

# PROLEGOMENA TO A THEORY OF MODULATORY SPACE IN MUSIC

Miguel RIBEIRO-PEREIRA<sup>1</sup>

**Abstract:** *The main focus of this prefatory study is the concept (and percept) of musical movement, namely in tonal music: how it is coherently generated, how it comes to express both the overall harmonic logic (and feeling) of tonal syntax and the major/minor key system. Developed from Aristotle's original understanding of nature as an inner principle of change and stasis, I shall briefly survey the fundamental concept of modulation throughout the Western music-theoretical tradition, then set forth a theory of modulatory space. To be sure, the ontological status of musical movement will be examined in current theoretical thought, too. Finally, three short case-study analyses address the topic at different hierarchical levels of tonal syntax: chord, key, and system.*

**Key words:** *musical movement; harmonic modulation; tonal syntax; key system; musical analysis.*

## 1. Introduction

‘Sounds perish’ (*soni pereunt*) — thus wrote Saint Isidore of Seville (ca. 560-636) in his treatise *De musica* [1]. Rather, they die away. Tones, intervals, and chords do not actually move in musical space; their sound remains in place until fading. Our sense of tonal motion, a kinetic illusion shaped by a specific gestural sequence in time, does rely upon discontinuous pitch elements. The whole life of tonal harmony is therefore represented in static images—chords and scale degrees—much like a motion picture, which can be screened forward and backward. How, then, is our sense of harmonic motion coherently generated? What is the fundamental

activity that transforms each chordal entity and unites them all, i.e. the inner dynamic and overall logic of tonal syntax? Why can we grasp the meaning of any present moment, while still recalling the past and expecting the future? Further, is it possible for us to set forth a comprehensive principle of musical understanding, an image of our creative musical mind, which runs through and accounts for different tonal systems?

Such indeed was the challenge for, and is the purpose of, this preliminary discussion: an attempt to understand the inner dynamic (or ‘movement’) of tonal music. It is based and further elaborates here upon my theory of *harmonic modulation*, developed from a sound, most ancient theoretical foundation and duly formalized in a previous book [2].

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<sup>1</sup> Superior School of Music / Porto Polytechnic Institute, Portugal. Research Centre for Science and Technology in Art / Portuguese Catholic University.

The ontological question ought therefore to be addressed first, that encompasses a long historical heritage; then, a synopsis of my cognitive paradigm and the ensuing nature of modulatory space; finally, an analytical illustration of my theoretical perspective.

## 2. The Ontological Question

Before addressing the musical issue, it might be helpful to give a broad overview of the original polarity in classical Greek thought concerning the fundamental nature of change and motion, whose balance and tension were to frame the evolution of our Western tradition.

### 2.1. Dual Philosophical Legacy

To be sure, the first, crucial, and most enduring problem that concerned Greek philosophy—if not philosophy *simpliciter*—was the intelligibility of change in the world, the transition from one state or condition to another. Among the early, pre-Socratic thinkers an original pattern of two realms—eternal and temporal—was championed in radical terms by Parmenides and Heraclitus: the former denied the reality of change in the name of the absolute continuity of being, as conceived by the intellect; the latter excluded the existence of any permanent substrate in the dynamic process of perpetual transformation, as perceived by the senses. This antinomy of being and becoming, of contrast between timeless perfection and changing decay, was to be reconciled for the first time on a logical and scientific basis by Aristotle (384–322 B.C.). Through the analysis of the sensible world, he distinguished between fundamentally different kinds of being—form and matter, potency and act—and thus could assert the objective reality of change and motion.

In sheer contrast with the immobility of number in the abstract mathematics of the

Pythagorean-Platonic tradition, the mobile character of things became the subject of natural science. A natural substance—the central notion of Aristotle’s philosophy—is characterized as an inner ‘principle and cause of change and stasis’ [3]. As the primary reality of the empirical world, an individual substance is a composite unity of immanent (intelligible) form and concrete (indeterminate) matter. Taking his cue from organic biology, Aristotle further views every natural organism as developing teleologically from a state of potentiality or imperfection to a state of actuality or perfection; the essential form of a being draws forward and moulds its matter from open potentiality to full actuality.<sup>2</sup> Change, or motion, is thus defined as ‘the fulfilment [act] of what exists in potency in so far as it is in potency’ (*Physics* 201b 10).

