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ESSENTIALS OF
MUSIC THEORY
ELEMENTARY

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ESSENTIALS OF
MUSIC THEORY

ELEMENTARY

BY

CARL E. GARDNER

AUTHOR OF "MUSIC COMPOSITION"



Price \$1.00

CARL FISCHER, Inc.
COOPER SQUARE, NEW YORK

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PREFACE.

THE primary object in the following pages is to supply the teacher and student with a text book to accompany the work on instrumental or vocal technic. Because of the great amount of time required to obtain proficient technic, text books are often neglected, and, if exhaustive, are usually ignored. Brevity and conciseness characterize this volume and it is planned to meet the needs of the busy teacher and student.

Many pupils may not see the importance of some of the following text, such as the research for theoretical keys; but the results thus obtained are nothing more than the natural outcome of simple mathematical reasoning, and are inevitable if the *structure* of the scales is understood. Pupils should be impressed with the structure of scales rather than be taught their keys and signatures by rote. Rote methods have little to recommend them in modern pedagogical ideals, and are used principally in teaching the young. The lack of knowledge of the *whys* and *wherefores* of scales, intervals, and chords among instrumentalists and singers is appalling, and is due partly to the neglect of text books and partly to incompetent teachers.

A further object of the text is to offer a course of preparation for the study of harmony, composition, and appreciation. Music Appreciation, as a cultural course of study, is growing in popularity and large enthusiastic classes in this subject are to be found in all our colleges. These students are frequently handicapped by poor preparation in the

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PREFACE.

essential rudiments of music such as are treated in this volume.

The author's gratitude for valuable aid, criticisms, and suggestions is due his wife, Marion Dillon Gardner, and his sisters, Mabel Gardner Bankart and Lena Gardner Lewis.

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ESSENTIALS OF MUSIC THEORY


CHAPTER I.

RHYTHM.


Sound is the effect produced by propagated atmospheric waves which affect the sense of hearing. Irregular impulses, propagated through the air, produce noise. Regular impulses produce musical *tone*.


The duration of tone is indicated by symbols called *notes*. Following is a list of notes:—


≡ or ||| Double whole note or *Breve*.


 Whole note or *Semibreve*.


 Half note or *Minim*.

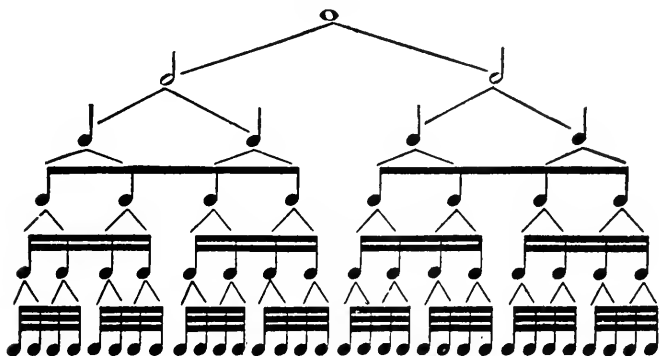
 Quarter note or *Crotchet*.

 Eighth note or *Quaver*.

 Sixteenth note or *Semiquaver*.

 Thirty-second note or *Demisemiquaver*.








Occasionally the sixty-fourth note () is used. Following is a table of the relative value of notes:—



The *breve* or double whole note is not given in this table as it is but seldom used. The value of it is twice the whole note, four times the half, etc.

The whole note is represented by an open oval; the half, by an open oval and stem; the quarter, by a closed head and stem; the eighth note is the same as the quarter with a flag; the sixteenth, the same with two flags; the thirty-second, the same with three flags. As is seen in the table, the eighth, sixteenth and thirty-second notes are often grouped when more than one occurs in succession.

Suspension of tone is indicated by symbols called *rests*. Each note has its equivalent rest. Following is a list of rests:—

	Double whole rest.
	Whole rest.
	Half rest.
	Quarter rest.
	Eighth rest.
	Sixteenth rest.
	Thirty-second rest.

The rate of vibration is called *pitch*. Rapid vibrations produce "high" (shrill) tones. Slow vibrations produce "low" tones. More complete information on sound, tone and pitch is given later under the heading "Acoustics."

The notes are written on the staff which consists of five horizontal lines together with their spaces. The duration of a tone is determined by the note used; the pitch, by the note's position on the staff. }

A dot placed after a note or rest adds one half its value. A "tie" is a curved line connecting two notes of the same pitch. Examples of dots and ties:—

$$o \cdot \text{ equals } \text{  } \text{ or } 1 + \frac{1}{2}.$$

♩. equals $\text{♩} \text{♪}$ or $\frac{1}{2} + \frac{1}{4}$.

♩. equals $\text{♩} \text{♪} \text{♩}$ or $\frac{1}{4} + \frac{1}{8}$.

etc., etc.

A double dot adds one half and one fourth its value, thus :—

$\text{♩}..$ equals $\text{♩} \text{♩} \text{♩}$ or $1 + \frac{1}{2} + \frac{1}{4}$.

$\text{♩}..$ equals $\text{♩} \text{♩} \text{♪}$ or $\frac{1}{2} + \frac{1}{4} + \frac{1}{8}$.

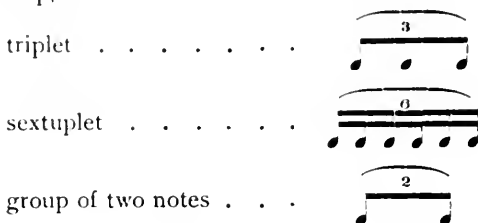
$\text{♩}..$ equals $\text{♩} \text{♩} \text{♪} \text{♩}$ or $\frac{1}{4} + \frac{1}{8} + \frac{1}{16}$.

etc., etc.

Bars are lines drawn vertically across the staff dividing music into *measures*. The contents of the measure is determined by the fraction at the beginning. The denominator of the fraction shows the kind of notes, and the numerator, the number of that kind contained in a measure. Each measure must contain the number and kind of notes or rests designated by the fraction, or their equivalents.

Artificial groups are groups of notes played and summed in other than their fractional value. The most common artificial groups are the *triplet* and *sextuplet*. A triplet is a group of three notes played in the time and summed in the value of two of its own kind. A sextuplet is a group of six notes played in the time and summed in the value of four of its own kind. A group of five notes is played in the time and summed in the value of four of its own kind. A group of seven notes is played in the time and summed in the value of six of its own kind. Occasionally a group of two notes occurs. This group differs from other artificial groups inasmuch as it is played more slowly than the tempo notes. A group of two notes is played in the time and summed in the value of

three of its own kind. Artificial groups are designated by a curved line over or under the notes with a figure showing the kind of group, thus :—



In “counting” music, it is customary to give as many counts to each measure as the numerator of the fraction indicates. Each of these counts is called a *pulse*. Pulses should occur regularly unless otherwise marked. Irregularities in the occurrence of pulses are marked in various ways. The *ritardando*, the *hold* (\frown), and the *accelerando* are the principal marks of irregularities. The *ritardando* (abbreviated *ritard.* or *rit.*) means to lessen the speed, the *accelerando* (abbreviated *accel.*) to quicken the speed, and the *hold* (\frown) to hold the note, over or under which it is placed, as long as musical taste dictates.

This occurrence of pulses is called *rhythm*. The most common rhythms are $\frac{4}{4}$ or C , $\frac{3}{4}$, $\frac{2}{4}$, $\frac{6}{8}$, $\frac{3}{8}$, $\frac{4}{8}$, $\frac{9}{8}$, $\frac{12}{8}$ and $\frac{2}{2}$ or C also called *alla breve*. Other rhythms not so common are $\frac{6}{4}$, $\frac{8}{4}$, $\frac{1}{4}$, $\frac{2}{8}$, $\frac{1}{2}$, $\frac{6}{2}$, $\frac{3}{2}$, $\frac{4}{2}$, $\frac{3}{16}$, and less often $\frac{1}{1}$, $\frac{5}{4}$, $\frac{5}{8}$ and $\frac{5}{16}$, etc.

On the first pulse of all kinds of rhythm is a primary accent called *thesis*. Secondary accents, called *arsis*, occur in $\frac{4}{4}$ on the third count and in $\frac{6}{8}$ on the fourth count. These natural accents give a “swing” to the music. They can only be displaced or overshadowed by artificial accents which are designated in various ways. The most common artificial accents are the *forzando* (designated thus : $>$, \wedge , or *fsz*), meaning

a sudden strong accent to the note or chord over or under which it is placed; the *rinforzando* (which is not quite so marked as the *forzando*); the *staccato* (designated by a dot placed over or under the note or chord) which makes the note thus indicated short and crisp, and the *syncopation*, which is a form of rhythm displacing the natural accent by the note's entrance on an unaccented part of the measure and its sustentation through the pulse.

