on the first string, *Figure 2d*.—The *first position* is what is usually termed the *back shift*. Here the first finger is placed on A sharp, or B flat: the second on B: the third on C natural: and the fourth on C sharp, or D flat. These positions of the fingers, in the *first position close*, are marked in the *Figure*, 1st Finger;—2d Finger;—3d Finger;—4th Finger. To give the *first position extended*, the first finger remains fast on A sharp, or B flat; the other three fingers are raised from

the string, and projected forward a semi-tone: that is, the second finger is moved forward from B to C; the third, from C natural, to C sharp; and the fourth, from C sharp, or D flat, to D natural. The figures 2d, 3d, and 4th, marked above, on the semicircles springing from the situation of the first finger, refer to the extended attitude of these other fingers. Let the first finger, now, quit the first position, and be placed on B natural; and let the other three fingers be placed, successively, on the following semi-tones, C, C sharp, and D, and we shall have the *second position* close. Let the first finger remain fixed on B, and let the other three fingers be, each, thrown forward the extent of a semi-tone. This will bring the second finger on C sharp; the third finger on D; and the fourth on D sharp, or E flat; and, of course, C natural will remain uncovered. This position close, and extended, is marked by distinct semicircles; and is what may be called, the *common position* in the lower compass. A similar description is applicable to the first finger placed on C natural, the third position: and to the first finger placed on C sharp, the *fourth position*. The third and fourth positions close and extended, are what, less definitely described, are termed *half-shift*. The first finger placed on D, gives the *fifth position* close and extended, as described. The *sixth position* places the first finger on D sharp, or E flat; and the semicircles described there, shew the close and extended position. The fifth and sixth positions close and extended, are what, less accurately defined, are called *full-shift*. The first finger placed on E, gives the *seventh position* close and extended. This position is marked by semicircles. The first finger carried to F natural; F sharp; G; and G sharp, or A flat, will, successively, give the close and extended positions at F, F sharp, and G; and the close position only of G sharp or A flat. Five of the positions are only marked by semicircles, to avoid rendering the *Figure* confused. It is to be observed, that the description of the positions is equally applicable to the other three strings, as to the first string, on which the *Figure* is projected. Some of the positions are more peculiarly applicable to *flat*, than to *sharp* keys; and *vice versa*. For instance, the first, third, sixth, and eighth, are generally flat positions; and the fourth, ninth, and eleventh, sharp positions. The fifth, second, and seventh, are, generally, natural positions. But this remark applies only generally, as all the positions change their characters according to some transitions from one key to another.

In applying the above description of playing positions, to printed music, the best attitude of a player; the most eligible mode of holding the instrument; and the most neat and efficient manner of bowing, are expected to be described. The real fact is, that no degree of description can possibly convey any adequate idea of these three essential points; and an *actual drilling* by a good master can, alone, effect this object. A few general remarks may not, however, be altogether useless.

The instrument is, in most instances, held too low; and too much sunk between the legs. This occasions too great an inclination of the body forward, when the middle and higher compasses are played in. A man about six feet high, sitting upright, should have the upper pins of the violoncello on a level with the eyes. The right leg cannot be

held perpendicular, but must be a little inclined outwards, to support the instrument. The outer rim of the instrument should press against the inside of the upper part of the calf of that leg; and the rim, and part of the side of the violoncello, should rest against the same part nearly of the calf of the left leg. The instrument is, generally, too much inclined backwards. The fingers of the left hand should be, as much as possible, at right angles with the finger-board, and form curves over it. The thumb is naturally on the level of, or as high as, the fore finger; but it ought to be, with its ball supporting the instrument, opposite to the middle finger. In the eighth, ninth, tenth, and eleventh positions, the thumb touches the angle under the neck of the instrument. The left elbow must be very little raised; otherwise, the fingers will not be at right angles to the finger-board. The fingers *behind* the note pressed, are to be down also, in their proper positions, in order to give firmness and sweetness to the tone, and to avoid that harshness of sound too frequently heard in the attempts of imperfect players; more especially, when they venture, at too early a period, to try rapid passages. The fingers ought not to be raised more than just to clear the strings.

The bow must be about two inches above the right thigh, and two and a half from the bridge; and it ought seldom to be raised from the strings. It is balanced between the ball of the thumb, and extremity of the inside of the first joint of the middle finger, which has its end on the inside resting against the hair. In playing, the fore-finger and third finger have a movement, respectively, which vibrates on the bow; the one acting on it in the up, and the other in the down bow. It is a general rule to draw the bow parallel to the bridge: but to do this *literally*, is not, strictly speaking, possible; for, in quick passages, the action is principally from the wrist. Supposing the wrist is held stiff, the fore arm and hand must act as the radius of a circle, however small; and consequently, each stroke of the bow must, necessarily, describe a segment of a circle, or rather a mixed curve, on account of some small degree of motion from the elbow, particularly where the bow passes from one string to the second, or third, from it. To prevent this effect, the wrist must act on itself, as a centre. The curve in which the bow moves, approximates, nearly, to a straight line; but never can be *exactly* such. The arm at the shoulder should never be raised much; as such a position, though shewy, cannot be long maintained. The action of the whole arm, and even of the arm to the elbow, can seldom be required; excepting where time is slow; where a passage must be forcibly expressed; or where a compound cadenza is struck.—We again recommend that all these considerations be referred to the absolute instruction of an eligible master. Man is an animal of habits; and physical and immoral ones, are equally difficult to correct, when long use has rendered them prevalent.

The situations of the fingers in the *eleven positions* of fingering in the lower compass of the Violoncello, have been, thus, fully described. We shall now apply the *new system of fingering by positions*, to actual music, in a flat, sharp, and natural key.

The examples under letters E, and F, are in three flats. The first four notes under

E, are E flat; F natural; G; and E flat. The figures 1, 2, 4, and 1, placed under these notes, mean, the first, second, fourth, and first fingers used to stop these notes, respectively. The line drawn under the figures, shews that these four notes are all fingered in the eighth position. The figure 3 placed under the 8, with a line between them, shews that the eighth position, on the third string, is meant. The large dot to the left of the figure ·8, shews that the position is an extended one: for where no dot of this nature appears, a close position is *always meant*. From this description, the fingers can be, at once, placed on the extended eighth position of the third string. In *every position*, the first finger is *always* supposed to be placed on the *first note* of that position.—The next four notes are, F natural; E flat; D; and B flat. Without quitting the eighth position extended, the notes F and E are taken in it, by the second and first fingers marked 2, 1. The next note D, is played open on the second string; and o, meaning open, is marked under it. The last of the four notes, B flat, is taken by the second finger, marked 2, under it. It is taken in the eighth position, on the fourth string, denoted by the ·8 under the 2; and the 4 (meaning fourth string) under the ·8 (which ·8, with the large dot to the left of it, means the extended eighth position) *always means the place of a string*, here the fourth.

The same eight notes are placed under the second letter E, with precisely, the same fingering; but with this difference, that they are played in the first extended position of the second and third strings, the last note but one D being played open, as in the first instance.

The next example is marked F. The four first notes are taken in the tenth position, on the second string. The number of the position, 10, is, as before, placed under the figures denoting the fingers; and the figure 2, under the number 10, shews that position 10, is on the second string. There being no dot to the left of position 10, it follows, that the position is a *close* one. Without quitting this position, the next four notes are played in the same position on the third string, as denoted by 3 under 10.—The same eight notes are again repeated under the second letter F, and are fingered precisely in the same manner, but in the third close position of the first and second strings, as marked 1, and 2, the lowest figures.

Under example G, the first minim, and following crotchet G, are taken in the ninth close position of the third string, as marked. The fourth finger marked ·4 gives these notes; and the heavy dot placed *on the left* of figure ·4, indicates that the note G may be placed, harmonically, in that position. Therefore, in the future examples, a dot so placed *always* means that the player, if he chooses it, may play such note, harmonically; a thing which always gives a peculiar sweetness and expression to the passage. The same example G is repeated under the second letter G, with the same fingering; but is played entirely, as marked, in the first position on the second and third strings. Here, the note G is not marked with the harmonic dot; because the harmonic under G the fourth

note of the second string (*See Fig. 1.*) is that of the double octave to D (the fundamental of G) in a sharp key.