Such is the purposefully dynamic process—a flux of organic development and decay—as it is realized in nature. Although forms are essentially changeless, they can only be comprehended through the changing patterns and transformations of the physical world. Aristotle’s conception of reality therefore differs substantially from the philosophical teachings of Plato, on ontological as well as epistemological grounds: immanent order in nature is substituted for transcendent archetypal forms; rational and empirical analysis, for ideal or spiritual intuition.

Building on this kind of universal frame worked out by Aristotle in ancient times—the empirical, sensible reality as an inner principle of change and stasis—a general, background conception of *modulation* will be put forth here (*infra* § 3): modulation as a plastic thought process and all-embracing principle in music.

<sup>2</sup> The early history (perhaps indeed the origin) of the concepts of harmonic progression and directed motion from Aristotelian inspiration has been examined by David E. Cohen [4].

## 2.2. Current Perspectives on Music

Let us enquire now into the current state of affairs as it concerns both the puzzling phenomenon of musical movement—with an implied dual nature of our perception—and the metaphor of musical space in some of the best critical thought.

While assessing different theories in his earlier book *The Aesthetics of Music*, English philosopher Roger Scruton makes two essential claims: that musical movement—not just a sequence of acoustic changes—must be explained in spatial terms, and that when melodies sound, nothing that we hear literally moves [5]. Then, more recently, in *Understanding Music: Philosophy and Interpretation*, he goes on to reconcile those two claims by resorting to the concept of *double intentionality*, which characterizes musical (like much aesthetic) experience. ‘You hear a succession of sounds, ordered in time, and this is something you believe to be occurring—something you ‘literally hear’. And you hear *in* those sounds a melody that moves though the imaginary space of music. This is not something you believe to be occurring, but something you imagine: just as you imagine the face in the picture, while seeing that is not literally there. Double intentionality, I suggest, is explained by our ability to organize a single *Gestalt* in two ways simultaneously — in one way as something literally present, in another way as something imagined. The literal perception and the imaginary perception can cohabit the same experience, since they do not compete’ [6].

This ‘acousmatic’ experience of tones, animated by a continuous movement that constitutes the background (virtual) reality for all musical organization, is central to Scruton’s own definition of understanding. Likewise, in his comprehensive treatise *A Theory of Art*, Polish-American musicologist Karol Berger comes to grips

with the essentially imaginary nature of movement in the perception of music under the strict requisite of tonality (and meter). He first defines, when dealing in general with the various media of culture—i.e., materials in which an imprint of an experience can be preserved—two objects of vast different ontological status: viz. a real work and an imaginary world. ‘Works (real objects) are there to be read (decoded) and thus trans-formed into worlds (imaginary objects). The work which is really out there in front of us demands that we imaginatively see or hear in it the world which in reality is not out there’ [7].

Later on, while dealing in particular with the aural medium, he asks then answers the question, What is, precisely, that imaginary content of music? ‘There is nothing imaginary about melodies [which we perceive as a real object]. . . Similarly, there is nothing imaginary about the rhythmic organization of a melody, nor about its tempo, nor about the timbre and the dynamic intensity of its pitches. The imaginary enters into the perception of music only when the music is in a very broad and inclusive sense tonal and metric; the imaginary content of real sounds depends on the closely interrelated phenomena of tonality and meter.

In the broadly inclusive sense in which I use the term here, music is tonal when its pitches are heard to be of unequal importance, when some of them are perceived to be relatively unstable, wanting to move, or being pulled, toward others, and then these other are perceived to be the relatively more stable goals of tonal motion, or centers of tonal gravity that pull the less stable pitches toward themselves’ (p. 30).