The rapidity of the occurrence of pulses is called *tempo*, which is indicated at the beginning of a movement by Italian words usually, the most common of which are as follows:—

Grave, slow and solemn (the slowest tempo).

Largo, slow, a trifle faster than Grave.

Larghetto, a trifle faster than Largo.

Adagio, a trifle faster than Larghetto.

Lento, slow.

Andante, moderately slow.

Andantino, translated literally means slower than Andante, but it is more often used incorrectly meaning faster than Andante.

Moderato, moderate; the mediate between fast and slow.

Allegretto, cheerful.

Allegro, quick.

Vivo, quick.

Presto, very quick.

To many of the above words is added the ending *issimo* which gives the word to which it is added its superlative degree. Other terms are oftentimes combined with the above words to characterize the movement. Every pupil should have a dictionary of musical terms for constant reference.

The majority of piano students have an absolute disregard for note values and tempo marks which are so important

that the pupils fail to gain any good results from their study unless they understand and pay strict attention to these marks. The incompetency of so many teachers is somewhat responsible for this state of affairs, but the majority of piano studies and methods is more largely responsible. In second grade studies, there are many which, if written in a judicious manner, would be excellent second grade work, but when played as they are written and as their tempo mark demands require a virtuoso to execute them correctly. These studies have led pupils to playing *allegro* movements in *largo* tempo. At the end of a week's practice a *moderato tempo* may be the result. Continued enforced disregard can produce nothing but habitual disregard for tempo marks. The teacher should constantly remind the student of these facts and, in as far as possible, omit such studies as cannot be played *a tempo*. Many exercises may be rewritten in a playable manner by the teacher, who, by so doing, would not only impress the pupil with the importance of tempo marks, but would develop his ability to read from manuscript, an ability which, unfortunately, is almost universally lacking in pupils.

EXERCISES.

ORAL AND WRITTEN.

1. What is sound?
2. Tell the difference between noise and musical tone.
3. What is a note?
4. Describe the most common notes.
5. Write a table of the relative value of notes commencing with the whole note.
6. Write a table of the relative value of notes commencing with the dotted half note.
7. Describe the rests.

8. For each dotted note, show its equivalent by two tied notes.
9. For each double dotted note, show its equivalent by three tied notes.
10. Describe measure and bar and upon what the measure's contents depends.
11. Describe the manner of counting the different rhythms.
12. Name the marks that designate irregularities in rhythms and describe the character of each mark.
13. Describe the natural accent.
14. Name the most common artificial accents and describe the character of each.
15. What is meant by tempo?
16. Name and define twelve different tempo marks.
17. Explain and notate artificial groups.

CHAPTER II.

THEORY OF SCALES.

MAJOR AND MINOR.

As stated before (Chapter I, page 4), the rate of vibration is called pitch. Tones vibrating an equal number of times produce an *unison* which is a perfect concordance and is pleasant to the ear. Equally as pleasant to the ear is the ratio of two vibrations against one. A tone vibrating twice as fast as a given tone is called the given tone's *octave*. Between these two tones many tones may be found. For example, suppose a note vibrating two hundred times in a second, its octave would vibrate four hundred times in the second. Between these two tones there would be (avoiding fractions which would produce more different pitches) one hundred and ninety-nine tones of different pitch. The ear is incapable of locating all these tones and modern custom has divided all octaves into twelve parts, each part being called a half step or, literally incorrect, a *semi-tone*. These semi-tones sounded successively upwards or downwards from any tone to its octave produce the *chromatic scale*.*

A *diatonic scale* is a progression from any tone to its octave in which certain chromatic steps are omitted. In modern music there are three forms of diatonic scales, called:—

1. Major.
2. Harmonic minor.
3. Melodic minor.

* All references to scales, intervals and enharmonic changes treat of the tempered scale.

All three forms have eight tones, the eighth being the octave of the first and is given the same name.

The tones of the diatonic scale are named in four different ways:—

1. by numerals (Arabic and Roman),
2. by the first seven letters of the alphabet,
3. by the Italian syllables (*do, re, mi, fa, sol, la, si,*) and
4. by the theory names (*tonic, supertonic, mediant, sub-dominant, dominant, submediant and subtonic*).

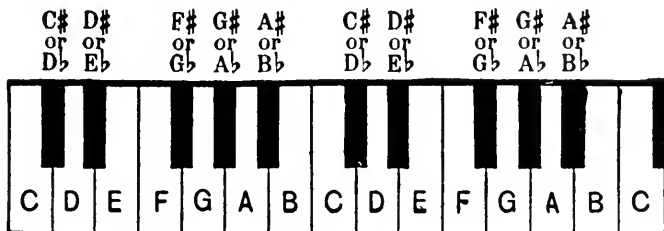
The key-tone is the tone from which a diatonic scale is built.

The numerical system is a movable system which means that 1 is always the key-tone. The theory name system is a movable system, the tonic being always the key-tone or 1. The alphabet system is a fixed system which means that a letter is always the same tone or its octave. The Italian system is treated as both a fixed system and a movable system. This book treats of the movable *do, do* always being the key-tone, 1 and tonic.

THE MAJOR SCALE.

A major scale is a progression from any tone to its octave in which chromatic steps are omitted between 1 and 2,— 2 and 3,— 4 and 5,— 5 and 6,— 6 and 7; from 3 to 4 and from 7 to 8 half steps are made.

Following is a diagram of a two octave keyboard:—



The keyboard shows white and black keys. The black keys are in groups of two and three. As can be seen in the diagram, the white key next to the left of the group of two black keys is *c*. The white keys in order to the right of *c* are respectively *d*, *e*, *f*, *g*, *a* and *b*. Following *b* is a repetition of *c* at the distance of an octave. Notice that between *e* and *f* there is no black key as is also the case between *b* and *c*. In these two cases, where no black key separates the white keys, the white keys are one semi-tone apart. Two white keys separated by a black key are one whole step apart. A black key is at the distance of a semi-tone from an adjoining white key. The black keys derive their letter names from the white keys. A black key is named from either of the white keys between which it is situated. The black key between *c* and *d* is named *c sharp* (\sharp) or *d flat* (\flat).

Starting at *c* and sounding the white keys in order to the right as far as the octave produces the ascending major scale of *C*; sounding in order to the left produces the descending major scale of *C*. Notice that no black keys are necessary in the case of the *C* major scale, the whole and half steps being in their proper places; namely, whole steps between 1 and 2, 2 and 3, 4 and 5, 5 and 6, 6 and 7, and half steps between 3 and 4 and between 7 and 8. The student must constantly keep in mind the order of whole and half steps in all scales explained. In each scale explained the letters will be numbered and a curved line will connect those figures representing tones one half step apart.

All major keys except *C* major require one or more black keys. The number of sharps or flats required for a key is placed at the beginning of the staff and this is called the signature.

A sharp (\sharp) placed before a note raises the tone one half step and a flat (\flat) lowers a tone one half step.

The sharp keys will be considered first and a sharp major scale will be built from each of the twelve tones.

Rule I. The Fifth of a Scale is the Tonic (or 1) of the Scale having the next Number of Sharps.

C has no sharps, the fifth of *C* is *g* and therefore by following the rule, we find that *G* has one sharp. The scale of *G* is as follows:—

$$\begin{array}{cccccccc} G & a & b & c & d & e & f\# & G \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \end{array}$$

Notice that the seventh of the scale is a black key.

The fifth of *G* is *d* and has two sharps:—

$$\begin{array}{cccccccc} D & e & f\# & g & a & b & c\# & D \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \end{array}$$

Notice that *f* remains sharped and the added sharp is the seventh of the scale. This is always the case, the added sharp is the seventh of the new scale.

The fifth of *D* is *a* and has three sharps:—

$$\begin{array}{cccccccc} A & b & c\# & d & e & f\# & g\# & A \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \end{array}$$

The fifth of *A* is *e* and has four sharps:—

$$\begin{array}{cccccccc} E & f\# & g\# & a & b & c\# & d\# & E \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \end{array}$$

The fifth of *E* is *b* and has five sharps:—

$$\begin{array}{cccccccc} B & c\# & d\# & e & f\# & g\# & a\# & B \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \end{array}$$

The fifth of *B* is *f* $\#$ and has six sharps:—

$$\begin{array}{cccccccc} F\# & g\# & a\# & b & c\# & d\# & e\# & F\# \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \end{array}$$

Notice that *e* $\#$ is not a black key but the white key which has been previously considered as *f*. It must be called *e* $\#$ to retain the alphabetical order.