Under letter H, an example is given in three sharps. Here, the first three notes are taken in the ninth extended position, fourth string; and D sharp, the fourth note, is taken by the first finger on the eighth position, third string. The next four notes are in the ninth position, third string, and extended. The following four notes are in two positions; *viz.* the first three, F sharp, E, and D sharp; are in the eighth close position, third string; and the fourth, in the eighth close position, fourth string, &c. The same example is repeated under the second H, with the same fingering, but in the first and second positions of the second and third strings.

The example under letter I, is in a natural key. The first four notes are in the tenth extended position on the third string. The next three notes G, F, E, are taken in the ninth position third string; and the C, the last note in that bar, is played harmonically in the ninth position, fourth string. The first note F of the second bar, is taken without quitting the ninth position. The next note D, is played open. The next G, is played harmonically in the same position; and G, the octave below, is played open. The last four notes in the second bar are played in the ninth position, on the fourth, second, and third strings; and this easy and expressive mode of playing these four notes, thus arranged, very frequently occurs in this key; the first and last being readily played harmonically.—Under the second example I, the same passage is marked with the same fingering; and is all played on the first, second, and third strings, all being in the second position, excepting the open notes, and the first four notes, which are played in the extended third position, on the second string.

It appears from the above detailed examples, that the first position is the same as the eighth on the next string *below*; that the second position is the same as the ninth on the next string *below*; and that the third position is the same as the tenth on the string immediately *below*; and, also, the fourth close position is the same as the eleventh on the next string *below*.

This easy and comprehensive system of fingering in the lower compass, extends to one note, only, beyond the first octave of each string; and includes every description of accompaniment in the lower, and middle compass of the instrument. The use of the thumb in every compass, will be attended to. To come up to a Lindley in wonderful execution, brilliancy, and force, would be a vain effort to attempt; but we are acquainted with a private gentleman who is only secondary to this celebrated performer. The respectable gentleman meant, accidentally lost the fore-finger of his left hand. This has forced him to use his thumb in the lower compass; and the consequence is, that his tones, from the firmness of his action, are finer and more expressive there, than common fingering can produce. This affords an argument and sound reason for introducing, at an early period, the use of the thumb in the lower, as well as in the higher compass of the Violoncello.

We shall now proceed to exemplify the fingering of the scales, from the lowest semi-tone, to the first octave. The methodical modes pursued, will be, to give the first, third, fifth, and eighth of each semi-tone (as a key-note) on one string; and to descend the octave by an easy chaunt. The same octave will be given with varied fingering, on one string, and on two contiguous strings containing its notes. This exemplification will be referred across the strings, in order to demonstrate the same process, regularly, on all the strings; and also to shew that the *same fingering* is applicable on *different* strings, and in *different* keys. Excepting where the thumb may be introduced, it will be quite unnecessary, after the full explanation given above, to advert to the figures expressive of the fingering, positions, and strings *figured* in the scales. The eight notes of each octave will be fingered in succession, ascending (and in some instances descending) on two strings, and, also, on one string only.

The various clefs are explained under letters J, K, L, M, and N. All music for the Violoncello, might be conveniently reduced to two, the *bass* and *treble clefs*: but others frequently occurring, it is necessary to explain them. The *tenor clef* is five notes above the bass. The true *treble clef* (See K) begins with the lowest note on the Violin, or the fourth note on the second string of the Violoncello. It is played an octave lower, as at letter L, excepting in such places where 8<sup>va</sup> *alto*, is printed. The *counter tenor* (See M) is seven notes above the same notes considered as bass notes: but in passages only, this clef must be so played, for as mere accompaniment, the counter-tenor note, regarded as a bass-note, may be played one note lower than it appears. This reduces it just an octave below *its real place*. In lieu of the *soprano clef* (See N), the treble clef may be always substituted.

Under letter O, five different modes of fingering the eight notes of the key of G major, are exemplified. The first, second, and third modes are all on one string, the third. The first mode is strictly applicable to this *Key*. The second mode is equally applicable to this, in common with other sharp keys. In the third mode, the thumb, marked by a x, is placed on D, the seventh position, in ascending and descending. The first four notes are the common chord. In the two last bars, the octave is regularly descended. The whole forms a pleasing chaunt, enabling the ear to judge, accurately, of the justness and interval of every note in the octave. In the fourth mode, G major is fingered on the third and second strings, in one position of the hand. In the fifth mode, the second finger is applied on B and F sharp; because in fingering sharp keys, the fourth finger must extend to F sharp, on the fourth string; to C sharp, on the third string; to G sharp, on the second string; and D sharp, on the first string. The two last examples of each of the positions (excepting the eleventh) consist of the eight notes of the octave fingered on two strings; and the same on one string. The octave is descended similarly, or by reversing the fingering, as in the last example under letter P.

The key of A major, the open note of the first string, is fingered according to the second and third modes. The key of D major, the open note of the second string, is fingered



according to the second, third, and fifth modes. The key of C major ; the open note of the fourth string, is fingered, occasionally, according to all the five modes.

Under letter P, appears the key of E major, three flats, fingered in four different manners. The first and second modes are both entirely on the second string. The third mode is on the second and third strings, concluding on the third string without quitting the thumb position-eighth. The fourth mode is fingered on the first and second strings. The key of B flat major on the first string is fingered all on that string ; similar to the first and second modes. The key of A flat major, four flats, is fingered on the third string ; on the third and fourth, and on the third and second ; similar to these four modes. The key of C major on the fourth string, with seven sharps, is fingered like the first, second and fourth modes.

Under letter Q, is exemplified the key of E major, four sharps. The first mode gives the octave fingered on the second and first string. The second mode gives the octave all on the second string. The third mode gives the same octave all on the second string, and five notes are fingered with the thumb in the ninth position. The fourth mode finishes the octave on the third string, in lieu of descending to the fundamental note on the second string. This last mode may be had recourse to in all keys, and will not, therefore, be repeated. The key of D major on the fourth string, and of A major, three sharps, on the third string, are fingered in the first manner ; the key of B major, five sharps, on the first string, is fingered according to the second, third, and fourth modes.

Under letter R, is an ascending and descending chaunt calculated to familiarize all the notes of an octave in the major key, to the ear. The same chaunt is equally applicable to all keys, major and minor ; and the tuning of keyed instruments may be proved by it.

We are now arrived at the scale of the third position, under letter S. The first mode fingers the octave on the first and second strings. The second mode fingers this octave all on the second string, where five notes are taken with the thumb in the tenth position.

In works of this description, the octave is generally exemplified as in the third and fourth modes under letter S, where the eight notes are given in ascent and descent. The ascending chord, and descending chaunt, may, probably, impress *all the characters* of the octave more on the memory : besides, the two last bars of the modes, give the ascending and descending octave in a less uniform, and more varied manner, than a succession of crotchets, as in example third and fourth. The key of B flat, third string ; and E flat, fourth string, are fingered like the first mode ; and C natural, first string, like the second mode.

Under letter T, are the scales of the fourth position B major, five sharps, on the third string. The first mode gives the octave on the third and second strings. The second mode gives the octave all on the third string, where four notes are taken, with the thumb in the eleventh position. The key of E major, four sharps on the fourth string ; and the key of F sharp with six sharps on the second string, are fingered like the first mode. The key of C sharp, with seven sharps on the first string, is fingered like the second mode.

Letter U states the usual scales of G major, the fourth note on the second string. This

is the first note of the fifth position, on all the strings. The first and second modes are fingered on the second and first strings. The *key* of F major on the fourth string, and the *key* of C natural major on the third string, are fingered similar to the first and second modes. The *key* of D major, fourth note on the first string, is fingered similarly to the third mode.