How, then, can that ontology be materialized in the case of major/minor tonality? Thus far we have dealt with melodies, as individuals in a figurative

space of their own; or lines, as the object to attend to in most Western art music. To round off this section we should now turn to a canonical harmonic progression in tonal music, one that is unequivocally perceived to lead to a stable goal and define a centre of gravity. In his final book, *Style and Music: Theory, History, and Ideology*, the late American theorist Leonard B. Meyer acknowledges that 'it is necessary to recognize that it is precisely this progression [from subdominant, IV or ii, to dominant, V or vii] that specifies particular tonal centres'. But then he makes a startling confession: 'I cannot satisfactorily explain why the progression from subdominant to dominant specifies a tonal centre' [8]. My theory must therefore rise up to this challenge (*infra* § 4.1).

### 3. The Concept of Modulatory Space

Consistent with the previous mode of my presentation, I shall re-examine the origins of Western music theory in ancient Greece with regard to the concept of modulation—the point of departure being once again Aristotle and his peripatetic school—then propose a comprehensive (re)definition in the context of modern major/minor tonality.

#### 3.1. Modulation as a Paradigm

The first substantial treatise from the extant music-theoretical Greek literature is the *Elements of Harmonics* by Aristoxenus of Tarentum (born ca. 354 B.C.), the most influential theorist—the Musician, he was called—of classical antiquity. The method he developed in music was borrowed and adapted from Aristotle's; also the terminology pertaining to the physical description of space, motion, and change. A melodic interval in Aristoxenus' system, rather than being reckoned simply from a specific

measure or number (i.e. extension or size), is primarily a dynamic relation between notes in actual context, characteristically defined by its function within the musical system. Musical *functions*, not intervals, are indeed essential to distinguish notes—for intervals of equal magnitude may differ in function, he insisted emphatically.

His seminal theory of modulation (*metabole*) will thus be introduced: 'We must bear in mind that musical cognition implies the simultaneous cognition of a *permanent* and of a *changeable* element, and that this applies without limitation or qualification to every branch of music' [9]. Here lies at once the essence of Aristotle's philosophical teachings and the distinctiveness of Aristoxenus' musical concepts. The nature of such a theory of modulation is twofold: the universal principle and the particular device. All possible musical categories can indeed be modified—be they modal, tonal, rhythmic, or stylistic—thus yielding as many types of modulation. 'Modulation' is a dynamic process of functional change; it is pervasive in the musical system of Aristoxenus, just as in Aristotle's use of this concept, whose wide meaning enables him to provide a fully comprehensive definition of nature as 'a principle of process and change [*metabole*]' (*Physics*, 200b 12).

The protohistorical survey of our concept of 'modulation' ought to consider another fundamental notion—Latin *modulatio*—steeped in the Platonic tradition, which is radically different from that of the Greek *metabole* (Latin 'transitus' or 'mutatio'). Both run parallel and remain effectively in use in modal theory throughout the Middle Ages and Renaissance. In musical context, *modulatio* means measurement of pitch height and time length, the elements which constitute the fundamental disciplines of music — harmonics and rhythmic. This

musical concept has essentially a twofold nature: endowed with a quantitative and mathematical character, it expresses as well an artistic and aesthetic quality. Both measure and movement must be accounted for when it applied to the inflection of the voice. Particularly, *modulatio* conveys the notion of a well-regulated, continuous movement of the melody.

The classical Latin definition of music as the science of modulating properly (*musica est scientia bene modulandi*) identifies the nature of music itself with the very process of modulation. Although its first statement has been attributed Marcus Varro (116-27 B.C.), Augustine of Hippo (354-430) made effective use of it and did provide its most comprehensive definition, fully elaborating this concept in one of his early works, *De musica* [10]. The work's prime technical concern is with duration and number along with their cosmological and theological significance. Augustine thereby seeks to renew a pure musical rhythmic of whole-number *ratios*. This concept in Latin has a dual, ambivalent understanding: it means number and reason, numerical proportion and intelligible perception. Between numerical order in the mind and sensible motion in perception, harmony stands for balance and equilibrium — in life as well as in music. Hence the vital importance of *modulatio*, as the means to achieve a well-regulated and pleasing melody.

Let us summarize: metabolic techniques were powerful means of expressing a full range of emotions in dramatic forms of Greek music, whereas modulatory rules were rationally cultivated for the sake of aesthetic and ethical balance in the medieval conception of music as a quadrivial discipline. The former understanding of modulation displays primarily an *intertonal* orientation, whereas the latter implies exclusively an *intratonal* inflection— i.e. an outward (systemic) meaning or an inward (syntactic) meaning, respectively.

