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Symmetries in Music

Various principles of symmetry have been mathematically defined, and physics, chemistry, and biology inform us that nature abounds in symmetries of all sorts – indeed in cases where no symmetry has as yet been observed, it is often taken for granted as a heuristic device. The history of ideas testifies that reasoning in terms of symmetry is deeply ingrained, and psychological studies have established that symmetric schemes facilitate perception, learning, and thinking. No wonder then that the world of artefacts, to which the works of literature, the visual arts, and music belong, is replete with objects and processes that exhibit symmetry, and no wonder that this fact has attracted the interest of aestheticians and analysts.

If one studies the concept of "symmetry" as it emerges in mathematics, in the more or less exact natural sciences, and finally in the humanities and arts, it can readily be observed that minor deviations from true reflection begin to be accepted, that additional, sometimes quite loose senses of "symmetry" turn up, that widened definitions betraying influences from or confluences with other related concepts gain ground.¹

"Symmetry" can thus be restricted to cover cases of mirroring and congruence, and be defined as the exact correspondence in size,

¹ It should be remarked, however, that there is no reason to complain of this state of affairs: insight is promoted both by expansion and contraction of conceptual content.

form, and position of parts on each side of a line/plane or around a point/axis. In the arts, however, many further aspects might be subsumed under the heading "symmetry": uniform arrangement or regular occurrence of more or less equal parts, harmonic proportions, balance between constituents making up a whole, ordered juxtaposition of opposites, and even conspicuous display of contrasts. Of these extensions uniformity and regularity of design appears to be the most radical since the identity, similarity or indeed contrast relationship involved is used recursively.

It seems that the concept of "symmetry" is derived from visual observations, and that this origin has thoroughly influenced the way we identify and discuss symmetries in music. But music is an art that evolves in time, and that must have its own laws of symmetry, laws that take account of the fact that musical processes cannot be reversed and cannot easily be surveyed. The heart of the matter appears to be that we have seen too many symmetries in music and heard too few, that many of the alleged symmetries in music do not come off as musical phenomena. It may be said, and it often is, that music is "floating architecture", but the grain of truth in that cliché needs many grains of salt to be precipitated. Indeed, if we take seriously Schelling's statement that "*Die Architektur ist gefrorene Musik*" there is acute danger that the buildings will fall down even without any change in the weather.

The purpose of this essay is to critically revise current notions of symmetry in music and to establish some cues that seem to bring about phenomenal symmetry in music, and music will to some extent be illuminated by pointing out the differences between the visual arts and music.

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Disregarding the fact that some sculptures make (additional) sense when you touch them and other non-paradigmatic ways of experiencing art, works of visual art are there to be seen. But the corresponding

notion that music is (of course) the art of sounds, is on second thoughts a delusion. Another, equally valid, way to enjoy music is to perform it; indeed, some people maintain that playing music is even more gratifying since you also produce, have power over, what you listen to. Finally there is in western art music a third possibility: you can read the music from the score. And if music is made visible, it can – evading the fact that it moves in time – be studied in the same way as a picture or a work of literature.

The symmetries of buildings and sculptures disclose themselves gradually as you walk around inside or outside them, trying to make a synthesis out of the various perspectives. But – leaving the rapid, flickering eye movements, the left/right eye differences, as well as all rabbit/duck problems aside – the properties of paintings and drawings are there to be seen at a single glance. (Though you must certainly inspect some artworks for a long time before you have discovered their secrets.) Works of music are like three-dimensional visual artworks in so far as there is necessarily a temporal process involved when you acquaint yourself with them. But unless you read a score, you cannot stroll around at your own discretion in a piece of music: you have to listen to its passages in the very order prescribed by the composer. True, phenomenal, musical symmetries are therefore never actually present, but always in the making – they are made up of relationships cumulated in memory and of prospective relationships that the stored aspects of the structure give the listener reasons to expect.