The fifth of $F\sharp$ is $c\sharp$ and has seven sharps:—

$C\sharp d\sharp e\sharp f\sharp g\sharp a\sharp b\sharp C\sharp$
 1 2 3 4 5 6 7 8

In this scale all the notes are sharped. The $b\sharp$ as well as the $c\sharp$ is a white key.

The fifth of $C\sharp$ is $g\sharp$ and has eight sharps. This key necessitates one double sharp and f is double sharped. The double sharps are added in the same order that the single sharps are. The double sharp (designated thus: \times) raises a tone one whole step.

$G\sharp a\sharp b\sharp c\sharp d\sharp e\sharp f\times G\sharp$
 1 2 3 4 5 6 7 8

The fifth of $G\sharp$ is $d\sharp$ and has nine sharps (two double sharps, f and c):—

$D\sharp e\sharp f\times g\sharp a\sharp b\sharp c\times D\sharp$
 1 2 3 4 5 6 7 8

The fifth of $D\sharp$ is $a\sharp$ and has ten sharps (three double sharps, f , c and g):—

$A\sharp b\sharp c\times d\sharp e\sharp f\times g\times A\sharp$
 1 2 3 4 5 6 7 8

The fifth of $A\sharp$ is $e\sharp$ and has eleven sharps (four double sharps, f , c , g and d):—

$E\sharp f\times g\times a\sharp b\sharp c\times d\times E\sharp$
 1 2 3 4 5 6 7 8

The fifth of $E\sharp$ is $b\sharp$ and has twelve sharps (five double sharps, f , c , g , d and a):—

$B\sharp c\times d\times e\sharp f\times g\times a\times B\sharp$
 1 2 3 4 5 6 7 8

$B\flat$ has taken us back to our starting key called by a different name.

All twelve keys have now been named with their sharp

signatures. To continue counting five would take us over the same keys called by different names. The student is advised to do a little of this for mental discipline. If this is done beyond fourteen sharps, it will be necessary to add triple sharps. Of course, triple sharps are never used in musical notation and such a research would be entirely arithmetical.

The order of the letters in the sharp signature which follows should be committed to memory:—

F C G D A E B.

All keys having one double sharp or more would be difficult to read, and so instead of using the sharp signatures on such keys, the flat signatures are used. All twelve keys with their flat signatures will now be given,

Rule 2. The Fourth of a Scale is the Tonic of the Scale having the Next Number of Flats.

C has no flats; the fourth of *C* is *f*; therefore, by following the rule, we find that *F* has one flat:—

F g a b \flat c d e F
 1 2 3 4 5 6 7 8

Notice the fourth of the scale is a black key.

The fourth of *F* is *b \flat* and has two flats:—

B \flat c d e \flat f g a B \flat
 1 2 3 4 5 6 7 8

Notice that the *b* remains flat and that the added flat is the fourth of the scale. This is always the case — the added flat is the fourth of the new scale.

The fourth of *B \flat* is *e \flat* and has three flats:—

E \flat f g a \flat b \flat c d E \flat
 1 2 3 4 5 6 7 8

The fourth of *E \flat* is *a \flat* and has four flats:—

A \flat b \flat c d \flat e \flat f g A \flat
 1 2 3 4 5 6 7 8

The fourth of A , is d , and has five flats:—

D, e, f, g, a, b, c, D
 1 2 3 4 5 6 7 8

The fourth of D , is g , and has six flats:—

G, a, b, c, d, e, f, G
 1 2 3 4 5 6 7 8

The fourth of G , is c , and has seven flats:—

C, d, e, f, g, a, b, C
 1 2 3 4 5 6 7 8

The fourth of C , is f , and has eight flats. This key necessitates one double flat and b has the double flat. The double flats are added in the same order that the single flats are. The double flat (designated: $b\flat\flat$) lowers a tone one whole step.

$F, g, a, b\flat\flat, c, d, e, F$
 1 2 3 4 5 6 7 8

The fourth of F , is $b\flat\flat$ and has nine flats (two double flats, $b\flat\flat$ and $e\flat\flat$):—

$B\flat\flat, c, d, e\flat\flat, f, g, a, B\flat\flat$
 1 2 3 4 5 6 7 8

The fourth of $B\flat\flat$ is $e\flat\flat$ and has ten flats (three double flats, $b\flat\flat$, $e\flat\flat$ and $a\flat\flat$):—

$E\flat\flat, f, g, a\flat\flat, b\flat\flat, c, d, E\flat\flat$
 1 2 3 4 5 6 7 8

The fourth of $E\flat\flat$ is $a\flat\flat$ and has eleven flats (four double flats, $b\flat\flat$, $e\flat\flat$, $a\flat\flat$ and $d\flat\flat$):—

$A\flat\flat, b\flat\flat, c, d\flat\flat, e\flat\flat, f, g, A\flat\flat$
 1 2 3 4 5 6 7 8

The fourth of $A\flat\flat$ is $d\flat\flat$ and has twelve flats (five double flats, $b\flat\flat$, $e\flat\flat$, $a\flat\flat$, $d\flat\flat$, and $g\flat\flat$):—

$D_{\flat\flat}$ $e_{\flat\flat}$ f_{\flat} $g_{\flat\flat}$ $a_{\flat\flat}$ $b_{\flat\flat}$ c_{\flat} $D_{\flat\flat}$
 1 2 3 4 5 6 7 8

$D_{\flat\flat}$ has taken us back to our starting key called by a different name as was the case when we had twelve sharps. To continue counting four would take us over the same keys called by different names. As was advised in the sharp keys, this research should be continued by the student. If more than fourteen flats are considered, it will be necessary to add triple flats.

The order of the letters in the flat signature which follows should be committed to memory:—

B E A D G C F.

By comparing the order of the letters in the flat signature with that of the sharp signature, it will be seen that the order of the letters in the flat signature is that of the sharp signature reversed.

Notice that each key has more than one name; for example, the white key next to the left of the group of two black keys has been called *C*, $D_{\flat\flat}$ and B_{\sharp} .

Rule 3. An Enharmonic Change is the Change of a Name of a Tone without Altering its Pitch.

Two or more scales played from the same pitched tone but called by different names are called *enharmonic scales*. In practice,* fifteen major scales are used, three of which are enharmonic scales. Following is a list of the major scales used in practice together with their signatures:—

C . . no sharps or flats	D . . 2 sharps (f and c)
G . . 1 sharp (f)	A . . 3 sharps (f, c and g)
E . . 4 sharps (f, c, g and d)	

* Theoretical keys appear in many compositions during transitions, but they are not obvious (except by analysis) because of the fact that their signatures do not appear.

B	5 sharps (f, c, g, d and a)
F \sharp	6 sharps (f, c, g, d, a and e)
C \sharp	7 sharps (f, c, g, d, a, e and b)

F	1 flat (b)
B \flat	2 flats (b and e)
E \flat	3 flats (b, e and a)
A \flat	4 flats (b, e, a and d)
D \flat	5 flats (b, e, a, d and g) enharmonical to C \sharp
G \flat	6 flats (b, e, a, d, g and c) enharmonical to F \sharp
C \flat	7 flats (b, e, a, d, g, c and f) enharmonical to B

The enharmonic keys used in practice are:—

B (five sharps)	enharmonical to C \flat (seven flats)
F \sharp (six sharps)	enharmonical to G \flat (six flats)
C \sharp (seven sharps)	enharmonical to D \flat (five flats)

Rule 4. The Sum of the Enharmonic Flat and Sharp Signatures is Twelve. Notice that this is true in the above three keys.

By this rule the theoretical keys (that is, those having more than seven sharps or flats) are easily found. For example:— to find the key having eleven flats; the key having eleven flats is enharmonical to the key having one sharp ($11+1=12$). *G* has one sharp and changing its name to the enharmonic flat key, we obtain *A $\flat\flat$* which, therefore, has eleven flats. This process should be applied to all keys having eight to eleven sharps and eight to eleven flats inclusive.

As stated in the first chapter, the pitch of a tone is determined by the note's position on the staff. The staff of five lines with its spaces allows of the designation of but one octave and one step, whereas, in modern music, there is need of the notation of at least six octaves. This necessitates the use of symbols called *clefs*, and lines added to the staff called *ledger*

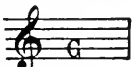
lines. Ledger lines are short lines parallel to the staff lines added above or below the staff lines.


There are three clefs :—

1. the treble or G clef,
2. the tenor, movable or C clef,
3. the bass or F clef.

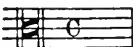
Middle *C* is the tone which all voices can sing. It is in the lower register of the high female voice and in the upper register of the low male voice.