### 3.2. Comprehensive (Re)definition

The 18<sup>th</sup> century is pivotal in the history of the concept of modulation. Coeval with the firm establishment of tonal syntax and the new system of keys, a broad concept of modulation develops anew. Both syntactic and systemic meanings (i.e. intratonal and intertonal orientation) now coalesce into a single, encompassing expression. Only in the 19<sup>th</sup> century will it be identified with, and exclusively mean, the narrow process of key change. In his last treatise, the 1761 *Code de musique pratique*, Jean-Philippe Rameau (1683-1764) eventually reached a lapidary definition: 'One terms modulating [*moduler*] the art of conducting a melody and its harmony, as much in a single key, as from one key to another' [11]. Ensuring logical consistency and continuity through all levels of the tonal system, Rameau's comprehensive notion of modulation leads to an all-embracing conception of tonality as a whole.

In the best tradition of 18<sup>th</sup>-century compositional practice and theoretical thought, I believe the all-encompassing notion of modulation to be an essential topic of triadic harmony — the cornerstone indeed of a more comprehensive understanding of the modern tonal system. It should bring together, truly in unitary perspective, both the innermost structure of one key and the kind of relationship that might be established with any other key. I will therefore advance an inclusive definition accounting for both the original meaning of inward harmonic syntax and the modern meaning of outward key change: *modulation is the harmonic reinterpretation (or shift in tonal meaning) of a single tone, tonal pattern— be it a harmonic interval, chordal entity or melodic segment—or diatonic collection within a piece.*

The kernel of all harmonic relationships, this comprehensive definition conforms to the original Aristoxenus' dictate regarding

musical cognition: viz. a permanent and a changing element. Only two essential conditions therefore ought to be met—a *continuing* tonal content and a *transformed* harmonic context—so that the intrinsic logic and inner dynamics of tonal motion can be perceived and comprehended. The former is ensured by the tones shared between chords in a given harmonic progression; the latter is expressed by the kind of the intervallic relationships.

For the sake of consistency with regard to the whole system of harmonic tonality, the concept of ‘chord-modulation’ ought to be introduced alongside the traditional concept of ‘key-modulation’. Defined as special cases of the universal principle of *modulation*, to be sure, they apply to different hierarchical levels of tonal activity: chordal syntax and the key system. In this sense, for instance, the pivotal bass of a I–vi<sup>6</sup>–ii<sup>4/2</sup> harmonic progression (or, for that matter, I–vi<sup>6</sup>–V<sup>#4/2</sup>/V in a tonicized or key-modulatory context) is properly said to be modulated, just as is scale degree 4 held in common through a IV–ii–V<sup>7</sup> (or inflective IV–ii–vii<sup>o7</sup>) progression.

Another major distinction concerns the notions of modulation and transposition, often associated and entangled. Although actually referring to the same phenomenon of change in tonal space, their respective approaches are radically different in kind: *modulation* refers essentially to a continuous flux, an ongoing process of harmonic transformation, while *transposition* refers to juxtaposed tonal patterns. The critical factor of modulation is the *transformation* of a given harmonic function (or context) assuming an identical tonal ground (or content); that of transposition, conversely, is the *transference* of a given tonal content, assuming an identical harmonic context. Whereas the former is essentially plastic, the latter is rather mechanical in nature.

#### 4. Three Case-Study Analyses

In this final section we must examine the cognitive approach to the aesthetic musical object, no longer from an ontological or a theoretical standpoint, but from an analytic and interpretive one. To be sure, the three hierarchical levels of tonal movement or syntax—respectively intratonal, intertonal, and systemic—will be addressed. But first, we ought to define the dual basic functions of modulatory space.