In many kinds of art and music there are rules or conventions that regulate how symmetries can be designed and are perceived, that distinguish between possible, permissible and meaningful symmetries on the one hand, and symmetries that seem strange or do not work at all on the other. In representational art and more generally in art that is subject to the laws of perspective, some symmetry arrangements are likely to strike the beholder as odd, implausible or incorrect, as invalid. In most musical idioms the very tonal substance has tendencies and effects that are inherent in the sense that they are present in the material as seemingly inescapable dispositions to move and to be heard in certain ways irrespective of the context in the individual work. In “tonal” music, then, tones cannot just be arranged as abstract entities to pro-

duce symmetries – apart from the problem of achieving syntactically well-formed musical formulations, such symmetry operations would in most cases ruin the similarity relationships necessary for apprehending the symmetry.

These general observations give rise to three delimitations of the field for the present essay.

Proprioceptive symmetries, presenting themselves for the musician while playing, offer a most important object for study, an object that has been largely neglected in music analysis, and that may contribute greatly to the understanding of the art of making music. But such symmetries, however interesting, must be left out in the present account, which will pay attention to the precarious nature of auditive symmetries.²

Many large-scale symmetries alleged to be present in music works are patently there for the listener; indeed, they are often demanded by the “form” governing the music. For instance, when the music starts again after the contrasting Trio part in a minuet, any normally attentive listener recalls that he has heard this melody, this rhythmic character, these sound qualities before, and enjoys the fact that he is about to witness the closure of a symmetric musical form. The aural identification of such large-scale recurrences does not involve musical memory and expectation in the dynamic sense – the listener does not enter into the musical flow, but steps back and surveys it as one takes a look at a painting – and symmetries involving extended portions of music are therefore of less interest in this essay, aiming at a discussion of more crucial cases.

Atonal and non-tonal twentieth century music is frequently constructed according to abstract and quite rigorous principles, and eager analysts have certainly not missed the opportunity to demonstrate various kinds of strict mirroring, and nor have they failed to observe cases of exemplary juxtapositioning of complementarities, intricate symmetries with respect to formal processes, or all-pervading schemes of proportional relationships. There is no reason to doubt these find-

² Cf. Edlund, Bengt, “Structural Symmetry vs. Proprioceptive Patterning in Music”

ings: such symmetries are generally as positively present in the score as they are difficult or impossible to confirm when listening to the music. And as a rule no one claims that they can or should be heard – though their secret effects are often taken for granted. Given the critical purpose of the present essay, they are of little interest.

Thus our examples are to be drawn from short passages of tonal music: such excerpts if one is engaged in symmetry re-search, if one is not prepared just to accept symmetries that are summarily based upon what there is to be seen in the score, if one wants to find out when and why various kinds of symmetry actually emerge for the listener. When hearing a comparatively short passage of tonal music, an alert listener is aware of an evolving musical entity displaying both an intricate network of “horizontal” relationships and a complex hierarchic structure. Such phenomenal entities, extending the psychological present by means of the artistic design, may include vivid memories of the not too remote past as well as glimpses of the near future, and are the locus within which the cues triggering phenomenal symmetry may be sought.

But how do we experience musical symmetry, and how can it be confirmed? Well, we listen to someone that plays the music, of course, and we may check the observation by hearing the passage once again (if possible) or by recalling it. Alternatively, given that we have the capability to do so, we can read the score and hear the music inwardly. We may also, if we know the piece very well, just imagine the music.

To use the score obviously entails a risk of a biased judgement – you never know for sure if you have heard (or become aware of) a symmetry just because you have seen it. But there is another precarious fact that casts doubts on all these methods. Music cannot be heard without being performed, without being formed according to a certain interpretation, and this holds not only in the ordinary cases when the music is played by X or Y, but also when you read or recall it, and when you listen to it in your own inward interpretation. It is likely that at least some of the interferences associated with interpretation involve the cues for symmetry, whatever they are, and that the performance therefore may affect the musical substance in a way that alters the sense of

symmetry. Phenomenal symmetry in music is not ultimately a property of the structure-as-composed, but a feature of the structure-as-performed. This means that it is difficult to specify the qualities of the objects that possess musical symmetry, and that true, phenomenal observations of symmetry tend to lack intersubjectivity – since interpretations vary, these observations do not refer to quite the same object.