The *G clef* (treble clef) is for high voices or instruments. Its symbol shows the position of the *G* next above middle *C*

thus : . Middle *C* is found on the first ledger

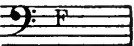
line below the *G clef*, thus : .


The *tenor* or *C clef* is for the use of medium voices or instruments. Its symbol shows the position of middle *C*. This clef is movable and may place middle *C* on any line or space of the staff. Its most common position is on the third line of

the staff, thus : . It is not uncommon, how-

ever, to find it on the second or fourth line. For vocal music it is often written in the third space.

The *bass* or *F clef* is for the use of low voices or instruments. Its symbol shows the position of the *F* next below middle *C*,

thus : . Middle *C* is found on the first ledger

line above the *F clef*, thus : .

The notation in the treble clef of all the major scales used in practice follows :

Scale of C 

C d e f g a b C

Scale of G 

G a b c d e f# G

Scale of D 

D e f# g a b c# D

Scale of A 

A b c# d e f# g# A

Scale of E 

E f# g# a b c# d# E

Scale of B 

B c# d# e f# g# a# B

Scale of F# 

F# g# a# b c# d# e# F#

Scale of C# 

C# d# e# f# g# a# b# C#

Scale of F 
 F g a bb c d e F

Scale of Bb 
 Bb c d eb f g a Bb

Scale of Eb 
 Eb f g ab bb c d Eb

Scale of Ab 
 Ab bb c db eb f g Ab

Scale of Db 
 Db eb f gb ab bb c Db

Scale of Gb 
 Gb ab bb eb db eb f Gb

Scale of Cb 
 Cb db eb fb gb ab bb Cb

THE MINOR SCALE.

There are two forms of minor scales, *harmonic* and *melodic*, both differing in construction from the major form.

The minor key having no sharps or flats in the signature is *a*. Starting at *a* and sounding the seven white keys in order to the right produces a form of scale with whole steps between 1 and 2, 3 and 4, 4 and 5, 6 and 7, 7 and 8, and half steps between 2 and 3 and between 5 and 6. This scale is

unsatisfactory to the ear as its subtonic is not a *leading tone*. The effect of a leading tone should be urgent, restless, and demand its tonic in order to obtain a restful effect. This urgent effect can only be obtained by the subtonic being one half step below the tonic. This may be obtained by simply raising the seventh one semi-tone in the above scale formation and thus is produced the so-called *harmonic minor scale*.

The symbols for raising a note are the *sharp* (\sharp), the *double sharp* (\times), and the *cancel* (\natural) (also called *natural*) when placed before a note that has been previously affected by a flat. The symbols for lowering a note are the *flat* (\flat), the *double flat* ($\flat\flat$), and the *cancel* when placed before a note that has been previously affected by a sharp. By these statements it can be seen that the cancel (\natural) is both a lowering and a raising symbol. The *cancel* lowers a tone when it cancels a sharp and raises a tone when it cancels a flat.

The *harmonic minor scale* is formed by whole steps between 1 and 2, — 3 and 4, — 4 and 5, — half steps between 2 and 3, — 5 and 6, — 7 and 8, and an interval of one and one-half steps (called an augmented step) between 6 and 7. In demonstrating the minor keys, a curved line will be used to connect those figures representing tones one half step apart and a bracket to connect those figures representing tones an augmented step apart.

The key of *a minor* (harmonic form) is as follows:—

a	b	c	d	e	f	g \sharp	a
1	2	3	4	5	6	7	8
	⤵		⤵		⤵		
	⤵		⤵		⤵		

The student will notice that this scale has one sharp (*g*). Nevertheless, the *a minor* is the minor key which has neither sharps nor flats in its signature. The raised seventh of all minor keys is *never* present in the signature, but appears as *accidental*.

When a sharp, double sharp, flat, double flat or cancel, which is not present in the signature, is placed before a note, it is called an accidental. If the raised seventh were present in the signature, uniform signatures in the minor would be impossible. It may also be remarked here that the seventh is not always raised during the course of a composition and is necessarily raised only when the composer desires the listener's ear to come at rest on the tonic, in which case the tonic must be preceded by the raised seventh, if the subtonic precedes the tonic in the melody or harmony.

The same rules (pages 13 and 15) used in the major for finding the key having the next number of sharps and the key having the next number of flats are applicable in the minor. The order of the letters in both the sharp and flat signatures is the same in the minor as in the major.

A minor has no sharps, the fifth of *a* is *e* and has one sharp (*f*):—

e	f \sharp	g	a	b	c	d \sharp	e
1	2	3	4	5	6	7	8
		⏟		⏟	⏟		

The fifth of *e* is *b* and has two sharps (*f* and *c*):—

b	c \sharp	d	e	f \sharp	g	a \sharp	b
1	2	3	4	5	6	7	8
		⏟		⏟	⏟		

The fifth of *b* is *f \sharp* and has three sharps (*f*, *c* and *g*):—

f \sharp	g \sharp	a	b	c \sharp	d	e \sharp	f \sharp
1	2	3	4	5	6	7	8
		⏟		⏟	⏟		

The fifth of *f \sharp* is *c \sharp* and has four sharps (*f*, *c*, *g* and *d*):—

c \sharp	d \sharp	e	f \sharp	g \sharp	a	b \sharp	c \sharp
1	2	3	4	5	6	7	8
		⏟		⏟	⏟		

The fifth of $c\sharp$ is $g\sharp$ and has five sharps (f , c , g , d and a):—

$$\begin{array}{cccccccc} g\sharp & a\sharp & b & c\sharp & d\sharp & e & f & g\sharp \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \end{array}$$

The student will notice that in this key, f is double sharped. F is sharped in the signature, but because the subtonic requires raising, f demands a double sharp.

The fifth of $g\sharp$ is $d\sharp$ and has six sharps (f , c , g , d , a and e):—

$$\begin{array}{cccccccc} d\sharp & e\sharp & f\sharp & g\sharp & a\sharp & b & c & d\sharp \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \end{array}$$

The fifth of $d\sharp$ is $a\sharp$ and has seven sharps (f , c , g , d , a , e and b):—

$$\begin{array}{cccccccc} a\sharp & b\sharp & c\sharp & d\sharp & e\sharp & f\sharp & g & a\sharp \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \end{array}$$

The minor keys having more than seven sharps should be found by the student and submitted to the teacher for correction. For the sake of brevity, they are not given here, but the student should be thoroughly capable, by this time, of finding them all.

A minor has no flats, the fourth of a is d and has one flat (b):—

$$\begin{array}{cccccccc} d & e & f & g & a & b\flat & c\sharp & d \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \end{array}$$

The fourth of d is g and has two flats (b and e):—

$$\begin{array}{cccccccc} g & a & b\flat & c & d & e\flat & f\sharp & g \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \end{array}$$

The fourth of g is c and has three flats (b , e and a):—

$$\begin{array}{cccccccc} c & d & e\flat & f & g & a\flat & b\flat & c \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \end{array}$$

The student will notice a contradiction in the above scale; it is stated that *c* has three flats and in the example, *b* is cancelled. This cancel, however, appears as *accidental* (the raised seventh) and must be a flat in the signature.

The fourth of *c* is *f* and has four flats (*b*, *e*, *a* and *d*):—

$$\begin{array}{cccccccc} f & g & a_b & b_b & c & d_b & e_b \sharp & f \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \end{array}$$

⏟
⏟
⏟
⏟

The fourth of *f* is *b_b* and has five flats (*b*, *e*, *a*, *d* and *g*):—

$$\begin{array}{cccccccc} b_b & c & d_b & e_b & f & g_b & a_b \sharp & b_b \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \end{array}$$

⏟
⏟
⏟
⏟

The fourth of *b_b* is *e_b* and has six flats (*b*, *e*, *a*, *d*, *g* and *c*):—

$$\begin{array}{cccccccc} e_b & f & g_b & a_b & b_b & c_b & d_b \sharp & e_b \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \end{array}$$

⏟
⏟
⏟
⏟

The fourth of *e_b* is *a_b* and has seven flats (*b*, *e*, *a*, *d*, *g*, *c* and *f*):—

$$\begin{array}{cccccccc} a_b & b_b & c_b & d_b & e_b & f_b & g_b \sharp & a_b \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \end{array}$$

⏟
⏟
⏟
⏟

The student should find the minor keys having more than seven flats.

The harmonic minor scale is awkward in formation on account of the augmented second step between steps six and seven. All augmented intervals sound harsh and are difficult to sing tunefully. For this reason, another form of minor scale is sometimes used which eliminates the augmented second step. This form is called *melodic minor* and is used, as its name implies, only for melodic purposes. It defies harmonization for the obvious reason that its ascending form differs from its descending form.