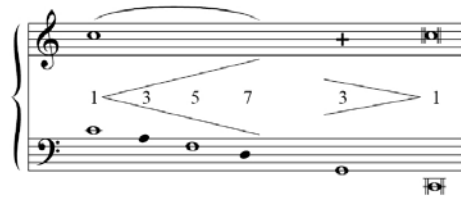
##### 4.1. Chord-Modulatory Syntax

My concept of modulatory space is based upon a scale of chordal roots by downward thirds, a diatonic ‘continuum’ whose third-step (its syntactic unit) corresponds to both the smallest morphologic unit and smallest consonance accepted in tonal harmony. Its underlying unit (similar in degree) is thus also an alternating modal pattern (different in kind) — permanent and changing, that is, essentially modulatory (Fig. 1). Indeed, this overall inverted balance matches a fundamental opposition in tonal meaning: motion through the plagal field (vi–IV–ii) proceeds *from* the original tonic, while through the authentic field (vii<sup>o</sup>–V–iii), *toward* the final tonic.



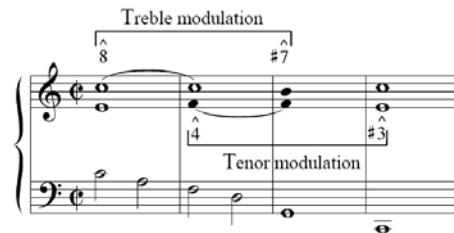
Fig. 1. *Root function (no. 1)*

Inscribed thereupon, my theoretical construct—I claim this ‘Plastic Model’ to be a cause as well as an expression of tonal coherence—is meant to represent *in nuce* the basic tonal relationships as they unfold in musical time (Fig. 2).

Fig. 2. *Common-tone function (no. 2)*

Its overall design is shaped by two modulatory functions (an active chordal root and a passive common tone) which embody the basic duality of change and stasis. Forwardly designed as a continuous, unwavering flow of increasing dissonant context, modulatory syntax gives full meaning therefore to the concept of cadence (from Latin *cadere*, “to fall”) as a definitive closure. The final progression  $V^7-I$  is indeed the only one falling in terms of harmonic tension: it finally resolves the ever-growing dissonant tension developed along the way, recapturing the original stability, which has been consistently eluded since the beginning of this tonal cycle. Ultimately, it is an archetypal representation of the keynote’s inner life.

As with this original stationary function, a focal pitch on the third of the tonic major—a sort of mirror-image of the keynote’s behavior, a *doppelgänger* or double of its character—is passively submitted to the whole modulatory process. Together they constitute the basic poles of modulatory activity; i.e. the dual matrix upon which the root function ‘modulator’ will inscribe its meaning and whence an overall dynamic picture of the key is to emerge (Fig. 3). If we were to adopt the vocal types of the old polyphonic music, which actually survived as the basic cadential categories in thoroughbass theory, the primary pole’s transformative process may be designated as *treble modulation*, while the secondary pole’s, *tenor modulation*.

Fig. 3. *Contrapuntal function (no. 3)*

The critical difference between them lies in their context within the diatonic scale. Located on degree 3 in major, the double alternates with its semitone neighbor or upper leading tone (3-4-3), entailing a symmetrical opposition with the primary pole (8-7-8). A sort of contrapuntal, quasi-canonic modulation applies to their core, on degrees 1 and 4, as both turn first into a dissonant minor seventh, and then likewise resolve downward by semitone. Their tonal meaning, however, is reversed: the treble modulation (8- $\sharp 7$ ) is bound to express tonal opening; the tenor modulation (4- $\sharp 3$ ), tonal closure. Whereas the keynote’s modulation imparts a sense of compelling articulation of the polar opposed albeit complementary harmonic fields, the secondary leading tone’s promotes their seamless transition. Together they are bound to express the idiosyncratic tritone—the tonal crux—whose constitutive leading tones (rising 7, falling 4) are approached as well as resolved by normative contrary motion. To be sure, this is a cogent modulatory rationale for the old puzzling *scriptum* that a progression from subdominant to dominant specifies a tonal centre (*supra* § 2.2.).