To be sure, beholding a work of visual art also involves interpretation of its structure, but the problem in music is different since it involves two superimposed interpretations. Listeners interpret differently the performance they hear, and two performances of the same work are always physically different (and this goes by extension also for imagined performances) because they emanate from different interpretations of the notated structure. Spectators, on the other hand, tend to see different configurations in pictures that – leaving contingent circumstances such as various lighting and pigment changes over time out of account – always have the same physical properties.

Further, when we recall or read music in order to check aural impressions, we run the risk of being deluded. Recalling music or reading it silently generally takes (much) less time than actually performing it. The tempo does not seem hurried – what probably happens is that certain details or indeed whole portions of the music are displayed as unities in memory rather than actually experienced. This means that the musical flow is more or less arrested and turned into a sequence of known fixtures, and that the checking might deteriorate into confirmation of conventional notions or first impressions.

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Starting with symmetries in which a certain configuration is actually mirrored, we will first deal with a group of symmetries that have a pre-compositional origin.

The theory of tone systems has come up with a number of symmetry relationships and symmetry operations, of which several can be demonstrated in the most common model of the tone system, the

circle of fifths; cf. illustration. This circle may be symmetrically divided from C to F#/G♭, separating the sharp keys from the flat keys, and indicating routes of transposition or modulation towards “brighter” and “darker” tonalities. The triads of the six diametrically opposed keys have no note in common, and the interval corresponding to these diameters, the tonally ambiguous augmented fourth/diminished fifth, divides the octave into two equal parts. Four different equilateral triangles and three squares may be inscribed into the circle, and these figures indicate keys with triads that are remotely related by major and minor third root relationships (mediants) and one note in common; the notes picked out by these figures make up augmented triads and diminished seventh chords, respectively, that divide the octave in three and four equal parts, and that offer three and four symmetric opportunities for enharmonic modulation. The two possible hexagons correspond to the two different whole-tone scales, and the neighbour positions of the dodecagon following the fifths around the circle indicate the roots of the intimately related main triads of tonal music, having two notes in common. Even the chromatic scale can be meaningfully visualized as a star-like figure.

However, these theoretical symmetries are of very little concern for the listener, and unless they are underscored by other much stronger, indeed decisive, structural cues in the actual music, they will not give rise to any phenomenal symmetry. If, say, an expansive resolution of an augmented fourth is immediately followed by a contracting resolution of the same pitches now behaving as a diminished fifth, the latter resolution will appear not as the completion of a symmetry, but rather as a surprise or indeed as an almost illegitimate deviation. And a motion from tonic to dominant has altogether other musical properties than the “corresponding” motion from tonic to subdominant, just as the “upstairs” quality of clockwise modulations towards sharper keys is very different from the effortless sinking down into the flatter regions. Mediant and whole-tone relationships may however contribute more substantially to symmetry by supplying conspicuous, contrasting key areas and pitch collections, by making possible changes in tonal aura that have little sense of symmetry as such, but that can activate, or be acti-

vated by, other aspects of the design in a way that suggests bisection or, more generally, indicates structural division.