In the third mode of this position, the thumb appears placed on D, the octave to the open note of the second string. This position of the thumb *commences the tenor-pitch of the Violoncello*; and therefore T, meaning *tenor-pitch*, is marked under the thumb. The figure 2 appears under the T, meaning that the thumb is in the *tenor-pitch* on the second string. The *tenor-pitch* will be, *thus noted*, till the thumb arrives at the *Violin-pitch*, at A (See Fig. 1.) one third part of the string from the bridge.

The sixth position, under letter V, is exemplified in the *key* of A major, four flats, second string. The *keys* of F sharp on the fourth string, and of D flat on the third string, are fingered according to the first, second, and third modes of this example. The *key* of E flat major, sixth position, first string, is all fingered on that string, according to the fourth mode of A major flat, fingered all on the second string, as in the present instance. The thumb in the fourth mode, is placed on E flat, the first semi-tone in the *tenor-pitch* (See Fig. 1.), marked T, with 2 under it, denoting *tenor-pitch, second string*. Five notes appear taken in this easy thumb-position.

The seventh position, under letter W, is exemplified in the *key* of A major, three sharps, second string. The first and second modes are on the first and second strings. The dot marked on the left of the .3 under A, shews that it is taken *harmonically*. The third mode is entirely on the second string, where the thumb, placed in E, in the *tenor-pitch*, commands five notes in that situation. The *key* of D major, on the third string, and the *key* of G major, on the fourth string, being both in the seventh position, are fingered similar to the first and second modes. The *key* of E major, in the same position on the first string, is all fingered on that string, similar to the third mode instanced here.

The eighth position, under letter X, is exemplified by making the next semi-tone, B flat, the *key* note. The first and second modes are fingered on the first and second strings; and the third mode is fingered entirely on the second string, where five notes are taken with the thumb placed on F. The *key* of E major flat on the third string, and the *key* of A major flat on the fourth string, both in the eighth position, are fingered like the first and second modes. The *key* of F natural, first string, eighth position, is fingered all on the first string, like the third mode.

The ninth position is under letter Y, in the *key* of B major, on the second string. The first and second modes are fingered on the first and second strings; and the third mode altogether on the second string, where six notes are taken in the *tenor-pitch*, the last of them E, by the first finger, in descending from the thumb-position. The *key* of E major on the third string, with four sharps, and the *key* of A major on the fourth string, with three sharps, being both in the ninth position, are fingered like the first and second modes.



The key of F sharp in the same position on the first string, having six sharps, is fingered all on the first string, similar to the third mode exemplified here.

The tenth position is exemplified under letter Z. The first mode is on the first and second strings, and descends to conclude on the third position, first string. The second mode concludes with the thumb in the tenth position, second string, in which position the last five preceding notes are taken. In the third mode, the whole ascending and descending octave is taken on the second string. After the first two notes, the thumb moves up to G, *and that is the highest tenor-pitch position for the thumb*. Five notes are taken thus, after which the thumb descends to the tenth position, in which the last six notes are played. The key of B flat on the fourth string, and of F natural on the third string, lying in the tenth position, are fingered like the first and second modes. The key of G major on the first string, in the tenth position, is all fingered on the first string similar to the third mode.

The series of scales concludes with the eleventh position given as D flat, and C sharp major, being the same notes. This scale is carried up to the extremity of the finger-board or to E flat, or D sharp major, which want a semi-tone of the "Harmonic Nineteenth Major." The first three notes in the example, are rather a constrained stretch of the fingers as an extended position. In the eleventh position, the first finger rests on the semi-tone, or seventh major of the first octave. In all fingering beyond this, the thumb must, necessarily, be constantly used. On the fourth note of the example, the thumb is placed on G flat or F sharp, the last semi-tone within the tenor-pitch. Five notes are taken in that position on the second string. Without moving the thumb, the next four notes, beginning with E flat, or D sharp are taken on the first string; and a V, meaning *Violin-pitch* (See Fig. 1.) is placed under the thumb mark x. Under the V appears the figure 1, indicating that the Violin-pitch meant, is on the first string. Every position of the thumb beyond E (including all the notes on the highest third part of each string), will be a *Violin-pitch* or position. The eleven lower positions, the tenor-pitch including four notes in the second octave, and the Violin-positions above these, will clearly indicate the situation of the hand and fingers, in every compass of the instrument. It must be recollected, that in springing the thumb from one position to another, its movement must not be in a straight line parallel to the finger-board; but in a segment of a circle, as such small curve is essentially requisite, in order to carry the thumb neatly and accurately to any new position. The practice of these ascending chords, and descending scales, in all the positions, including the same position (though a different key) on each string, cannot fail to give a ready command of fingering in the lower and middle compass of the instrument. To render the rise and fall of all the notes of each key familiar, the descending chaunt should be practised also reversed or ascending from the close on the fundamental note, to the octave. The grace-note is thrown in to combine the fingering of the highest four notes of each octave. The chaunt under letter R, will, if applied to each octave, in all the positions, impress the essential combinations of the notes within the octave, forcibly and pleasingly on the memory.

Fingering in the upper compass of the instrument, though more shewy, is probably

less difficult than the necessarily very varied action of the hand in the lower, and middle compass. In the upper compass, the whole octave lies within the space of *one thumb-position*; and this circumstance is what, principally, constitutes the comparative simplicity and facility of fingering all beyond the *eleventh position*.

A few examples will be quite sufficient to illustrate the whole system of fingering on, and above the middle of the strings.

Opposite to marginal letter *a*, there are four examples of fingering the first octave D major, with the thumb commencing on the first *tenor-position*. In Example 1st, the first four notes are taken as marked; the thumb being on D, the middle of the second string. The next four notes are taken in the same tenor-position, but on the first string. The fourth finger takes the semibreve E, which is a very fine and soft harmonic. The octave, as appears, is descended to the key note, with the same fingering reversed.—Example 2d ascends and descends the octave in one *tenor-position* of the hand. Example 3d, concludes the octave in the fifth extended position of the first string. In fingering all *tenor* and *violin-positions*, the descent may always be made in this manner, with reference to thumb-positions in descending; or the close may be made on the next lower string, as in Example 2d.—In Example 4th, the octave is *all* fingered on *one* string, the second.—Here, the first two notes are in the first tenor-position. The thumb is sprung forward to A, the first *violin-position*, in which five notes are taken; the third finger playing D harmonically, as indicated by the large dot on the left of 3.—The thumb, then, quits the *violin-position*; and concludes the octave, by playing the last six notes in the first tenor-position. The fingering of the key of A, middle of the first string, is executed all (similarly to Example 4th) on the first string. The *key* of G, middle of the third string; and the *key* of C, middle note of the fourth string, are fingered in all respects like Examples 1st, 2d, 3d, and 4th.—Example 4th carries the hand to the last note D, of the double octave to the open string.

A second set of examples of *violin-positions* is given opposite to marginal letter (b), a fifth higher than the four preceding examples. In Example 1st, the thumb is placed on the twelfth major A, on the 2d string; and four notes are played in this *first violin-position*. The next four notes are taken on the first string, and in the same position. The scale is descended in the same manner, with reversed fingering, the harmonic notes being dotted as before. In the second example, the octave is fingered on the first and second strings, and in one violin-position. In the third example, excepting the two first notes, the octave is fingered on the first string; the last six notes being played, having the thumb in the *first tenor-position* on the first string. The fourth example is fingered throughout on the second string. Here the notes lie close to each other; and, therefore, the second finger takes the third note E; and the third finger the *nineteenth major A*, a fine harmonic beyond the finger board. The seventh, sixth, and fifth, are descended with the thumb placed in E, a *violin-position*. The thumb is, then, thrown back to the fundamental note A, and the last six notes are played in this *first violin-*

*position.* The grace-notes are here marked by small figures. The major seventh G, lies at the *very extremity* of the finger-board.