The *melodic minor scale* has the sixth as well as the seventh raised by *accidental* in ascending, but in descending, both the sixth and seventh are restored. The ascending form has whole steps between 1 and 2, — 3 and 4, — 4 and 5, — 5 and 6, — 6 and 7, and half steps between 2 and 3 and between 7 and 8. The descending form has its half steps between 6 and 5 and between 3 and 2. Notice that the descending form is as its signature dictates.

Ascending: — 1 2 3 4 5 ^{raised}6 ^{raised}7 8
 Descending: — 8 7 6 5 4 3 2 1

The ascending form of the melodic minor is nearly the same as the major scale, and for this reason it is best not to retain the raised sixth and seventh in descending. The subtonic in a descending scale does not lead (progress) to the tonic and therefore need not necessarily be situated one half step below the tonic.

Any minor key is called the relative of the major key having the same signature; therefore, the relative minor of *C* major is *a** as they both have neither sharps nor flats.

Rule 5. The Relative Minor is found on the Sixth of the Major Scale.

Rule 6. The Relative Major is found on the Third of the Minor Scale.

Some writers have called the *relative* minor *parallel* minor, using *relative* and *parallel* synonymously. This is a usage to be regretted as it causes considerable confusion. By most writers, the parallel minor is treated as the scale commencing on the same key-note as the major and will thus be treated in this book, therefore: —

the relative minor of *C* is *a*;
 the parallel minor of *C* is *c*.

* Capital letters are used to designate major keys and small letters to designate minor keys.

The parallel minor scale has three more flats or three less sharps in its signature than the major scale. In other words, by lowering steps 3, 6 and 7 of the major scale one semitone, the signature of the parallel minor is obtained.

The notation in the treble clef of all the minor scales (harmonic and melodic) follows:—

Scale of a
Harmonic

Scale of a
Melodic

Scale of e
Harmonic

Scale of e
Melodic

Scale of b
Harmonic

Scale of b
Melodic

Scale of f#
Harmonic

Scale of f#
Melodic

Scale of c# Harmonic

Scale of c# Melodic

Scale of g# Harmonic

Scale of g# Melodic

Scale of d# Harmonic

Scale of d# Melodic

Scale of a# Harmonic

Scale of a# Melodic

Scale of d Harmonic

Scale of d Melodic

Scale of g
Harmonic

Scale of g
Melodic

Scale of c
Harmonic

Scale of c
Melodic

Scale of f
Harmonic

Scale of f
Melodic

Scale of bb
Harmonic

Scale of bb
Melodic

Scale of eb
Harmonic

Scale of eb
Melodic

Scale of a \flat
Harmonic

Scale of a \flat
Melodic

EXERCISES

ORAL AND WRITTEN

1. Into how many parts does modern custom divide an octave?
2. What is each part called?
3. What is the difference between a chromatic scale and a diatonic scale?
4. How many forms of diatonic scales are there and what are their names?
5. Name and define the four ways in which the tones of the diatonic scales are named.
6. What is the key-tone?
7. Describe the movable and fixed systems.
8. Describe the major scale.
9. Describe the effect of a sharp; of a double sharp; of a flat; of a double flat; of a cancel.
10. State the rule for finding the key having the next number of sharps and the rule for finding the key having the next number of flats.
11. Write on the staff, using the treble clef, all the major keys to eleven sharps and eleven flats. Write several scales (the teacher deciding the number) using the bass and tenor clefs. (Show by curved line those notes situated one semi-tone apart.)
12. What is the order of the letters in the sharp signature? In the flat signature?


13. What is meant by *enharmonic* ?
14. What are the *enharmonic* scales used in practice ?
15. Give *enharmonic* letter names for each of the twelve keys.
16. What is the sum of sharp and flat signatures of enharmonic keys ?
17. By the use of this enharmonic sum, find all the theoretical keys.
18. What is the construction of the harmonic minor scale ? Of the melodic minor ?
19. Write on the staff all the minor scales (both harmonic and melodic) to eleven sharps and eleven flats, letting the teacher determine which clef or clefs to use.
20. What is the reason for raising the seventh in harmonic minor ?
21. What is the reason for raising the sixth in melodic minor ?
22. Why does the descending form of melodic minor differ from the ascending form ?
23. Why does not the raised sixth or seventh appear in the signature ?
24. What is an accidental ?
25. What is the *relative* minor and how is it found ?
26. What is the *parallel* minor and how does its signature differ from its parallel major ?

N. B. Before proceeding to the next chapter all these exercises should be properly answered and corrected by the teacher.

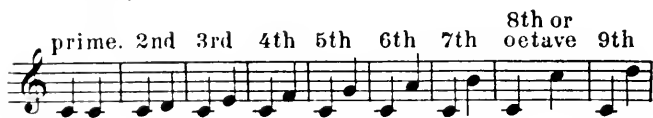
CHAPTER III.

INTERVALS AND INTRODUCTION TO CHORD BUILDING.

An interval is the distance between two tones; intervals are named by the ordinals. The number of letters comprised in the notation of two tones determines the ordinal name of

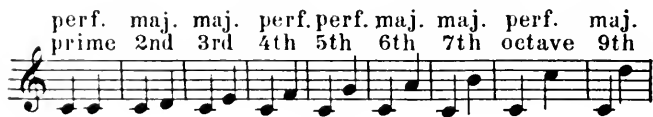
the interval. Example:  *c* to *d* is an interval of a second because two letters are comprised. It makes no difference whether or not either or both of the above tones is affected by an accidental, the interval still comprises two letters and is a second.

Reckoning from the tonic of the major scale to each degree of the scale produces the following intervals:—



The interval of the ninth is often called a second, the octave not being considered.

These intervals are the normal intervals of the major scale. These normal intervals are qualified in two ways. The prime, fourth, fifth and octave are called perfect. The second, third, sixth and seventh are called *major*; thus:—



All intervals should be reckoned from the lower note, which is considered a major key-note. If the upper note is in the major scale of the lower note, the interval is normal; that is, either perfect or major. If the upper note is not in the major scale of the lower note, the interval is a derivative interval. The derivative intervals are called *minor*, *diminished* and *augmented*.

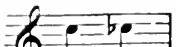
A minor interval is derived from a major interval and is one semi-tone smaller. By lowering the upper tone of any major interval one half step or by raising the lower tone of any major interval one half step (not altering the letter name in either case) a minor interval is formed, thus:—



A diminished interval is one half step smaller than a minor or a perfect interval. By lowering the upper tone of any minor or any perfect interval one half step, or by raising the lower tone of any minor or any perfect interval one half step (not altering the letter name in either case) a diminished interval is formed, thus:—



The tones of the diminished second are the same pitch, but must be called a second because two letters are comprised.

The diminished prime is possible melodically, but harmonically, only in theory. It is .

An augmented interval is one half step larger than a major or a perfect interval. By raising the upper tone of any major or perfect interval one half step, or by lowering the lower tone of any major or perfect interval one half step (not altering the letter name in either case) an augmented interval is formed, thus:—



Notice that the tones of the augmented seventh are the same pitch, but must be called a seventh as seven letters are comprised.

The following intervals are the same in sound, but not in name:—

perfect prime	sounds the same as	diminished 2nd
augmented prime	" " " "	minor 2nd
diminished prime	" " " "	minor 2nd
major 2nd	" " " "	diminished 3rd
minor 3rd	" " " "	augmented 2nd
major 3rd	" " " "	diminished 4th
perfect 4th	" " " "	augmented 3rd
augmented 4th	" " " "	diminished 5th
perfect 5th	" " " "	diminished 6th
minor 6th	" " " "	augmented 5th
major 6th	" " " "	diminished 7th
minor 7th	" " " "	augmented 6th
major 7th	" " " "	diminished 8th
perfect octave	" " " "	augmented 7th

From the preceding list the following rule is apparent :—

Rule 7. By Changing Enharmonically Either or Both of the Tones of an Interval, a Different Interval is Obtained Which Sounds the Same as the Original Interval.