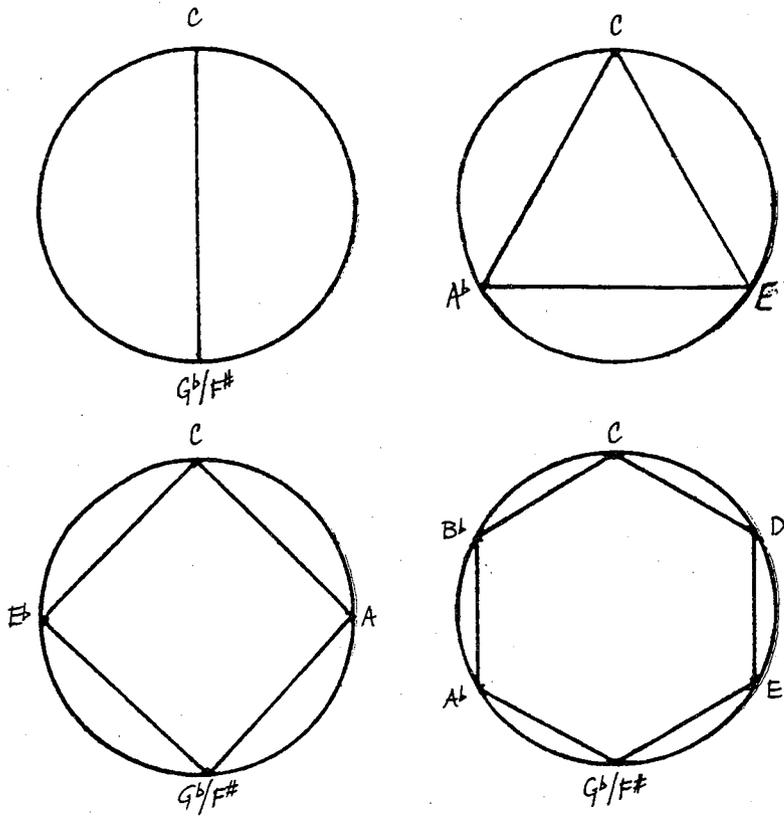
The symmetries that have most attracted the analysts are those that can be clearly seen in the score, and that involve strict mirroring giving rise to congruent shapes. Their presence cannot be denied – such devices are comparatively rare in tonal music and testify both to supreme craftsmanship and rigorous compositional integration – but the listener’s profit in terms of phenomenal symmetry is generally quite meagre.

The mirror can be placed “vertically” in the score, an operation that gives rise to a replica that is an exact retroversion of the model. But tonal relationships cannot be reversed in time and retain their musical identity, a fact that applies already to tiny fragments (a rising semitone, for instance, has a tonicizing implication that its backwards, falling counterpart lacks) and that makes for a total change of musical appearance when it comes to larger entities: a melody played backwards is simply not recognized. And if similarity is completely gone, phenomenal symmetry finds no hold.

While everyone can somehow appreciate the utter austerity of the construction of the retrograde canon from Bach’s *Ein musikalisches Opfer*, we are not able to hear that one of the voices starts as the other will close, and the other way around, that there is a midway moment of exchange of material between the voices, and that from this very moment there is exact retrograde symmetry. (Cf. ex. 1)

And it seems that inversion, the use of a “horizontal” mirror producing a replica that turns the intervals of the model upside down, fares only slightly better. Though the tones to be associated are not displaced in time, pitch inversions are hard to recognize, since the tonal implications of the sequence in question become radically changed. Nevertheless inversion relationships may sometimes be noticed, and they may contribute to a sense of symmetry if model and replica are closely juxtaposed, and if supporting cues (such as rhythmic similarity) are present.

There is another canon from *Ein musikalisches Opfer* to illustrate the point that inversion symmetry is a hard nut to crack for the listener even if these conditions are fulfilled. The entries of the flute and



Ex. 1

The musical score for Ex. 1 is presented in five systems, each with two staves.
 - System 1: Measures 1-4. Arrows above the staves point from the first measure to the second and from the third to the fourth.
 - System 2: Measures 5-8. Measure 5 is marked with a '5'.
 - System 3: Measures 9-12. Measure 10 is marked with a '10'. A dashed arrow points from measure 10 back to measure 9, and a solid arrow points from measure 11 to measure 12.
 - System 4: Measures 13-16.
 - System 5: Measures 17-20. Measure 15 is marked with a '15'. Arrows above the staves point from measure 17 to 18 and from measure 19 to 20. A circled '5' is written above measure 20, and an arrow below points from measure 20 back to measure 19.

the violin are immediately juxtaposed and yet clearly separated, and the rhythm is retained, but the mirroring implication of the shift in m. 3 is all but clear. (Cf. ex. 2)

Ex.2

The score for Ex. 2 consists of three staves: Flauto traverso (top), Violino (middle), and Cembalo (Continuo) (bottom). The Flauto traverso part features a melodic line with various ornaments and a final flourish. The Violino part provides a rhythmic accompaniment with a steady eighth-note pattern. The Cembalo part has a more complex rhythmic pattern, often mirroring the violin's rhythm but with different articulation. The music is in a minor key and features a mix of eighth and sixteenth notes.