The *key* of D on the third string, and the *key* of G on the fourth string, in the same position, are fingered according to these four examples. The *key* of E, in the same *Violin position* on the first string, is fingered *all* on that string; similar to Example 4th in the present instance. The *harmonic* seventeenth major F, is a fine harmonic in the fourth example.

Opposite to marginal letter (c), Example 1st places the thumb on D, the first note of the third octave of the second string. The seventeenth and nineteenth major are taken in that *Violin position*, with the first and second fingers. The thumb is then placed on the first note D of the fourth octave. The chord of that octave is fingered as appears in that position. The octaves are descended by reversing the fingering, which brings back the thumb to D, where the example commenced. *All* the notes in this example are harmonics.

Example 2d includes the extremes of the instrument, and is a modulation on the third string throughout. It gives a connected view of the second, fifth, and ninth extended positions in the lower compass, united to the tenor-pitch, blended with violin positions. The three last bars, are three consecutive chords of G; and the last terminates at the extremity of the fourth octave.

Opposite to marginal letter (d), Example 1st, is inserted the *Chromatic Scale*, from A, the open note of the first string, to E, the nineteenth major. Though sharps are marked, they of course may become flats, according to the key. It is recommended to practise the eleven positions numbered on this scale, first close, and then extended, in every position exemplified for each semi-tone. The practice of the positions close, and extended, and consecutively, will soon produce a great facility of fingering in the lower compass.

From the tenor-pitch to the end of the scale, the successive semi-tones may be practised by taking five in each position: always shifting the thumb to the sixth, in order to take the following five.—Much benefit will arise from practising in the above manner, occasionally, on each string.

The manner of practising the positions on all the strings, is exemplified fully under Figure 2d, and on the first string. The first finger in B flat or A sharp, is followed by the second, third, and fourth; each on the following semi-tone. The close position being thus practised, the first finger remains fast; the second finger is thrown forward to C natural; the third, to C sharp; and the fourth, to D as the extended *first position*. The first finger is then moved forward a semi-tone, or to B natural, the *second position*; and there the *close* and *extended positions* are practised in the same manner. This is to be continued (on every string) till the first finger arrives at G sharp; C sharp; F sharp; and B, the eleventh and last position *on each string*. It is to be observed again, that the first finger, both in ascending and descending, is always supposed placed on the first tone (or semi-tone it may be) of each position.—In the extended position, the semi-tone

next to the first finger, remains of course, uncovered, because the other three fingers occupy their situations. This practice cannot be too much carried on, even by good players.

Under letters (e), (f), and (g) are three examples of the minor modes, in the keys of C, D, and E. It will be immediately perceived, on inspecting the fingering of these examples, that our new system of fingering, is equally applicable to the *major* and *minor modes*. Independent of the difference of character between the two modes, in reference to their effect on the mind, the apparent difference consists in reducing the seventh, sixth, and third, a semi-tone. This, as in the first example of C, will give C natural major, reduced, or changed to the key of C minor, with three flats. It is to be observed, that in ascending a minor scale, the great sixth and seventh are requisite, and not the same notes flattened. The principal reason of this is, that harmony requires, that the step leading into the octave should be the semi-tone, or seventh major, which, on that account chiefly, has been termed the *sensible*, or *leading note*. From this it appears, that the minor mode, principally displays its affecting character, in descending passages: as in the upper part of the octave, both modes coincide. Some composers do make use of the flat sixth and seventh, in ascending; but the effect is not adequate, and the passage into the octave cannot, without shocking the ear, be otherwise than by the major seventh. In general, three flats added to a flat major key, will render it minor. Three sharps must be taken from a sharp key to make it minor; as here in the key of E, which appears with one sharp. If there be two sharps, as in the major key of D, the sharps disappear, and one flat is introduced, as under Example (f). The key of C natural major, has three flats given to it, or E, A, and B; the third, sixth, and seventh, being flattened, to constitute it a minor key. As the major key, as that of G, has one sharp, it disappears, and two flats, B and E, are added. The key of A major sharp, becomes minor, by taking away the three sharps; or, in other words, by reducing them to naturals; excepting in ascending the last part of the octave.

In singing, it is harsh to rise or fall by sixths major. Such forbidden intervals are deemed *salti vietati*. On the contrary, in the minor mode, a rise or a fall by sixths increases the plaintive or mournful effect of music in this affecting mode.

This system of fingering in every compass of the instrument, without the possibility of mistaking one situation of the Violoncello finger-board for another, will, it is trusted, be found easy and simple. Before it thus reaches the public, it has experienced the marked approbation of eminent judges of the subject it involves. It is the result of much reflection, and continual study of a science elucidated by few.

In a work of this description, it is usual to give some explanation of musical notation; of time; and of the various signs, marks, and characters constantly occurring in the course of practice. These heads will be adverted to as briefly as possible.

Under letter (h) is inserted the time-table, in a very comprehensive form, as used by

Woldemaar.—Under letter (i) the *rests* adequate to the various *notes* are marked.—Under the letter (j) there is an example of time. *Adagio* is instanced; as the slowest time, excepting *grave*. A number of experiments were made to ascertain the length of a pendulum which would vibrate eight times during the time of playing *one bar* in *adagio*.—Six-and-thirty inches from the centre of the ball, to the point of suspension, will vibrate about sixty-four times in a minute, reckoning a vibration for every time the string, or rather the plummet of the pendulum passes over the perpendicular. This will be found to correspond, *very nearly* with the common *adagio*-time. The second instance under (j) gives *allegro*, which may be taken as the *half* of *adagio*, by making a bar, or four crotchets, equal to four vibrations of the above pendulum. The next example (k) *allegro*, has three in a bar, equal to three vibrations of the pendulum. In the second line under (k) the six quavers in each bar, are, of course, played, during three vibrations of the pendulum. Eight quavers in a bar, will be played precisely in the time of eight of these quavers. The figures above, and below the notes, in these two examples, mean distinct vibrations; and we would strongly recommend practising occasionally before the pendulum, whose vibrations are arcs of *varying dimensions*, but vibrated in the *same time*, till the force of gravity stops it. If made to vibrate in the space of a foot, it will go about ten minutes; and the last vibrations will be made in less than an inch. A string attached to a common musquet-ball, will make one sufficiently exact: for unless actually moving by clock-work, the vibrations of theory and practice will not quite coincide.

The next most important measure of time is *largo*. We think a pendulum twenty-four inches in length, which will vibrate about eighty times in a minute, will give vibrations nearly equal to this time. The first line of the example under letter I, is in this time, with three crotchets in a bar. The upper figures mean, each, two vibrations, as marked by the second set. The second line has six quavers in a bar, as numbered, and two of these quavers are played in the time of two vibrations. The common time, marked  $\Phi$ , is nearly the *half* of *largo* as here specified; as common time, marked C, is the *half* of *adagio*.—The notes of these examples under (k) and (l) are taken from *Renaigle*; and *largo* is added merely to adapt them to the explanation here given. These simple pendulums may be constructed in five minutes; and they are here applied to *adagio* and *largo*-times, as being the foundation of all others, excepting *grave* which will require a pendulum about forty inches in length.

Opposite to marginal letter (m) is inserted the usual mode of playing dotted notes; a subject of some difficulty to tolerable players. This is of much importance, as *accenting* the notes *according* to the dots, gives the leading character, and general effect to a passage.

Letter (n) simply indicates the value of dots attached to notes: a thing to be considered, *previously*, to the last article. The articles opposite to letters *o* and *p*, are inserted, merely because their omission might appear a defect.

The marginal letters (q), (r), and (s) give the figures indicating the various times, of which C,  $\mathbb{C}$ ,  $\frac{2}{4}$ ,  $\frac{6}{4}$ ,  $\frac{6}{8}$ ,  $\frac{12}{8}$ , are generally reckoned common time. In playing the *crescendo*, *diminuendo*, and their union, the *Fermato*, great care must be taken, not to alter the time.