The distance in semi-tones of all the intervals to an octave is as follows :—

prime	=	unison	comprises	1	letter
augmented prime	=	1 semi-tone	"	1	"
diminished 2nd	=	unison	"	2	letters
minor 2nd	=	1 semi-tone	"	2	"
major 2nd	=	2 semi-tones	"	2	"
augmented 2nd	=	3 "	"	2	"
diminished 3rd	=	2 "	"	3	"
minor 3rd	=	3 "	"	3	"
major 3rd	=	4 "	"	3	"
augmented 3rd	=	5 "	"	3	"
diminished 4th	=	4 "	"	4	"
perfect 4th	=	5 "	"	4	"
augmented 4th	=	6 "	"	4	"
diminished 5th	=	6 "	"	5	"
perfect 5th	=	7 "	"	5	"
augmented 5th	=	8 "	"	5	"
diminished 6th	=	7 "	"	6	"
minor 6th	=	8 "	"	6	"
major 6th	=	9 "	"	6	"
augmented 6th	=	10 "	"	6	"
diminished 7th	=	9 "	"	7	"
minor 7th	=	10 "	"	7	"
major 7th	=	11 "	"	7	"
augmented 7th	=	12 "	"	7	"
diminished 8th	=	11 "	"	8	"
perfect 8th	=	12 "	"	8	"

A quicker and better method of determining an interval than by committing to memory the above table is to consider the lower note the tonic of the major scale. If the upper note is in the major scale of the lower note, the interval is normal (major or perfect). After a little practice the number of letters in an interval can be determined at a glance. If the upper note is not in the major scale of the lower note the interval is derivative and is determined by the information heretofore given.

INVERSION OF INTERVALS.

Intervals are said to be inverted when the lower note of the original interval is placed an octave higher, thereby becoming the upper note of the interval thus formed. Ex-

ample: the inversion of  is .

The same letters are in both intervals, but the first interval is a third and the inverted interval is a sixth.

Rule 8. The Sum of an Interval and Its Inversion is Nine.

The above rule, therefore, gives the following table of inversions:—

a prime	inverts to	an octave	($1 + 8 = 9$)
a second	" "	a seventh	($2 + 7 = 9$)
a third	" "	a sixth	($3 + 6 = 9$)
a fourth	" "	a fifth	($4 + 5 = 9$)
a fifth	" "	a fourth	($5 + 4 = 9$)
a sixth	" "	a third	($6 + 3 = 9$)
a seventh	" "	a second	($7 + 2 = 9$)
an octave	" "	a prime	($8 + 1 = 9$)

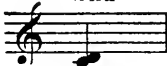


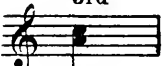
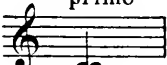

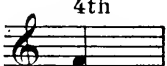

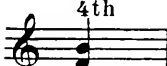
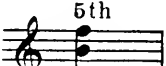
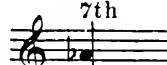
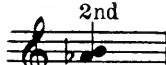
To find to what intervals ninths, tenths, elevenths, twelfths, etc., invert, consider them respectively as seconds, thirds,

fourths, fifths, etc., and consider the lower note placed two octaves higher instead of one octave.

Qualifications invert in the following manner:—

<i>major</i>	intervals invert to	<i>minor</i>	intervals
<i>minor</i>	" "	<i>major</i>	" "
<i>perfect</i>	" "	<i>perfect</i>	" "
<i>diminished</i>	" "	<i>augmented</i>	" "
<i>augmented</i>	" "	<i>diminished</i>	" "

By the use of the above table and rule 8, all inversions may be determined. Examples:—

<p>major 2nd</p> 	inverts to	<p>minor 7th</p> 
<p>major 6th</p> 	" "	<p>minor 3rd</p> 
<p>perf. prime</p> 	" "	<p>perf. 8th</p> 
<p>perf. 4th</p> 	" "	<p>perf. 5th</p> 
<p>aug. 4th</p> 	" "	<p>dim. 5th</p> 
<p>dim. 7th</p>  <p>etc.</p>	" "	<p>aug. 2nd</p>  <p>etc.</p>

The *prime* is also called an *unison*, but in speaking of intervals, it should always be called a *prime*. Correctly speaking, a *perfect prime* is not an interval, but in the theory of music it is so called. There is good reason for making this error, but none for calling a *diminished prime* a *diminished unison*. Notice that the *diminished second* as well as the *perfect prime* is an *unison*.

Intervals are considered both harmonically and melodically, or in other words, both when sounded together or separately. In either case, the lower note is the one from which to determine the interval.

CHORD CONSTRUCTION.

A chord is a combination of two or more tones sounded simultaneously. All chords are constructed in *thirds*. The *fundamental tone* of a chord is the tone on which the chord is constructed.

A chord of three tones is a *triad* which consists of a *fundamental* together with its third and its fifth. Triads are divided into two classes, *independent* and *dependent*. The independent triads have no dissonant intervals and may end a composition. The dependent chords have one or more dissonant intervals and are "restless" chords and demand another chord to follow. The progression of a dependent chord to an independent chord, thereby obtaining a restful effect, is called *resolution*.

There are two kinds of independent triads, *major* and *minor*. A *major triad* consists of the fundamental, the *major* third, and the *perfect* fifth. Example:—



A *minor triad* consists of the fundamental, the *minor* third,

and the *perfect* fifth. Example:—



If the fifth of a triad is augmented or diminished, the triad is a dependent. Dependent triads are found constructed on the subtonic of major keys; on the subtonic, supertonic, and mediant of the minor keys. The triad on the mediant of the minor key is an augmented triad and the first three mentioned triads are diminished.

Music written for four voices necessitates the doubling of one of the factors of the triad. Any factor of the triad may be doubled. The factor most frequently doubled is the fundamental in the octave, double octave, or unison. The four voices are *soprano* (high female voice), *alto* (low female voice), *tenor* (high male voice), and *bass* (low male voice). Chords are figured under the bass by Roman numerals. Large numerals designate *major* triads; small numerals designate *minor* triads; large numerals with the mark (') affixed designate augmented triads; small numerals with a cipher affixed designate diminished triads. The notation of the triads on each degree of the major and minor scales follows:—

Major Mode. N. B.

I II III IV V VI VII°

Minor Mode.

The image shows a musical staff with two systems of notes. The top system consists of seven triads in close position, each with a different inversion. The bottom system consists of seven single notes, which are the fundamentals of the triads above. The triads are labeled with Roman numerals: I, II°, III', IV, V, VI, and VII°. The key signature is two flats (B-flat and E-flat).

N. B. Although doubled in the above examples, the fundamental of the subtonic triad is seldom doubled in four voice writing and if doubled, a bad progression results in many cases.

The three upper voices in a fundamental chord may be arranged in a different manner:—

With the fundamental in the soprano:—

The image shows a single treble clef staff with a C major triad. The notes are C, E, and G. The C is on the first line (soprano), E is on the second space, and G is on the second space. Below the staff, the letter 'C' is written under the C note, and the Roman numeral 'I' is written under the G note.



With the third in the soprano:—

The image shows a single treble clef staff with a C major triad. The notes are C, E, and G. The E is on the first space (soprano), C is on the first line, and G is on the second space. Below the staff, the letter 'C' is written under the C note, and the Roman numeral 'I' is written under the G note.


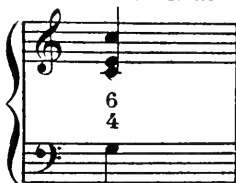
If the three upper voices do not exceed the compass of an octave, the chord is said to be in “close position.” If the three upper voices exceed the compass of an octave, the chord is said to be in “open position.”

INVERSION OF TRIADS.

A chord is inverted when a factor other than the fundamental is in the bass. The first inversion of the triad is where we have the third in the bass. It is called the chord of the sixth, because the fundamental is the sixth of the bass. This chord is figured by a small Arabic figure (6) over the bass note, the Roman numeral under the bass showing the fundamental. Examples:—

<p>doubled fundamental</p> 	<p>doubled third</p> 
---	---

The second inversion of the triad has the fifth in the bass and is called the chord of the sixth and fourth, or six-four chord, because the fundamental is the fourth of the bass. This chord is figured by the small Arabic figures (6₄) over the bass, the Roman numeral under the bass showing the fundamental. Examples:—

<p>doubled fifth</p> 	<p>doubled fundamental</p> 
--	--

THE SEVENTH CHORD.

The seventh chord is obtained by adding the seventh of the fundamental to any triad. A seventh chord may be formed on each degree of the major and minor scales. It is figured with the Roman numerals below the bass and a small Arabic (7) over the bass. The notation of the seventh chords on each degree of the major and minor scales follows: —

C Major.

Musical notation for C Major seventh chords. The top staff shows the triads and the bottom staff shows the bass notes. The chords are labeled I, II, III, IV, V, VI, and VII°.

a Minor.

Musical notation for a Minor seventh chords. The top staff shows the triads and the bottom staff shows the bass notes. The chords are labeled I, II°, III', IV, V, VI, and VII°.