But inversions raise another topic of interest. Musical symmetries usually involve two (or several) configurations in temporal succession that for some reason are associated with each other so as to give rise to an impression of symmetry – but inversions also work, indeed they work most patently, when played off simultaneously against each other. To expose two inversed lines at the same time implies opposition, and the joint contrary motion exhibiting expansion or contraction seems to suggest a quasi-spatial aspect of the musical process, comparable to the spatiality of events (or objects) in visual space. And the concurrent presentation makes the listener less aware of the actual and often quite substantial tonal difference between the two configurations; indeed, exact mirroring may in fact be dispensed with without upsetting the sense of symmetry.

Though the right and left hand parts are far from identic there is for instance an irresistible quality of symmetric motion, of expansion followed by rapid contraction of tonal space, inherent in this climactic passage from Beethoven's C-minor Sonata Op. 111. This passage continues with an obvious symmetry in terms of dialogue. (Cf ex. 3)

Ex.3

The score for Ex. 3 is a piano piece with two staves. It features a climactic passage with dynamic markings of *p cresc.*, *sf*, *p cresc.*, and *dim.*. The right hand part has a melodic line with a wide intervallic leap, while the left hand part provides a rhythmic accompaniment. The music is in a minor key and features a mix of eighth and sixteenth notes. The passage ends with a section marked *Espressivo* and *p dim.*.

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Turning to symmetry effects of configurations that reappear in identic, similar or contrasting form, it is first necessary to shortly discuss and dispose of musical symmetry as simply a matter of recursive addition of equal parts. As in the visual arts a series of repeated motifs does not actually evoke a sense of symmetry, but only (or rather) a sense of regularity – given that there is sufficient demarcation between the units to make them stand out. But in addition, since the constituents cannot be surveyed when listening to a passage of music, a string of musical repetitions will give rise to a strong expectation that something new is bound to happen. The working principle of minimal music is to suspend gratification of this urge for change, and to supply almost subliminal differences when change eventually occurs; in Chopin's more-than-a minute Waltz op. 64 no. 1, on the other hand, the function of the reiterated motif is to build up a tension that must be released by a new initiative. (Cf. ex. 4)

Ex.4

Molto vivace Opus 64 Nr. 1 · Brown-Index 164

leggero

These observations apply also to sequences, i.e., to passages in which the repeated motifs are distributed along a scale or some other identifiable pitch scheme. Sequences usually imply that a sense of direction has been introduced, an impression that even more reduces the "symmetry" of the design and often enables the listener to anticipate when and how the uniform process will be terminated.

Symmetry, then, seems rather to be associated with duplication, but again a difference to the visual domain turns up. Whereas it seems that in visual art the most patent (though generally not the most interesting) symmetries involve strict duplication, exact replicas in music do not necessarily give rise to the most obvious symmetries, and this is an observation that holds for repeats of larger sections as well as for duplication of tiny motifs. The reason for this appears to be that identic replicas lack cues that make the two units form a pair. Or to put the principles of musical matching more explicit: the first unit should exhibit a certain incompleteness requiring a further unit, and the second unit should have qualities that meet the demands of the first unit and that preclude the possibility that a third unit will occur. Symmetry, in art as well as in music, is a reflexive property, but in music it necessarily involves time.