My theoretical model also explains why a harmonic-contrapuntal formula such as  $I-ii^{4/2}-V^{6/5}-I$  with 3-4-4-3 in the treble, a typical exordium in late Baroque compositional heuristics, defined originally and unequivocally a key (especially in major). Epitomizing the basic modulatory process in the outer parts—treble modulation in the bass, tenor modulation in the soprano—it

summarizes the polar tendencies of tonal syntax: first away from, then back to, the framing tonic. A lapidary instance appears at the very beginning of J. S. Bach's *Well-Tempered Clavier*, book I, in the famous C-major prelude (Fig. 4). Its paradigmatic statement is reduced to the bare necessities of tonality's full syntactic revolution with pristine clarity: (1) original tonic, (2) plagal harmony, (3) authentic harmony,

and (4) closing tonic. Notice the overlap of the essential modulatory process between bass and treble in bar 2, a smoothing technique to provide continuity in modulatory space. Growing dissonant tension is thereby built up to the crucial diminished fifth in bar 3, as the opposed *and* complementary leading tones meet.

Fig. 4. J. S. Bach: *WTC*, book I, prelude no. 1 (exordium)

#### 4.2. Key-Modulatory Syntax

In the original plagal field, tonal syntax may be described in terms of the keynote's well-regulated modulation — a focal point consistently undermined in its original consonant status (i.e. harmonically degraded) by the modulatory agent, which withdraws progressively from its primal location on the tonic through the intervallic series 1–3–5–7. Now, this steady modulatory design around the stationary keynote may aptly be cast in figured-bass notation ( $C^{5-6-6/4-4/2}$ ), whereby we can perceive the whole plagal field subsumed under an essentially plastic, pliable nature. Foremost, the meaning of tonal syntax is embodied in concrete, sonic relationship that we can actually perceive and hold on to — a true physical reality (or *vinculum substantiale*) upon which we can effectively generate a coherent concept. It makes tangible the growing dissonant con-

text which purposefully shapes the whole sonic design around a fixed, thoroughly modulated keynote

In the context of the Plastic Model, then, we can understand the root progression I–ii<sup>7</sup> as a downward seventh-relationship, the keynote's swift chord-modulation spinning through the entire plagal field. The familiar move is reckoned *directly* (i.e. keeping in immediate physical contact) as the distance between two roots in downward direction: a triple skip on the plagal side of the modulatory third-step scale, based upon (and made possible by) the fixed common tone. It is not necessarily a combination of third and fifth—whether or not concealed—as in Rameau's original conception, which was replicated in later theories of harmony. No intermediate harmonies should be inferred, implied, or supposed—i.e. analytically supplied—in order to keep such a progression connected on logical and material grounds.



Nor should the supertonic be perceived either as a mere dominant preparation or a tonic prolongation, as in Schenker's linear-contrapuntal approach. First and foremost, on harmonic-modulatory grounds, the keynote's extended decay actually expresses one essential motion of tonal syntax and defines its inner, processive logic; that is, it fulfills a structural, not subservient, role.

The keynote first endures a full modulatory process from the consonant I through the dissonant  $ii^7$ , thereupon reaching its last stage within the plagal field. Eventually, it yields downward by half step to the *subsemitonium modi* (a normative *ficta* in the minor mode). This indeed is the ultimate dissonant context, the outcome of a dual, relentless, thorough modulatory activity.

Fig. 5. Beethoven: *Piano sonata op. 53 (Waldstein)*, 1<sup>st</sup> theme

A similar move to that of Bach's prelude ( $C^{5-4/2}$ ), otherwise in chromatic context, is featured in the first theme of Beethoven's *Waldstein* sonata, op. 53 (Fig. 5). This will allow us to make three main points: the underlying unity of modulating within a key and modulating from one key to another; the complementary roles of transposition and modulation as defined in actual music; and the progression from subdominant to dominant as specifying a tonal centre. The *allegro con brio* sets off with a pulsating C-major chord (contrapuntally identical to

that of Bach's previous example) only to reveal itself as a subdominant of G major, not confirmed as a tonic. The root C is thus radically modulated to become a secondary leading tone, that is, turning from degree 1 to 4. Notice how this articulation, although harmonically weak ( $V^{4/2}-I^6$  resolution onto B/G), is motivically emphasized by the inversion of its contrapuntal arrival (the 3<sup>rd</sup> B-G stretch), then corroborated in the high register by delineating a cadential gesture (D-G). The ensuing four-bar phrase is just a sequential, transposed pattern.