The tonic and subdominant of the major mode and the submediant of the minor mode are formed with the major triad and the major seventh. The dominant seventh in both modes is formed with the major triad and the minor seventh. The seventh chords on II, III and VI in the major mode and on IV of the minor mode are formed with the minor triad and the minor seventh. The seventh chords on VII° in the major mode and on II° in the minor mode are formed with the diminished triad and the minor seventh. The subtonic seventh chord in the minor mode is called the *diminished seventh* and is formed with the diminished triad and the diminished seventh. The seventh chord on the mediant in the minor mode is formed with the augmented triad and the major seventh. The seventh chord on the tonic of the minor mode is formed with the minor triad and the major seventh. In four voice writing, all the seventh chords with the exception

of those on the subtonic of both modes are often written without the fifth and with the doubled fundamental. All seventh chords are dependent chords and their natural resolution is to the chord the fundamental of which is situated a fourth above or a fifth below the fundamental of the seventh chord. This progression is called "cadencing resolution." The subtonic seventh chord of both modes may also naturally resolve to the tonic. The most important seventh chord is the dominant, which resolves to the tonic. This progression is called the *authentic close*. Another method of ending a composition is by the *plagal close* which is a progression from subdominant harmony (triad) to tonic. The plagal close is preceded by the authentic close and is also called the *after cadence* and the *Amen cadence*.

INVERSION OF SEVENTH CHORDS.

The first inversion of the seventh chord is called the chord of the fifth and sixth (six-five chord). The chord is figured by the Roman numeral below the bass note and the Arabic figures ($\frac{6}{5}$) over the bass. Example:—

C V⁷

The second inversion is called the chord of the third, fourth and sixth (four-three chord). It is figured by the Roman numeral below the bass and the Arabic figures ($\frac{6}{4}$) or simply ($\frac{4}{3}$) over the bass. Example:—



The third inversion is called the chord of the second and fourth. It is figured by the Roman numeral below the bass and the Arabic figures ($\frac{6}{4}$), ($\frac{4}{2}$), or simply (2) over the bass, Example: —



The study of chord progression, altered chords, melody writing, passing tones, etc., belongs properly to the study of harmony and counterpoint which is not the subject of this volume.

EXERCISES.

ORAL AND WRITTEN.

1. What is an interval?
2. How are intervals named?
3. What are the normal intervals?
4. Qualify the derived intervals; from what is each derived?

15. Notate and figure all the seventh chords in several different major and minor keys.
16. What is the most important seventh chord?
17. What is the authentic close?
18. What is the plagal close?
19. Notate and figure a six-five dominant chord in several major and minor keys.
20. Notate and figure a four-three dominant chord in several major and minor keys.
21. Notate and figure a four-two dominant chord in several major and minor keys.
22. Choose some standard chorals (Bach's are advised) and analyze the chords therein.

CHAPTER IV.

EPITOMIZED ACOUSTICS.

The science of sound, including its cause and effect and the manner, velocity, and intensity of its conveyance through different media, is called *acoustics*.

The medium through which sound is most commonly propagated is air. Through this medium, at a temperature of 32° Fahrenheit, sound travels at a rate of 1090 feet per second. The quality and intensity of sound do not alter the rate of speed. If this were not true, ensemble music would be impossible. Intensity of sound is greater in condensed air; velocity of sound is greater in a warm temperature.

Many experiments have been made to determine the velocity of sound, the most reliable of which vary not over seven feet per second. The average of six of the best experiments, made in the early part of the nineteenth century, is 1089.7 feet per second at 32° Fahrenheit. Ten hundred and ninety feet per second is the rate now generally adopted.

Wind and temperature are the only circumstances affecting the velocity of sound in the air to any extent. Sound travels about four times faster through water than through air, and about ten times faster through solids such as metals and wood than through air. A sudden displacement of the molecules of a medium produces sound which travels in waves at an equal velocity in all directions. An idea of the manner in which sound waves travel may be obtained by throwing a stone in water; small waves are propagated from the point of impact which, if the water be still, spread equally in all directions, but if it be running water, the waves extend a

greater distance down stream than up stream. The effect of wind on sound waves may be compared to the effect of running water on the waves propagated by the impact of the stone.

Musical tone is produced by regular vibrations; noise by irregular vibrations. The tones of the tempered chromatic scale have the following number of vibrations per second:—

Middle	c	. . . . .	258.6
	c \sharp or d\flat	. . . . .	274.
	d	. . . . .	290.3
	d \sharp or e\flat	. . . . .	307.6
	e	. . . . .	325.9
	f	. . . . .	345.2
	f \sharp or g\flat	. . . . .	365.8
	g	. . . . .	387.5
	g \sharp or a\flat	. . . . .	410.5
	a	. . . . .	435.
	a \sharp or b\flat	. . . . .	460.8
	b	. . . . .	488.2

The preceding figures represent the vibrations of the "International Pitch" which was adopted by the Piano Manufacturers' meeting in 1891. A is the standard pitch having 435 double vibrations per second at a temperature of 68° Fahrenheit. Many pitches have prevailed in different countries at different times. At the time of Handel and Mozart, the pitch was lower (422.5 and 421.6). England has had the pitch run as high 454.7 and the United States as high as 460.8.

Sounds vibrating below a certain number lose the character of musical tones as do those vibrating above a certain number. Great discrepancies of opinion exist among theorists on this subject. Savart claims the lowest audible sound has eight vibrations per second; Helmholtz claims that there is no

definite pitch of sounds having less than forty vibrations per second; Herr Appum claims to hear fifteen vibrations by the use of specially loaded tongues in reed pipes. He claims the character of tone commences at twenty vibrations, but the musical character of bass tones does not exist until frequencies exceed twenty-four vibrations per second. On the subject of the audibility of acute sounds, opinions are advanced ranging from 6,400 to 36,000 vibrations per second.

The limits of the human voices are tabulated below:—

Bass	E	81.5	. . . . .	D	290.3
Baritone	F	86.3	. . . . .	F#	365.8
Tenor	A	108.7	. . . . .	A	435.
Contralto	E	163.	. . . . .	F	690.5
Mezzo Soprano	F	172.6	. . . . .	A	870.
Soprano	A	217.5	. . . . .	C	1034.6

Occasionally there are exceptional voices having a wider range than the above scale indicates.

Ratio of Intervals:—

Octave	. . . . .	1— 2
Perfect fifth	. . . . .	2— 3
Perfect fourth	. . . . .	3— 4
Major third	. . . . .	4— 5
Minor third	. . . . .	5— 6
Major sixth	. . . . .	3— 5
Minor sixth	. . . . .	5— 8
Major second	. . . . .	8— 9
Minor second	. . . . .	15—16
Major seventh	. . . . .	8—15
Minor seventh	. . . . .	9—16

Each tone generates “over tones” called *harmonics*. These *harmonics* are the octave, the twelfth (perfect fifth), the seventeenth (major third), the twenty-first (minor seventh) and the twenty-third (minor ninth). Other *harmonics* than the above

exist but are not used at the present time in chord construction. The old theorists treated chords of the eleventh and thirteenth, but modern theorists treat these intervals as suspensions, anticipations, etc.* The origin of chord construction may be seen from these *harmonics*. These over tones, generated from a fundamental, are the pure (untempered) intervals. The tempered intervals, with the exception of the octave, are slightly out of tune but not enough so to shock the ear.

The pure (untempered) scale of C has the following number of vibrations per second:—

Middle	c	261.
	d	293.6
	e	326.2
	f	348.
	g	391.5
	a	435.
	b	489.3

An entire volume would be necessary to explain completely the science of acoustics. All ambitious students should consult books on acoustics. The author recommends the books on sound by the following writers: —

Appum	Benjamin Peirce
G. B. Airy	Rodolphe Radau
Pietro Blaserno	Savart
Helmholtz	Tyndall
Pole	J. August Zahn

* Composers of the present day often use these intervals as chord factors.

CHAPTER V.

EAR TRAINING.

A person with an untrained ear can appreciate music comparatively little, even though he is well educated in the theory of music. Absolute pitch is the ability to recognize and intonate any tone indicated. Very few persons possess naturally absolute pitch, but it may be acquired by a systematic study of ear training. Relative pitch is the ability to recognize a tone by comparison with a known tone. Advancement in relative pitch eventually leads to the attainment of absolute pitch.

In practicing ear training, only a few minutes at a sitting are advised. Too much time at once devoted to this practice tires the ear and does more harm than good. On the other hand, these sittings should be many each day. Students who do not have a teacher daily, should have a member of the household play the exercises in ear training and correct the mistakes. If no member of the household is musical, the student should co-operate with another student.