The second unit in a pair evoking a sense of symmetry should thus deviate from the model, but any deviation will not do, and various types of deviation work differently. Variation, for instance, might also suggest growing long-term continuity, and the listener has to await the following, third unit before he knows whether the previous two units did make up a pair or not; the symmetry, if any, will have a retrospective quality. On the other hand, duplets that stand for a sense of antithesis almost demand to form a pair, and though clear-cut contrasts may make for symmetry, it seems that the most effective antitheses are those that retain obvious similarity (or identity) in all but one respect, which brings the difference. Replicas introducing softer dynamics (rather than the other way around), another pitch register, or a different timbre have a very strong tendency to form second unit in pairs that exhibit symmetry.

The variation theme of Mozart's A-major Sonata K. 331 is frequently analyzed in all its exquisite details, and it may also serve to illustrate the subtle ways in which duplication gives rise to symmetry. The motif of the first bar is immediately reiterated one step lower along the scale producing a second, slightly less intense replica. This pair (or actually pair-to-be) is not closed, however, and the next entry a further step down might have supplied a new unit in the descending sequence, but the motif is now shortened to just two notes, and doubling the mo-

tivic pace a new pair brings the melody back to its point of departure. An ordered motion, neatly symmetric in terms of pitch, broken in terms of temporal proportions, binds the music together. After the inconclusive cadence in m. 4, the melody starts again – this time the return to the initial register is even more condensed – and arrives at a more definite ending that makes for a patent pair at the 4 + 4 bar level. (Cf ex. 5)

Ex. 5

KV 331 (300i)

Andante grazioso

The musical score for Ex. 5 is in G major and 3/8 time. It consists of two systems of music. The first system shows the first four measures, with dynamics *p* and *f*. The second system shows measures 5-8, with dynamics *mf* and *p*. The piece ends with a double bar line and a repeat sign.

Triptychs in art, and main buildings with wings in architecture, represent three-part symmetries, in which a central, important and large/massive piece is flanked by two less significant, smaller, and similar outer pieces. This type of symmetry is encountered in many musical movements as well, and it is constitutive for all ABA forms. But as the minuet (scherzo) shows, the middle section is as a rule shorter, more relaxed, and less dense in texture, and turning to ABA forms in general, the second of the outer sections is often abridged, expanded, or varied – differences that do not appreciably affect the musical symmetry but would make for odd or vitiating deviations in architecture.³

Shorter musical sections, however, tend to lack middle portions, and we are either left with two-part formations, with symmetries without a centre, or tempted to adopt the idea that AAB configurations, quite frequent in “periodic” music, make up a kind of three-part symmetry despite the fact that the “central” portion is heard after the less

³ On the other hand, listeners (at least if they care for musical structure) may be annoyed when repeats are arbitrarily left out in performances of variation works, destroying the regularity of the design.

weighty ones – a symmetry arrangement that would not work in a picture if applied in the horizontal left-right dimension, but that might seem balanced if oriented vertically.⁴ As far as the duration of the two A parts taken together equals (or is less than) the length of the B part, symmetry may be present in the proportional sense, but if the symmetry is to be enacted in the musical process, the A parts should not emerge as just a pair but rather make up a compound unit that leads up to a point where a climactic, concluding formulation must ensue.

The English horn melody from the second movement of Franck's D-minor Symphony seems to be a case in point. The fact that the second unit features the motif stretched upwards indicates that a further, intensifying development is about to come. But the third unit starts with the original shape, making the preceding units form a pair, and is then expanded to form a unified balancing shape of double size; the overall result is symmetry in terms of proportions, and a kind of hierarchic symmetry between a paired preparatory statement and a quite emphasized concluding part. (Cf. ex. 6)

Ex. 6

Cor.igl. *cantabile*

a^1 a^2 (a^1) ... b / a^1

*

Symmetry in terms of time proportions has already been incidentally mentioned, and it cannot be denied that a series of portions of the same length may give rise to an impression of balance, order and regu-

⁴ There is no meaningful, true correspondence in music to the important difference in art and visual perception between the left/right and up/down spatial dimensions. Whereas we do speak of a "vertical" aspect of music and also of a "horizontal" one (at least when referring to scores), the notion of high and low pitches actually derives from our metaphorical musical terminology, while the left-to-right inscription of musical events in the score is a graphic convention that conveys nothing of the nature of time.

