Minor System

Ramsay

"While Mr. Ramsay was meditating on these teachings of the great mathematician, Euler, and studying these notes and their vibrations, he was led to discover that *the order of quantities above F, when taken below B, constitutes the Minor System*. This was the discovery of the Law of Duality in Music. This Law of Duality in Mr. Ramsay's hands asserts an importance not second even to the Law of Mathematical Ratios which rules in the genesis of the notes." [Scientific Basis and Build of Music, page 8]

It runs in all the polarities of Nature. Music, as belonging to Nature - as one of the things which the Great Numberer hath created - is under this Law of Duality as well as that of mathematical ratios and other laws. The *Law of Duality* in *music* gives the *major and minor systems*. As the major is derived from certain primes in ratios *ascending*, and the **minor** from the same primes in the same ratios *descending*, they are *inversely* related; and these diatonic scales have in the responding parts exactly the same quantities. But as multiplying by 3 three times gives the framework of the major system in the ascending genesis, and dividing by 3 three times gives the framework of the **minor system** in the descending genesis. They are in this view also *directly* related. The Law of Duality in music emerges into view from the genesis [Scientific Basis and Build of Music, page 42]

It is in their *inverse relations* that the major and the minor are equal. Every note, chord, and progression in the one has its reciprocal or corresponding note, chord, and progression in the other. This is the *Law of Duality*. And this general law of Nature is so deeply rooted in music, that is the numbers which represent the vibrations in the major system be made to represent quantities of string, these quantities will produce the **minor system** (beginning, of course, with the proper notes and numbers); so that *when the quantities are minor the tones are major, and when the quantities are major the tones are minor*.¹[Scientific Basis and Build of Music, page 44]

In the laws of quantities and motions the three primary ratios, 1:2, 1:3, 1:5, with the three different units, F1, C3, and G9, the roots of the chords of the subdominant, tonic, and dominant, produce the three chords of the musical system major, the one not interfering with the other; and by an inverse process are produced, from B720, E240, and A80, its generating notes, the three chords of the musical system minor; the one chord not interfering with the other. In a similar way the chromatic chords can be produced from three different units, without the one interfering with the other; and, like the subdominant, tonic, and dominant chords of the diatonic scale, they are fifths apart. So we may call them the subdominant, tonic, and dominant chromatic chords. Each of the three chromatic chords has also kinship with the major and minor modes, from the way in which the diatonic minor triad is constituted a chromatic chord by its supplement coming in the one side from the **minor**, and on the other side from the major system. [Scientific Basis and Build of Music, page 53]

The *Chromatic Scale* is naturally the last to come into view, for it is not generated by a mathematical process at all. Chromatic intervals are indeed found in the scale as mathematically generated. The semitones between B-C and E-F are two chromatic intervals, and the chord which occurs between the major and the minor in the chord-scale when it begins with the minor mode is a chromatic chord, though in an uncompleted condition. But the making of the octave into a chromatic scale of twelve small or semi-tones, is the work of modulation from one key to another through the whole twelve keys in either the major or **minor sphere**; and this process is fully set forth in the pre-note to the chromatic treatise. [Scientific Basis and Build of Music, page 69]

Having found the framework of the major scale by multiplying F1 three times by 3, find the framework of the minor by dividing three times by 3. But what shall we divide? Well, F1 is the unbegotten of the 25 notes of the great genetic scale; B45 is the last-born of the same scale. We multiply upward from F1 for the major; divide downward from B45 for the minor. Again, B45 is the middle of the top chord of the major system, a minor third below D, the top of that chord, and the top of the whole major chord-scale, so B is the relative minor to it. Now since the minor is to be seen as the INVERSE of the major, the whole process must be inverse. Divide instead of multiply! Divide from the top chord instead of multiply from the bottom chord. Divide from the top of the minor dominant instead of multiply from the root of the major subdominant. This will give the framework of the **minor** system, B45/3 = E15/3 = A5/3 = D1 2/3. But as 1 2/3 is not easily compared with D27 of the major, take a

higher octave of B and divide from it. Two times B45 is B90, and two times B90 is B180, and two times B180 is B360, the number of the degrees of a circle, and two times B360 is B720; all these are simply octaves of B, and do not in the least alter the character of that note; now B720/3 is = E240/3 = A80/3 = D26 2/3. And now comparing D27 found from F1, and D26 2/3 found from B720, we see that while E240 is the same both ways, and also A80, yet D26 2/3 is a comma lower than D27. This is the note which is the center of the dual system, and it is itself a dual note befittingly. [Scientific Basis and Build of Music, page 81]

PLATE II. THE GENESIS.

In Fig. 1, the mathematical framework of the scales major and minor, is shown the genesis of the scale. F1, in the top figure, is multiplied by 3, and that by 3, and that by 3, which brings us to D27, top of the major dominant. F1 is the root of the whole system. C3 is the top of the first chord, and from that grows the next, and from that the next; and so we have F, C, G, and D, the tops and roots of the major system of chords. When these 3 roots are each multiplied once by 5, the middles of the chords are found, as shown - A, E, and B; so B is the last-born of the major family. When B is taken 4 octaves higher at the number 720 and divided by 3, and that by 3, and that by 3, we get the notes E, A, and D, which are the roots and tops of the **minor system** of chords. Dividing B, E, and A each by 5 once, we get the middles of the 3 minor chords, as shown. [Scientific Basis and Build of Music, page 103]

See Also

apotome minor **Helmholtz Subharmonic Series** introductory minor major system minor minor fifth minor mode minor scale Minor Second **Minor Seventh Minor Sixth Minor Third** Ramsay - PLATE VIII - The Mathematical Table of Majors and Minors and their Ratio Numbers **Ramsay - PLATE XII - The Major and Minor Scales Ramsay - PLATE XVIII - Chromatic Resolutions Minor** Ramsay - PLATE XXII - Mathematical Table of the Twelve Major Scales and their relative Minors Ramsay - PLATE XXIV - Vibrations of the Major are the String-lengths for the Minor Subminor and supermajor