This transposition will give momentum to the impulse generated by the modulatory bass pattern, further promoting a chromatic descent: it is indeed the age-old tetrachord of lament. Upon the critical *lament motive* ( ${}^b6-5$ ), precisely, the modulatory strategy is renewed, now contrapuntally recast in the treble. Once again the local tonic F turns into the secondary leading tone in C major (i.e. from 1 to 4). Notice how this stretched F in the highest register (with extra octave skip) alternates with its diminished fifth B, while the deeper bass oscillates over the resonating ‘lament motive’, definitively asserting the key centre.

Meant to define the first theme’s overall tonic, this ultimate modulation imparts a sense of urgency by way of a continuous articulation, instead of juxtaposing discrete statements. The F minor 6<sup>th</sup>-chord on bar 8 acts as a flattened, upbeat subdominant to the structural V<sup>7</sup>, no longer strengthening the arrival on the previous local tonic with an outlined cadential gesture. Even though the overall tonic C is only briefly uttered, furthermore in minor, the progression IV–V will suffice to unequivocally define the central tonic. To be sure, this will have far-reaching consequences in 19<sup>th</sup>-century Romanticism, as the tonic seems to lie beyond the horizon.

#### 4.3. Modulatory Major/Minor System

Finally, we must extend the fundamental concept of harmonic modulation up to the highest hierarchical level: the key system. Tonal syntax will now be essentially defined in transit between the opposed yet complementary poles — major and minor. Strikingly, my Plastic Model’s stationary functions (i.e. the contrapuntal dyad C/E, defined by their reversed leading tones) are shared by the pair of relative tonic triads. Lying at the bottom of the major harmony and at the top of its correspondent minor, the third-dyad C/E thus becomes also the

heart of diatonic tonality, the modulatory mean of the dual key system: an opposed harmonic matrix is inscribed upon the very same dyadic core. In this shifting harmonic polarity we see once again the workings of the complementary notions of transposition and modulation. The minor key resorts to a chromatic inflection or altered leading tone ( $G^\#$  in the bass) to provide the tonic with a required semitone polarity. Missing in the original key signature, this is a sort of tonal *ficta* ( ${}^\#7$ ), a treble clausula transposed from the original major key — in its own image. Now the secondary leading-tone polarity is otherwise modulated or reinterpreted, from a  $4-{}^\#3$  polarity in major to a  ${}^b6-5$  polarity in minor. While keeping the same content F–E, that is, its tonal function is changed.

Archetypal of this plastic representation is J. S. Bach’s chorale ‘O Haupt voll Blut und Wunden’ in the St. Matthew Passion, whose singular features can be accounted for in pure modulatory terms. This indeed is the epitome of a modulatory conception, as the tantalizing dirge resurfaces over and over again throughout the Passion in ever-changing settings. Let us examine the key definition of its controversial exordium,<sup>3</sup> a distinctive contrapuntal-modulatory move upon scale degree 4 (Fig. 6).

O Haupt voll Blut und Wun - den

Fig. 6. J. S. Bach, chorale no. 98

<sup>3</sup> This chorale has been analyzed in different installments by Fred Lerdahl and Ray Jackendoff [12]. Its beginning was criticized and given an alternative analysis in John Peel and Wayne Slawson’s review [13]. The controversy still lingered between the co-authors [14] and the pair of reviewers [15].

A remarkable cross-fading design shapes the original phrase as a whole: the triple tonic arrival grows steadily in harmonic as well as metric stability, while an offsetting decay affects the accented plagal harmonies holding onto scale degree 4, to and fro between bass and treble. As a stunned cry, 'O Haupt', the emblematic opening gesture leaps upward in the (parallel) outer voices onto the first accented downbeat, outlining the original I–IV plagal inflection, which is then expected to be filled in smoothly by stepwise descent. This focal polarity IV–I<sup>6</sup> in the bass is further echoed and conspicuously modulated as the secondary leading tone in the treble, a moving 4-<sup>#</sup>3 resolution over a cadential progression IV<sup>6</sup>–V<sup>6/5</sup>–I<sup>9-8</sup>.