larity; much tonal music in fact exhibits proportional symmetry of this kind. But it is also a fact that the sense of symmetry is very much strengthened if the units are clearly demarcated from each other, and if the musical substance suggests relationships that make for a layered phenomenal structure, i.e., if the units are not just added together to produce a series with little interior organization, but arrayed to form a coherent, hierarchic whole. And this sort of structurally supported, qualified proportional symmetry is a very common feature; derived from poetic forms and choreographic patterns or not, "periodicity" in music means that the abstract and evasive tonal flow becomes more surveyable for the ear and more readily accessible for the analytic mind.

Standard, paradigmatic, periodicity means that units on the same level are paired, and that the proportions between units on adjacent levels are always regulated by the factor 2. This scheme is quite frequent (a fact that does not imply that all such periods on closer listening exhibit the same symmetry properties) but other periodic configurations are possible, configurations involving none, little or substantial loss of symmetry as the case may be. Levels in the hierarchy may thus be skipped, and units be lengthened or shortened in symmetric or unsymmetric ways, and the factor 3 may dominate a certain level (or a part of it) or indeed take over and imprint the structure throughout.

The second theme episode from the first movement in Mozart's C-minor Serenade K. 388, counting twenty-four bars in all, is in fact a twelve-bar period in which both halves are repeated – if one listens to the two middle portions the 6 + 6 bar symmetry is evident. But the first half-period has a 2 x 3 bar interior organization, whereas the second features 3 x 2 bars. Due to the exchange of motif, and since the melody returns to its point of departure, the first half-period suggests a symmetry axis between the third and fourth bar; in the second half-period the third and fourth bars are sequentially appended to the first and second bars in a tonic-to-dominant way that makes for a symmetric pair. (Cf. ex. 7)

In addition to structural cues suggesting symmetry by indicating demarcation of units and hierarchic coherence, periods are characterized by tonal properties that contribute to and differentiate the sense of symmetry. Practically all periods come to a final rest on the tonic, but

after the middle cæsura, usually ending the antecedent phrase inconclusively in the dominant, the second, consequent phrase of the period might either start again from the tonic or proceed from the dominant (or some other suitable non-tonic harmony).

Ex. 7

When the second half-period begins in the tonic, there is often similarity enough between the constituents to guarantee the pairing, but the symmetry actually obtains between two parts of which the antecedent has an unmistakable opening character and the consequent is closed, harmonically circular, self-contained – a difference that paradoxically seems to give additional confirmation of the symmetry. In the visual arts, on the other hand, where parts are seen simultaneously, an open or incomplete plus a closed, complete form will hardly make up a configuration evoking a sense of symmetry.

In the woodwind theme from the first movement of Beethoven's Violin Concerto – a most symmetric structure, stable and yet lofty – the third and fourth bars come up with free inversion, exact rhythmic mimicking, and a patent tonic-to-dominant shift, features that strongly suggest symmetry. The cadence in the dominant in m. 4 is fol-

lowed by an exact citation of the first two bars and by a closing formula to the tonic, making the overall symmetry quite patent. (Cf. ex. 8)

Ex. 8

When on the other hand the second half-period starts from foreign tonal territory, the period features symmetry between an opening motion away from the tonic and a closing motion back to it – this is perhaps as near to an understandable retrograde symmetry relationship as tonal music can come. On the other hand, there is in many cases only a modest degree of similarity connecting the phrases on each side of the demarcation.