Opposite to letter (t) is the usual mode of marking time, by the action of the foot; and *d* means down, and *u* up foot. It will prove of much benefit to correct the movement of the foot, by means of the pendulum. For instance, in playing common time, four crotchets in a bar, the foot goes down, and remains down during the second vibration; rises with the third vibration, and goes down with the fifth vibration, or first crotchet, or note of the next bar. To practise quavers in the same time, let 1, 2, 3, 4, be counted during the time the foot is going down, and is down; and 5, 6, 7, 8, while the foot is rising and up; and repeat this practice till perfect in it. To play semi-quavers, count 1, 2, 3, 4, —1, 2, 3, 4, during the time the foot is going down, and is down. Count 1, 2, 3, 4, during its rise, and 1, 2, 3, 4, during its continuance up with the fourth vibration, or crotchet of the bar. The same idea may be applied to all the other times, by considering the number of vibrations adequate to the bar, combined with the action of the foot, which must be without noise or gesticulation, excepting a little, when leading.—The semi-breve in common time, being adequate to four crotchets, or four vibrations; and the minim being the half of this, these two measures of time will be readily counted by the pendulum, and thus impressed on the memory. The quavers, and semi-quavers, will by habit of practice with the foot and pendulum, be played with equal justness of time. The playing of quavers, semi-quavers, and demi-semi-quavers, conjoined in various combinations, can only be effected in true time, by mere force of habit, after an indispensable knowledge of groundwork of time, has been acquired, practising nearly as above.

Opposite to marginal letter (u) is inserted a thorough-bass chord, which is placed opposite to letter (v) also, with a view of exemplifying the fingering of chords.

The chord first placed there, has the three notes D, B, and G. The fingering is marked immediately under, in three lines. The highest line, marked  $\times T 2$ , refers to the highest note D. The  $\times$  with T on its right, shews that the thumb is placed in a tenor-position, and the 2 on the right of the T, shews that the tenor-position is on the second string. In playing a chord, when once the thumb (or it may be the first finger) is fixed, the other fingers used, easily find their places. In the present instance, the thumb being placed, the first finger is applied on B, tenor-position, third string, all marked as here, 1 T 3. The third or lowest note of the chord G, is taken by the third finger on a tenor-position, fourth string, being marked 3 T 4. The same notes in a chord, at the beginning of the second bar, are fingered in the same manner, excepting that the second finger takes the B, instead of the first. The same three notes chorded, appear in the middle of the third bar. In this case, they are fingered in another situation; for the thumb is placed in the fifth position on D, first string, marked  $\times 5 1$ . The first finger is placed on B, second string, ninth position, marked 19 2. The third finger is placed, *harmonically*, on the middle of the third string, T position, marked 3 T 3. The second chord in the first bar has, downwards, the letters B, G, and D. Here,



the thumb is placed on the second position B, first string, marked  $\times 21$ . The first finger is placed on G, fifth position, second string, marked 152. The third finger is placed on D, seventh position, third string, marked 373. The same chord, middle of the second bar, is fingered with the thumb placed in the ninth position, and the first and third fingers, at the same time, in tenor-positions, on the third and fourth strings. The chord at the beginning of the third bar, contains, downwards, the notes G, D, and B. The thumb is placed in the tenth position first string, marked  $\times 10,1$ . The other two notes are fingered with the first and third fingers in tenor-positions, respectively, on the second and third strings. The last chord of the first and second bars, has downwards, the notes G, D, and B. The G is had by the thumb in the fifth position, second string marked  $\times 52$ . The other two notes, as marked, are had, at the same time, by placing the first and third fingers in the seventh and eleventh positions, respectively, on the third and fourth strings. It appears from this, that in fingering chords, the position stopped by the finger used, is marked; whereas in fingering single notes, the position meant is *always* that under the first finger, or thumb.

Opposite to marginal letter (w) are examples of chords, of four notes fingered. Here the first finger, laid flat on two strings, stops a note on each string.

Example under letter (x) gives a few bars of an arpeggio from Renaigle, but fingered according to our manner. In fingering the chords, the o means open note. The arpeggio is bowed with an up bow, for the first two notes; and a down bow, the next two. The dots under the slur, shew that the notes are *feathered*, or played *staccato*, under the slur. As for bowing, it is a general rule, if possible, to give the first note of a bar accented, with a down bow. When, therefore, after a rest of any kind, an odd number of notes appear at the end of a bar, begin them with an up bow, which will bring in the first note of the next bar, a down bow. If the number (after a rest) at the end of a bar, be even, begin them with a down bow, to produce the same effect. Two or three notes may be slurred, or staccatoed, to bring in a down bow, at the beginning of the next bar. A good player will, however, find all this a matter of indifference.

Example (y) is an instance of octaves from Renaigle, but fingered by our mode, on the first and second strings. The A at the beginning, is an octave lower than the A placed under the mark, 8<sup>va</sup>  $\text{::}$  <sup>alto</sup>; being the middle of the first string, and played also, as twelfth major, second string. The *alto* continues till the word marked *Ioco*, brings the thumb on D the middle of the second string. In all the examples hitherto given, the true treble A, middle of the first string is *meant*; but as it is generally played an octave lower, or the open note of the first string, it will be so meant in future, excepting where the mark 8<sup>va</sup>  $\text{::}$  <sup>alto</sup> raises it to its *true place* in the scale.

Opposite to marginal note (z) is an enharmonic andante played by *Mestrino* at Paris. The enharmonic style was prevalent among the ancients; but there are no distinct traces of it later than the era of Alexander. It is on record, that it was deemed the most captivating species of music among the Greeks. It consisted of quarter notes, and major thirds, according to which idea, nearly, *Mestrino* has given the present instance. It is

played by touching the first note (see bar A) and sliding the finger along the string to the next note played distinct. The first finger is placed on B, the first position, first string. That note is articulated, and all the quarter-notes, till the finger arrives at the great fourth D, which is played distinct. The intervals between the notes of the Violoncello being considerable, afford scope for displaying the enharmonic style. How far this *groaning music* (*touches* of which are now frequently introduced by very eminent performers) may be calculated to please a modern ear, this easy specimen will furnish an opportunity of evincing.

To instance the fingering of chords, the perfect chord of G major is given. The minor chord of G is similar, with the difference of a minor third and sixth, B and E flat. It is evident, by inspecting *Fig. 1*, that the perfect chord is, precisely, the *harmonics*, twelfth, octave, and seventeenth major, reduced to the third, fifth, and octave of the fundamental note; and on this principle depends nearly the whole system of thorough-bass and chords. This will appear by a reference to letter (z 1) where the *harmonics* mentioned, appear, first, unreduced; and reduced in the two following instances; the last being the first, third, and fifth. Any of the three chords specified, may be taken with the fundamental bass. The bass of  $\frac{6}{4}$  is always the fifth to the fundamental chord; and the bass of 6, the third to the same. Those who are conversant in these studies, will always find much amusement in considering the nature and construction of the chords and inversions of the minor third, the ninth, eleventh, and thirteenth; and more especially of the fundamental discord chord of the minor seventh, which has of late attracted so much of the attention of eminent composers.

Example 1, opposite to letter (z 1) shews what is termed *anticipation*; because, the D in the bass being a crotchet and a half, the crotchet of its time, or duration, belongs to the notes B and C above; and the remaining quaver to D above, which has its half remaining to correspond to the quaver D below. Example 2, is generally called *suspension*. They are much the same in meaning, being, generally, anticipation in ascending, and suspension in descending. Example 3, is an instance of the combination of both characters.

We have, at length, arrived at the application of the new system of fingering (as amply described) to the compositions of various authors; and these illustrations will be occasionally given in the different compasses of the instrument, using the bass, *tenor*, and treble clefs, singly, and intermixed, in order to be able to play in them *at sight*.

Fingering in the tenor and violin compasses, may, if necessary, be postponed, till perfect readiness of execution, attended with a good position, tone, and bowing, is attained to, in moving in the eleven described positions close, and extended.