Each exercise should be thoroughly learned before proceeding to the following exercise. It may be recognizable and properly intonated at once or it may take several sittings. The pitch A at 435 is the standard for orchestral tuning and is recommended to the student for a fundamental. The student should carry upon his person a tuning fork of this pitch and sound it as often as an opportunity permits, and thereby fix this fundamental thoroughly in his mind. Eventually, the student will recognize this pitch whenever he hears

8. Major third:—



9. Minor sixth:—



10. Major sixth:—



11. Minor third:—



The first measure of exercise 2 contains the major second which is an easily recognized interval. The last measure but two of exercise 2 contains the major seventh. This interval is ordinarily a difficult interval to intonate but coming as it does in exercise 2 it is easy to intonate because of the ascending scale on the second half of the measures. For the present, it is not advisable to practice the major seventh except in some such sequence as exercise 2. All other normal intervals may be practiced separately and in combinations. After the student has become thoroughly proficient in recognizing and properly intonating all the intervals in group I, he may proceed to the intervals of the minor scale found in group II.

GROUP II.

THE NORMAL INTERVALS OF THE MINOR SCALE.

1. Melodic minor scale:—



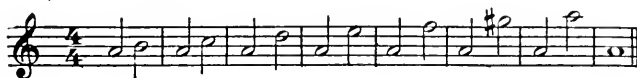
2. Harmonic minor scale:—



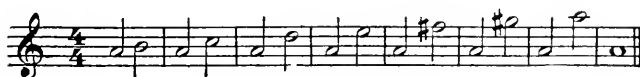
If the student finds difficulty in singing the harmonic form with the awkward augmented step, the singing of this scale may be postponed.

3. Play alternatively the major scale and both forms of minor, and require the student to distinguish between them. Do not proceed until the student is capable of recognizing and distinguishing between all diatonic scales.

4. All intervals of the harmonic minor scale:—



5. All intervals of the ascending melodic minor scale:—



6. The minor triad:—



7. The minor third:—



8. The major sixth:—



9. The minor sixth:—



10. The major third:—



11. Play slowly several minor melodies free from modulations and require the student to notate.

The teacher should now play melodies in which are transitions from major to *parallel* minor and *vice versa*. Great familiarity with the normal intervals is necessary before studying altered intervals. It is hoped that the major seventh may now be properly intonated.

The student may experience considerable difficulty with the following group, in which case it is advisable to postpone this group until the ear is more thoroughly trained. The object of its following the normal intervals is to fix firmly the fundamental and all intervals by comparison with this fundamental.

GROUP III.

ALTERED INTERVALS.

1. The chromatic scale:—



In syllabicating the chromatic scale or any of the altered intervals, the syllable *ah* may be used on each tone. To those wishing to adhere to the Italian syllables, the tonic sol-fa syllables, invented by Miss Sarah Ann Glover, may be used which are as follows: ascending chromatic scale — *doh, de, ray, re, me, fah, fe, soh, se, lah, le, te, doh*; descending chromatic scale — *doh, te, ta, lah, la, soh, sa, fah, me, ma, ray, ra, doh*. Miss Glover changed the spelling of the Italian syllables to coincide with the English pronunciation. She also changed the subtonic from *si* to *te*.

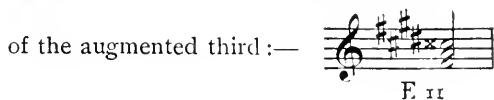
2. *The augmented fourth* is found as a scale interval between the fourth and seventh steps of the major scale (*fah* to *te*). It is more difficult to conceive and intonate properly the augmented fourth when it is constructed upon the tonic. In order to make this interval less difficult, the following exercise contains the intermediate scale steps previous to the skip of an augmented fourth:—



It may be necessary with some students to interpolate some or all the intermediate steps previous to skips to all altered intervals. It may not be amiss to state here that in correct melody writing augmented and diminished intervals are usually avoided. Singers almost invariably intonate them out of tune. When these intervals exist as constituent parts of an arpeggio chord progression, they are comparatively easy. As altered intervals these skips are given to instruments (instruments being capable of properly intonating all skips) when a dramatic effect is desired.

3. *The diminished fifth* is analogous to the augmented fourth. Being the inversion of the augmented fourth, it is

8. *The augmented third* is analogous to the perfect fourth. This interval is found in the altered minor triad between the third and the raised fifth of the triad. Derivation



Exercise:—

The exercise is written for piano in a key signature of two sharps (F# and C#) and a common time signature (C). It consists of five measures. The first measure shows a melodic line in the treble clef and a bass line in the bass clef. The second measure shows a melodic line in the treble clef with a dotted quarter note and an eighth note, and a bass line with a dotted quarter note and an eighth note. The third measure shows a melodic line in the treble clef with a dotted quarter note and an eighth note, and a bass line with a dotted quarter note and an eighth note. The fourth measure shows a melodic line in the treble clef with a dotted quarter note and an eighth note, and a bass line with a dotted quarter note and an eighth note. The fifth measure shows a melodic line in the treble clef with a dotted quarter note and an eighth note, and a bass line with a dotted quarter note and an eighth note.

9. *The augmented sixth* is analogous to the minor seventh. This interval is found in the augmented sixth chord. Origin of the augmented sixth chord:—

The image shows a single treble clef staff with a key signature of two sharps (F# and C#). It contains three chords: a triad of E4, G#4, and Bb4; a triad of E4, G#4, and Bb4 with an augmented sixth interval between G#4 and Bb4; and a triad of E4, G#4, and Bb4 with an augmented sixth interval between G#4 and Bb4. Below the staff, the text "E II" is written.

The diminished sixth, which is the inversion of the augmented third and analogous to the perfect fifth, is not used melodically. *The diminished third*, which is the inversion of the augmented sixth and analogous to the major second, is but seldom used melodically.

If the singing of the harmonic minor scale has been postponed, it should now be practiced. Exercises containing the major seventh may now be given.

GROUP IV.

ARPEGGIO CHORDS.

If the fundamental is not yet fixed in the student's mind exercises pertaining to groups I and II should be given before proceeding. The intervals already given should be expanded, the major second to a major ninth, the major third to a major tenth, etc., etc.

In practicing the following exercises, the student should name the intervals between consecutive notes and between each note of the chord and the fundamental.

1. The major triad:—



2. The minor triad:—



3. The diminished triad:—



4. The augmented triad:—



A III'

5. The dominant seventh chord:—



The teacher should explain the dominant seventh chord and its resolution. Also give exercises on the skip of a minor seventh.

6. The supertonic seventh chord:—



7. The subtonic seventh chord:—



8. The diminished seventh chord:—



A great many exercises on these chords should be given together with the natural resolution of the dependent chords. Exercises on the inversions of these chords may be given when the student has obtained proficiency on the fundamental position. The inversions may be found in Chapter III.

GROUP V.

TWO VOICED CHORDS.

The student should name the interval that one voice forms with the other. The upper melody should then be sung as the exercise is played. Repeat the exercise, the student singing the lower melody this time. If the student experiences difficulty in naming the intervals, the chords should be played in arpeggio style.

1. Thirds :—



2. Sixths :—



3. Mixed intervals and rhythm (contrapuntal) :—

Cherubini



(b)

Musical score (b) in 3/4 time. The right hand (treble clef) plays a sequence of chords: C major, D minor, E minor, F major, G major, A minor, B minor, and C major. The left hand (bass clef) plays a bass line: C4, D4, E4, F4, G4, A4, B4, C5, B4, A4, G4, F4, E4, D4, C4.

4. Introducing the dominant and secondary seventh chords :—

(a)

Musical score (a) in 3/4 time. The right hand (treble clef) plays a sequence of chords: C major, D minor, E minor, F major, G major, A minor, B minor, and C major. The left hand (bass clef) plays a bass line: C4, D4, E4, F4, G4, A4, B4, C5, B4, A4, G4, F4, E4, D4, C4.

(b)

Musical score (b) in 4/4 time. The right hand (treble clef) plays a sequence of chords: C major, D minor, E minor, F major, G major, A minor, B minor, and C major. The left hand (bass clef) plays a bass line: C4, D4, E4, F4, G4, A4, B4, C5, B4, A4, G4, F4, E4, D4, C4.

Musical score in 4/4 time. The right hand (treble clef) plays a sequence of chords: C major, D minor, E minor, F major, G major, A minor, B minor, and C major. The left hand (bass clef) plays a bass line: C4, D4, E4, F4, G4, A4, B4, C5, B4, A4, G4, F4, E4, D4, C4.

The chorals that were chosen for analysis in Chapter III should now be played for ear training. The teacher's judgment is very necessary in deciding the limitations of each

individual student. At the proper time modulations may be made. Before the student may be called proficient, he must be capable of instantly recognizing and properly intonating any and all chords sounded.

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PUBLISHED BY

CARL FISCHER, INC.

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