In the initial period of Mozart's D-major Sonata K. 576, the tonic is not used to begin the second half period, and nor is the dominant, but the fanfare motif is sounded again, announcing the start of a parallel portion of the melody that eventually brings the music back to the tonic. (Cf. ex. 9)

Ex. 9

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So far the discussion has indicated a number of structural cues that seem to be operative when it comes to promote impressions of symmetry. Among the signs of symmetry are: clear demarcations between units, regularity of proportions, some sense of antithesis between parts rather than merely identity, connecting relationships between and hierarchic configuration of units rather than merely unrelated fragments, however regular. But it is important to realize that just as great formulations of tonal music must not necessarily exhibit symmetry, symmetry must not as a rule emerge as the only, uncontested phenomenal organization. Great art shuns the unequivocal, and therefore symmetry cues are often used so as to counteract each other, so as to produce designs in which an otherwise too obvious symmetry is undermined, or in which symmetry makes itself heard though the structure at a cursory glance does not invite to such a reading. And when analyzing passages of this kind, we are bound to transcend the merely formal and touch upon realm of musical content.

A few final examples will show how composers of ingenuity refine and diversify symmetry, how they conceal it, and how they let it emerge.

The last Sarcasm of Prokofiev's op. 17, displaying in turn a sudden outbreak of fierce rage, a contrasting episode of utmost desolation, and a closing section of strange grunts, is no doubt at first heard by most listeners as a piece in rhapsodic, almost bizarre ABC form. And yet the last section is a kind of exact replica of the first – it is just slowed down and transferred to the lowest register. The recurrence is masked, and appears as a total contrast both to the preceding section and to its model, but as soon as the relationship is noticed, as soon as the difference is identified as a transformation, the demonstratively broken symmetry of the ABA form adds immensely to the interest of the piece, and gives substance to the sense of grim joke that is promised by the title. (Cf. ex. 10)

Ex.10

Precipitosissimo

ff

senza Ped. al fine

pp

mp

8

The melodic phrase that begins (and ends) Schumann's piano piece *Warum?* from op. 12 seems like a question, and the alto voice then mimicks this gesture in a more affirmative vein, a continuation that both evokes a sense of symmetry and suggests a dialogue, a dialogue which is then pursued with a further, eagerly curtailing statement. And yet this first rising inflection is not far from sounding as an assertion – the harmonization inherent in the melody is disappointingly symmetric and quite prosaic: tonic *f* dominant *f* tonic. However, *der Dichter spricht*, and the dominant-of-the-dominant chord that actually supports the start of the melody means that the tonic is approached from a foreign harmonic territory, a stroke of genius that combines the opening melodic gesture with an impression of harmonic arrival, and that almost suppresses the fact that the piece has a beginning. (Cf. ex. 11)

Ex. 11

Langsam und zart

Warum?

Pedal

(D) D T

The coda in the second movement of Mozart's Piano Concerto K. 482, finally, offers an example demonstrating how

major/minor shifts and discontinuity of instrumentation can create a strong sense of symmetric contrast where no symmetry would otherwise have been heard. The melody in question is actually in itself a boldly incomplete remnant of a symmetry: a separate four-bar consequent phrase, played twice and consisting of just a short falling motif, appearing three times in descending sequence, to which is added a closing formula. The piano, introducing a shimmering C-major seventh chord instead of the C-minor tonic expected to conclude the preceding period, gently plays the first two motifs; then the flute, clarinet, and bassoon abruptly break in, replacing the tender high register statement of the soloist with multiple octaves and restoring the tragic sonority of the minor key. The piano is robbed of the melody and plays only the accompaniment – and it seems, as it were, to know that this is to happen, since it is actually the piano that brings the F-minor turning point. Has shadow ever been introduced in a more heart-rending way, has the inevitability of fate ever sounded more definite – and more consoling – than in this truly non-Salieri passage? (Cf. ex. 12)

Ex. 12

The musical score for Ex. 12 consists of four staves. From top to bottom, they are labeled: Fl. (Flute), Cl. I. (Clarinet I), Fag. I. (Bassoon I), and Klav. (Piano). The piano part is written in a grand staff (treble and bass clefs) and features a complex, rhythmic accompaniment with many sixteenth and thirty-second notes. The woodwind parts (Flute, Clarinet, and Bassoon) enter with a melodic line that is more prominent than the piano's melody. The score includes various musical notations such as slurs, ties, and dynamic markings.