Example 1, is played in the lower compass. Example 2, the same tune, is played with different fingering, and with more refinement and expression, above the common position, which may be reckoned the *second position*. The 104th Psalm, composed by Handel, is added here, and is all, excepting a few notes, played in the second close position. Example 3, a beautiful Scotch tune, and one of the finest instances of the pathetic melody in that









that the simple melody of this air was published at Aberdeen, in a book of Anthems, in 1682.—Following number 18, is a Scotch Reel, which, with similar ones, will tend to steady the hand in the lower compass.

Number 19, is the Third Concerto of Corelli, in the key of C minor. It is, probably, the most difficult to finger with accuracy and precision; and, therefore, the mode of taking every note is figured. By playing this fine concerto accurately, the practice of flat, and minor keys will become greatly facilitated. In general, playing low down, in a flat key, has not a good effect, as is well known by those who understand the nature of the Violoncello. On this account, the fingering is kept near to, and in, the middle compass, and different modes of taking the same passage are marked; but it is recommended to follow the higher mode. This Concerto and the Eighth, were played at the Pantheon in Italy, annually, for many years, in commemoration of the distinguished Composer. In all these examples it will be necessary to play only a few times, with *strict attention* to the fingering marked; as such an impression will be made on the memory, that the passages will very soon be taken nearly as figured; and the hand will be found to move from one position to another, with a degree of satisfaction proportioned to the smoothness and facility of execution. In counting the *rest of eight bars*, previous to the allegro, *count each four bars mentally; one, two, three, for each bar*; the foot going down with *one*, and rising with *three*, for every bar. Begin counting, on hearing the first note of the leading instrument.

The practice of the Third Concerto will lead to the next number, which is the celebrated Eleventh, containing the finest rapid obligato solo that, perhaps, was ever composed. The playing of rapid passages, or running basses in flat keys, in the first and second positions, ought to be avoided as much as possible; on account of the jargon, or cackling noise, produced there, by the interference of imperfect harmonics near this end of the strings, with the notes intended to be stopped. The bow of a young player is apt to take the string *before* the note is pressed down: the consequence of this will invariably be, that an imperfect *harmonic*, or a sort of shriek, will precede the intended note, unless great care is taken to press firm with the finger used, previously to the action of the bow. Independent of all this, the notes and half-notes at this extremity of the strings are inferior, in softness and tone, to the same taken in a higher position. From these weighty considerations, this far-famed Concerto is fingered in the higher positions, the *handling* of which, under every possible advantage of tone, flow, and effect, will be found easier than that of the lowest positions; because the notes lie closer and more contiguous, and occasion a less constrained extension of the fingers. The Concerto must be played slow, till the taking of the successive positions, as marked, is perfectly attained to.—Passages of demi-semi-quavers, must, however, be frequently played in the two lowest positions, because there is scarcely time for shifting the hand to more eligible positions.

Nothing can be better calculated than this Concerto, for training the hand, and giving smoothness, firmness, and decision to the action of the bow, on which so much depends. To express the *accent*, groupes of four notes are fingered in succession.

Number 21, is a fine Air from Handel, in a difficult key of four sharps. For the reasons last mentioned, fingering in the lowest positions is avoided. Towards the situation of the adagio, there are two bars fingered in the lowest positions, merely to shew that they are as much as possible to be avoided. The playing of this air with tolerable success, will require considerable pains, and a minute attention to the taking of the positions in tune, with a corresponding accuracy in the movements of the bow.

Beginners find it rather difficult to slur notes in quick time, more especially when they run in arpeggio style, from string to string. Much of this requisite slurring is, purposely, introduced in the present example, as such practice is frequently necessary where smoothness of execution is indispensable. Annexed to this Number 21, is Fischer's famous Minuet, in the treble clef, in order to combine the tenor-pitch with the whole extent of the lower compass.

Number 22, contains the Slow movement, and the Obligato passage, of Correlli's First Concerto. The slow movement must be played with a lengthened bow, and a considerable motion of the arm. There are eight quavers in a bar. A vibration of a line and plummet, twenty-four inches in length from the point of suspension to the middle of the plummet, will be nearly equal to one of these quavers in time. The bow must not remain on the string during the whole vibration; but still, the movements of the bow, in each direction, must be quite equal; so that the half of the time of each quaver is sounded, and the other half reckoned. Many, however, play each quaver its full length on the string; but the former mode does more justice to the author, and renders the first violin more prominent. In these instances, crotchets, minims, and semibreves, must be played, or sounded, their exact time.

This rapid obligato passage can certainly be fingered in the lower positions, and others approximating towards the middle of the strings. The execution of the portion of it in the tenor clef, is exemplified nearly in the tenor-position, on two strings; in order to shew, that, with a little practice, the execution with the thumb in the tenor-pitch, is more neat and ready, than a more troublesome variety of shiftings of the hand among the lower positions. Where the bass clef succeeds the tenor clef, were the hand to remain in the tenor-pitch, it would be necessary to play the notes E and F, as often as they occurred, on the fourth string. These two notes are harsh on that string; and, therefore, the hand descends, to finish the passage in the lower positions. The conclusion of this difficult obligato being similar to this commencement, the fingering there is not repeated in the tenor-pitch, but, for variety's sake, is exemplified in the lower compass. This solo demands spirited and decided bowing, entirely from the action of the wrist; and, therefore, any attempt at rapid execution for a considerable time, will defeat every intended purpose. It must not be got by heart: for the eye, the finger, and the bow, must take up every note in rapid succession. Any person who can play this moving bass with accuracy, and with an expressive tone, will be entitled to think favourably of his own execution.

Number 23, is a Minuetto movement, with a Vivace, from an Overture of Haydn.

The fingering might have been given in a lower compass; but it was deemed more eligible to exemplify a minor key in the higher positions, where the tones are unquestionably softer, and more pleasing. As has been already remarked, the same fingering will be found equally applicable to the similar positions above and below: but it is far from being asserted, that the effect to be produced is equal in either. The practice of this example will give a great command of the hand in all the flat and minor keys.

Number 24, is a March from the *Scipio* of Handel. It is to be played after Pleyel's German Hymn, and is intended as an improving instance of the practice of double stops, which are exemplified, on purpose, in the various leading positions of the lower compass. It is to be recollected, that the three highest figures refer to the highest note, and the three under to the lower of the double notes. The figure on the left, means the finger: the middle figure means the position; and the figure on the right, the string. When a double stop has been once figured fully, where it occurs again, the figures of the fingers are deemed sufficient. The bar marked A, can have the three last notes played properly by placing the thumb on A, fourth string; the first finger on G, third string; and the third finger on E, in second octave, fourth string. The fingering at B, must be nearly similar, with the thumb either in the ninth position, fourth string; or in the second position, third string. This example should be assiduously practised, as it will tend to render familiar the taking of double positions throughout the lower compass of the instrument.

It may be proper here to make a few remarks on the order in which the sharp and flat keys run. The sharp keys run by consecutive fifths, each increasing by one sharp: as, C—G with one sharp—D, two sharps—A, three sharps—E, four sharps—B, five sharps—F, six sharps—and C, seven sharps. The flat keys rise by consecutive fourths, beginning with the fourth of the natural key: as F, with one flat—B, two flats—E, three flats—A, four flats—and D, five flats. These are the twelve keys of the major mode.—To render these flat keys minor, the third, sixth, and seventh, are lowered a semi-tone; or, in other words, three flats are added to each in their order. The natural key of C is made minor by giving it three flats, B, E, and A. The key of A is made minor, by taking away the three sharps. D with two sharps is rendered minor, by taking away the two sharps, and adding one flat. G sharp is made minor by taking away the sharp, and adding two flats. All the other major sharp keys are made minor by deducting three sharps. The keys of the minor mode which appear with flats, rise by consecutive fourths from A minor, which appears natural:—A—D with one flat—G, two flats—C, three flats—F, four flats—B, five flats—E, six flats—A, seven flats. The minor keys which appear with sharps rise by successive fifths:—E minor, one sharp—B, two sharps—F, three sharps, and C four sharps. These together make the twelve scales of the minor mode. This enumeration may aid young players who may be apt to mistake the nature of the various notation of the major and minor modes.