Thus vividly expressed upon 'Blut', this accented modulation brings forth the first dissonant harmony and stirs the only 8<sup>th</sup>-note rhythmic activity—a thrilling urge in the body of harmony, similar to a genuine physical disturbance—which overlaps with a treble clausula in the alto. Stuck with the crucial semitone polarity and its moving contrapuntal-modulatory echo, this three-fold dramatic picture scans the epigraphic verse and motto 'O Haupt, voll Blut, und Wunden'. It seems indeed an iconographic representation of the steps to the Cross, an innermost visual experience prefiguring the Via Dolorosa, conveyed by a profound modulatory appeal of the music.

Ultimately, this contrapuntal-modulatory foundation also makes it possible for Bach to reconcile the old Phrygian tune with the new harmonic syntax. When it is set in the context of the major/minor key system, the idiosyncratic semitone of the E-mode (2-1) yields the closing secondary polarity of C major (4-<sup>#</sup>3) as well as A minor (<sup>b</sup>6-5). Here indeed lies the modulatory kernel of Bach's tonal assimilation, for a fixed pitch centre may be characteristically perceived in quite different systemic contexts.

Fig. 7 offers an alternative setting of that same chorale tune. The whole phrase is ac-

tually defined by a reversed move upon the secondary pole in minor, developing from a deceptive impulse (V–<sup>b</sup>VI) and heading toward a Phrygian cadence (iv<sup>6/5</sup>–V); thus ascribing a different meaning to the same F–E pole in the bass. By the same token, a new modulatory light is shed upon the secondary leading-tone resolution in the treble (4-<sup>#</sup>3): it recaptures momentarily the major relative at the heart of this other picture in minor. The ensuing leap downward of the bass onto an accented, extended Phrygian cadence constitutes the dissonant peak of the phrase. A dramatic effect is therefore achieved by the contrapuntal-modulatory shift from the major pole 4-<sup>#</sup>3 in the treble (back) to its minor counterpart <sup>b</sup>6-5 in the bass.

The image shows a musical score for a chorale in C major. The score is in 4/4 time and features a treble and bass clef. A shaded area labeled 'C region' highlights a specific passage. Above this region, the notation '4-<sup>#</sup>3' is written with a caret (^) over the 4 and a sharp (#) over the 3, indicating a resolution in the treble. Below the bass line, the notation 'a: 5-<sup>b</sup>6' is written with a caret (^) over the 5 and a flat (b) over the 6, indicating a resolution in the bass. A dashed line connects the bass line resolution to the treble line resolution, showing their relationship. The score includes various musical notations such as notes, rests, and accidentals.

Fig. 7. J. S. Bach, chorale no. 345

To be sure, this will be the final setting of the chorale in the Passion—a mournful meditation following the death of Christ—which is to remain symbolically suspended on a half cadence in the A-minor key. It is paradigmatic of the modulatory power of music to effectively generate drama, aptly displaying the dual nature of the new tonal system as well as the distinctive character of the old modal melodic line. Emotionally lodging in our mind since Jesus's despair on the Mount of Olives, when the Phrygian tune was first heard, are we then expected to hear the five musical settings of such an ever-changing chorale as a prophetic elegy representing the five wounds of Christ?

## 5. Conclusion

By and large this article reproduces most of a lecture, ‘Modulatory Space and Musical Form’, given at the Faculty of Music, Transilvania University of Brasov on May 4, 2012, slightly different from another one ‘Modulatory Space and Interpretive Analysis: A Novel Approach to Tonal Music’, at the Faculty of Composition, Musicology and Music Pedagogy, National University of Music Bucharest on May 2. Both were meant to promote my understanding of the inner dynamics (or ‘movement’) in tonal music, as it has been given earlier in book form [2].

By no means, however, is that work the sole source of the materials presented here, even if my cognitive theory of *modulation* ought to be adequately outlined. Nor does it have a comparable scope, aim, or design. Indeed, my current research seems to begin anew (hence the title ‘prolegomena’) and faces new challenges, now focused on the critical concept of ‘modulatory space’.

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