Number 25, is a good, and moderately difficult specimen of fingering in every compass of the instrument; and the transitions are in extremes: for at C, the fifteenth, seventeenth,

and nineteenth-major notes (*all fine harmonics*) are taken with the thumb, first and second fingers; and a descent of four octaves and a third is *immediately* made to C sharp, the *lowest* semi-tone of the fourth string. There are, generally, more modes than one, of playing almost every passage in general, and in solos particularly. For instance, at A, the bar is played in one position of the hand, by taking four notes on each string. The same passage, with more shew of execution, might be run down all on the first string, excepting the concluding note G. It might be played on the first and second strings together: it might be played, entirely, on the second string, beginning on the harmonic nineteenth major: it might be played on the second and third strings. This sufficiently evinces how cautiously opinions on fingering ought to be given, before the subject is duly considered.—At B, a variety of fingering in descending solo passages, is exhibited, down to the open note of the second string. Where there are repetitions, the fingering is not again figured; and where the hand remains in *alto*, in the first violin-position, the figures indicating the thumb and fingers, are deemed sufficient. In playing these solo-concertos, the bowing is bold, spirited, and decided: but not so in accompaniments, where delicacy and softness of playing are required, as the reverse would overpower the modulations of a flexible voice, or destroy the effect of the fine tones of the violin, and wind instruments. This is so common an error, that the Violoncello performer should, as a constant *memento*, mark the word PIANO on his instrument.

We have thus conducted the exemplification of the fingering system recommended, to a close, (and be it understood) without meaning to convey any reflection on modes now in use. It is the nature of all human sciences to be approximating to a perfection, or maximum, to which they never attain; and future ages may surpass the present, in this and every other species of knowledge, in the same proportion that the barbarism and ignorance of the middle ages have been succeeded by the civilization and refinements of modern times. Whether a link has been added to the general chain of knowledge, the intelligent reader will decide. If he already knew most, or all, of what is here written, we shall be sorry that nothing better can be offered. The work may, however, incite him to a farther pursuit of this interesting subject; and to a numerous class of young players, it may prove beneficial.

As some very fine notes may be, occasionally, taken in the fourth octave of the Violoncello, these examples conclude with the Air of "God save the King" (on account of the distinctness of the notes), set in a key corresponding to each of the four strings. The fingering is affixed to the air commencing on the lowest note, G, of the fourth octave of the third string. The notes lie so close to each other, that the same finger is used for successive notes. The tune is all included within the octave, excepting one note, marked *above* with a ×. This note is the one immediately under the fourth octave; and is the harmonic twenty-first from the open string. It is flatter than the common diatonic scale admits of. In Examples 2d, 3d, and 4th, it must be played *harmonically* on the string immediately





will lead to very pleasing practice in that style, which will give a ready command in the treble clef. Solo-playing will be now arrived at; and Example 25, and the four specimens in the fourth octave, will be a good preparation for this highest description of execution. The modern style will be acquired by joining, frequently, in playing the works of Haydn, Beethoven, Mozart, and Pleyel. Lindley's, Schetky's, Breval's, and Schonebeck's duets, are useful and improving practice, for playing with precise accuracy and distinctness, and without *dragging*, in slow time. Real good playing is to be found in the eleven lower positions of this fine instrument; though execution in other compasses, have their distinct merit. Rules and examples, founded on a sound *rationale*, aid powerfully; but he who has studied the genius of the instrument will, in time, learn *to be a rule to himself*.

**DICTIONARY**  
**OF THE**  
**PRINCIPAL MUSICAL TERMS.**







## I.

*Inganno.* Tromperie; cheat; is when a *tacet* is made, where a prepared close was expected by the ear.

*Interval.* The difference between two sounds, as to acuteness and gravity. They are divided into simple and compound, which last includes lesser intervals.

## K.

*Key.* A fundamental note, to which the whole piece refers; on which it generally commences; and with which it always terminates. It resembles the keeping some leading circumstance, or person, constantly prominent in a well adjudged oration.

## L.

*Larghetto.* Somewhat quicker than *largo*.

*Legato.* Notes tied, or slurred in playing.

*Leggiardo.* Lively, brisk. *Leggiardamente*, the same.

*Lento.* *Lenté*, are both, in time, similar to *largo*.

## M.

*Measure.* See what is written on the pendulum, as a measure of time.

*Men.*  $\left\{ \begin{array}{l} \textit{Forté.} \\ \textit{Allegro.} \\ \textit{Presto.} \end{array} \right\}$  Means a diminution of these, or of any other mentioned times.

*Mezzo.* The half of any subject, or effect to which it is applied.

*Minor.* And major, explained in the work: as also *mode*, *modulation*.

*Molle.* A flat sound, in reference to a sharp.

*Monochord.* The harmonical canon, or rule to measure intervals, experimentally.

*Music.* Described, in some degree, in the work. See the works of Smith, Taylor, Malcolm, &c. &c. on the subject.

## N.

*Nona.* The ninth, a dissonant interval, being properly the second doubled. It has generally an octave placed near it, being resolved by descending to the octave.

*Notes.* As used, instead of points, are ascribed to Guido; as are lines, ledger-lines, letters, clefs, sharps, and flats. Johannes de Muris, Doctor of Paris, was the first who assigned shapes to notes, expressive of different times.

## O.

*Octave.* Called diapason, as containing all the intervals, or simple tones. Des Cartes, from finding that an over-blown whistle, or organ-pipe, gave an octave, concluded that the fundamental note is always accompanied by an acute octave. See what is here written on *harmonics*, and experiments made on strings.

*Organ.* Invented in the eighth century. St. Jerom mentions one heard at the distance of a mile. There is one at Ulm, ninety-three feet high, and twenty-eight broad. It has sixteen pair of bellows. The largest pipe is thirteen inches in diameter.

*Organo.* Generally means thorough-bass.

## P.

*Pastoral.* Airs in imitation of the melody of the music of Shepherds.

*Pause.* Demi, or general; a cessation partial, or total; in order to strike forcibly; and, as in oratory, to recommence, after this silent appeal.



*Phonics.* Acoustics; the science of sounds.

*Piano.* Soft and sweet.

*Pianissimo.* Very soft, so as that the sound may appear, as it were, distant.

*Pizzicato.* Passages or notes played by the *finger*, in lieu of the *bow*. The bow must be thrown suddenly out of action, and the notes to be *pizzicatoed*, are to be sounded with the middle finger, in preference to the first of the right hand.

*Poco.* A little less, as *Piu* means a little more, or *poco piu*.

*Point.* Simple counterpoint, when a note below corresponds with one above; and *figurate*, when there is a syncopation, or holding on of a note. Points are still used; as a pointed semibreve equal to three minims.

## R.

*Rattle.* Aristotle writes that Archytas invented this *musical instrument*, to amuse his children, and to prevent their deranging his articles.

*Recitativo.* The art of declaiming musically, by voice and instruments.

*Repieno.* Parts played to *fill up*, occasionally, or to increase the effect.

*Rondeau.* Applied to pieces that end with the first strain.

*Rostrum.* An instrument for ruling music paper.

## S.

*Saraband.* A dance or measure derived from the Saracens.

*Soprano.* The first treble, or Canto.

*Sostenuto.* To hold a note steadily through one, two, or more bars.

*Staccato.* Notes struck in a smooth, but distinct manner.

*Supposition.* Two consecutive notes, one a discord, and the other a concord to a third note.

*Syncopation.* A breaking of the time into different contiguous notes. It means, also, when a note of one part terminates in the middle of a note of another part. It also connects the last note of a bar, with the first of the next.

## T.

*T.* Means frequently Tutti, or all playing simultaneously.

*Tacet.* Let it be silent, or let the whole, or such and such instruments stop. It often conveys a similar meaning to the pause.

*Tasto.* The touch. It means the finger-board, or keys of an instrument. *Tasto solo* frequently means a gentle holding on of one note, till more mixed accompaniment is indicated.

*Temperament.* A term applied to all instruments whose notes, or sounds, are fixed. It means an amelioration of the imperfect concords, by adding to them a part of the beauty of those that are perfect. From this the Italians call it *participatione*; and it is also called *bearing*, because it bears away a small portion of one note, to enlarge another. *Bontempi* (See *Historia Musica*) found that the *fifth* could bear a diminution, to give a greater extent to the *fourth*. Nature herself, in some degree, meant this *systema temperato*; for the harmonic fourth of the fourth octave, is even now sharper than in keyed instruments. Though the exact mathematical ratio between notes is deranged by *temperament*, it is unquestionable that a cultivated ear deems it indispensable. It may be a proof, probably, that *nothing on this side of time must be deemed perfect*; for, even now, opinions are divided on the degree of *temperament*.

*Tenore.* Means, in its true sense, the ordinary pitch of the voice.

*Third.* An imperfect concord. It has two intervals, and three terms, or sounds, which are rendered nearly equal by the application of *temperament*. The great third is brisk, gay, and sprightly, in rising; but soft, tender, or rather heavy and melancholy, in falling. The minor third maintains the opposite character.

*Time.* In music, is derived from the *tempi staccate* marked by the hand, or foot, first in Italy.





The page contains ten exercises labeled A through K. Exercises A through I are in standard guitar notation with six strings. Exercise J is in Tenor Clef (C4 on the fourth line). Exercise K is in True Treble Clef (C4 on the first line). The exercises include various scales, arpeggios, and fingerings. Fingerings are indicated by numbers 1-4 and 0 (thumb). Some exercises include specific fingering instructions like '1st String' or 'Thumb, middle of the 1st String'.













































Handwritten musical score for piano, featuring five systems of music. Each system consists of a treble and bass staff with complex rhythmic notation and fingerings.

**System 1:** Treble staff has a key signature of one sharp (F#) and a common time signature. Bass staff has a key signature of one sharp (F#) and a common time signature. Fingerings are indicated by numbers 1-5.

**System 2:** Treble staff has a key signature of one sharp (F#) and a common time signature. Bass staff has a key signature of one sharp (F#) and a common time signature. Fingerings are indicated by numbers 1-5.

**System 3:** Treble staff has a key signature of one sharp (F#) and a common time signature. Bass staff has a key signature of one sharp (F#) and a common time signature. Fingerings are indicated by numbers 1-5.

**System 4:** Treble staff has a key signature of one sharp (F#) and a common time signature. Bass staff has a key signature of one sharp (F#) and a common time signature. Fingerings are indicated by numbers 1-5.

**System 5:** Treble staff has a key signature of one sharp (F#) and a common time signature. Bass staff has a key signature of one sharp (F#) and a common time signature. Fingerings are indicated by numbers 1-5.

The score includes various musical notations such as notes, rests, and dynamic markings like *hr* (hairpins) and *B* (Basso).



First system of musical notation. Treble staff: 3 0 3 0 0 2 1 4 1 4 1 4 0 0 2 1 4 2 1 0 1 3 4. Bass staff: 0 3 4 0 3 4 0 0 4. Fingerings: 2/1, 2/1, 2/3.

Second system of musical notation. Treble staff: 1 2 1 0 4 4 1 3 4 4 3 4 4 1 3 4 4 3 4 2. Bass staff: 0 0 4 3 1 0 3 1 4 4 1 4 1 3 4 4 3 1 4 1 4. Fingerings: 2/1, 7/1, 9/2, 7/1, 2/3, 4/3, 4/3, 4/3.

Third system of musical notation. Treble staff: 1 2 2 2 4 1 2 3 4 1 0 4 2 1 2 2 1 0 1 3 4 0 1 3 4 3 4 0 1. Bass staff: 4 1 4 1 4 3 4 0 0. Fingerings: 6/1, 3/2, 3/1, 9/2, 5/2, 2/2.

Fourth system of musical notation. Treble staff: 2 1 4 3 1 0 4 3 0 1 3 4 3 0 1 3 4. Bass staff: 0 1 2 2 1 5/2 5/3 1 5/2. Fingerings: 2/1, 2/2, 2/3, 2/3, 2/3.

Fifth system of musical notation. Treble staff: 1 2 4 2 1 2 4 2 1 2 4 1 3 4 0 4 1 4 2 4 2 1 2 1 3 2 1 4 7 1 3 7 2 0 3. Bass staff: 4 4 9 4 2 2 5/3 5/3 5/3 5/3 2 1 5/2 4 1 5/2 0. Fingerings: 2/1, 2/1, 7/1, 2/2, 9/2, 9/2, 9/2, 9/2, 5/2, 5/2, 5/4, 1/2.































2 3 2 3      3 1 0 1      3 4 2 4      1 4 2 4      2 3 1 3  
 $\frac{2}{2}$   $\frac{2}{1}$        $\frac{2}{2}$   $\frac{2}{1}$   $\frac{2}{1}$        $\frac{4}{2}$   $\frac{4}{1}$        $\frac{7}{2}$        $\frac{7}{2}$   $\frac{7}{1}$

1 8 2 3 1 3 2 1 2 1 2 3 2 3 1 1 2 1 2 4 2 4 1 2 2 1 2 4 2 4 1 1 3 1 3 4 3 4 1 3  
 $\frac{9}{2}$        $\frac{11}{2}$        $\frac{5}{1}$        $\frac{7}{1}$

*Adagio*

2 1 2 4 2 4 1 2 4 4 0 0 2 1 2 4 2 2 2 1 2 4 1  
 $\frac{9}{1}$        $\frac{9}{2}$        $\frac{6}{2}$        $\frac{6}{4}$   $\frac{6}{3}$   $\frac{6}{4}$

## OVERTURE Haydn

## Minuetto

23

1 3 4 1 3 1 4 3 1 1 2 4 2 1 4 3 1 2 4 2 1  
 $\frac{10}{2}$        $\frac{8}{2}$        $\frac{3}{2}$        $\frac{9}{3}$   $\frac{9}{4}$   $\frac{8}{2}$        $\frac{10}{3}$        $\frac{7}{2}$        $\frac{4}{1}$

4 2 1 4 1 1 2 4 2 1 4 2 1 1 2 4 2 1 2 1 2 4 2 1 2 2  
 $\frac{6}{2}$   $\frac{8}{3}$   $\frac{6}{2}$   $\frac{6}{3}$   $\frac{10}{2}$   $\frac{4}{2}$   $\frac{4}{1}$        $\frac{10}{2}$        $\frac{6}{2}$        $\frac{10}{2}$   $\frac{6}{3}$   $\frac{6}{2}$   $\frac{6}{3}$   $\frac{6}{4}$

2 1 0 1 4 3 1 3 8 4 2 1 4 2 1 1 2 4 2 1 2 1 4 2 1 2 1  
 $\frac{1}{1}$        $\frac{8}{3}$        $\frac{8}{4}$        $\frac{5}{2}$        $\frac{6}{2}$        $\frac{9}{3}$        $\frac{4}{2}$   $\frac{21}{4}$   $\frac{12}{2}$   $\frac{1}{2}$   $\frac{3}{2}$

1 3 1 4 3 1 1 2 4 2 1 4 3 1 4 4 3 1 1 4 4 3 1  
 $\frac{8}{2}$        $\frac{10}{3}$        $\frac{9}{3}$   $\frac{9}{4}$   $\frac{8}{2}$        $\frac{10}{3}$        $\frac{8}{2}$        $\frac{10}{3}$

1 2 2 2 4 4 2 1  
 $\frac{9}{3}$   $\frac{9}{2}$   $\frac{9}{3}$   $\frac{9}{4}$        $\frac{2}{3}$   $\frac{1}{4}$









