IV

Principles of Pattern Perception: Completion and Closure

General Considerations

To assert that incompleteness gives rise to expectations of completeness is tantamount to tautology. For things seem to be incomplete only because we entertain definite feelings, latent expectations, as to what constitutes completeness in a given stimulus situation.

Our opinion or feeling as to the completeness of a given stimulus is a product of the natural modes of mental organization. These function both within the framework of what is given in the style and within the sound terms established in the particular work. In other words, the mind, governed by the law of Prägnanz, is continually striving for completeness, stability, and rest. But what represents completeness will vary from style to style and from piece to piece.

For instance, to the listener practiced only in the music of the eighteenth and nineteenth centuries, the cadential formula which closes and completes many pieces written during the Renaissance will seem to be a semicadence. It will be felt to be incomplete, to lack finality. However, to a listener who understands the Renaissance style, the same cadence will seem to be a final, satisfactory conclusion. Similarly the practiced listener will not feel a sense of real completeness and conclusion after only the minuet part of a minuet movement of a classical symphony has been heard, though the same series of sound terms will appear as final when they are repeated later. He expects the trio and minuetto repetition to follow, partly,

because of a desire for repetition and, partly, and this is important, because he knows, though perhaps only unconsciously, what constitutes completeness for this kind of movement in this particular style.

Our sense of completeness or incompleteness is also a product of those patterns or sound terms which become established as more or less fixed, given parts of a particular work. That is, once a sound term has been established as a coherent, though not necessarily as a complete or closed unit, then part of the series taken by itself will, generally speaking, seem to be incomplete, particularly if the fragment occurs in the earlier parts of the total work. Thus repetitions of the beginning of a well-shaped theme already heard several times will arouse expectations that the theme will be completed as it has been in the past.

Even this seemingly plausible statement is subject to important qualifications. Particularly in the later stages of a work, part of a sound term or an abstraction of its essential motion or its motives may come to stand for and represent the whole sound term. In such a case, the repetition of a fragment of a larger part may not be felt to constitute incompleteness but, on the contrary, be taken as a sign of closure, making the whole work seem complete and stable.

This observation illustrates the difficulties involved in setting up any accurate distinctions between the various laws of perception. For our feeling of expectation where a normal stylistic process is broken off or where an established theme is only partially presented is as much a result of the desire for good continuation as it is a result of our desire for completion and closure. Indeed, it would appear reasonable to consider the law of completion as a corollary of the law of continuation, since all incompleteness is, in some sense, a lack of good continuation and since that which is complete must have been well continued.

Completeness and closure are possible only because the motions presented in music are processes involving relationships between antecedents and consequents. Completion is possible only where there is shape and pattern. Repetition in itself does not make for completeness and closure, nor does change in itself. For completion is not simply cessation—silence. It involves conclusion—almost in

the syllogistic sense that the conclusion or completion is implicit in the premises, in the earlier phases of the musical motion. It is for this reason that, granted a sensitivity to the style in question, it is not difficult to know when a sound term is incomplete, partially complete, or finally closed.

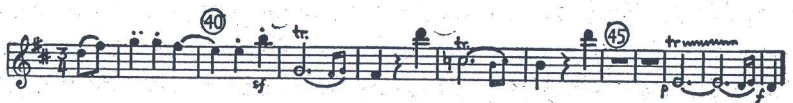
Furthermore, completeness and closure exhibit the same architectonic order as the music itself. That is, what is felt to be a completed process on one level may appear to be incomplete on a higher architectonic level. This is important because the mind of the listener is able to take certain patterns as units, to close them out, so to speak, and take them as given.

This analysis makes it clear that neither continuity nor completeness create shape or pattern. Rather they are products of shape and pattern. The problem of what makes a shape or pattern is an extremely intricate and difficult subject, which can be investigated only superficially in this study (see chap. v).

Two types of incompleteness can be distinguished: (1) those which arise in the course of the pattern because something was left out or skipped over; and (2) those in which the figure, though complete so far as it goes, simply is not felt to have reached a satisfactory conclusion, is not finished. The first type of incompleteness may be said to be a product of a "structural gap," the second type, a product of a delay in the need and desire for "closure."

STRUCTURAL GAPS

A structural gap occurs where something is felt to be left out. The hiatus created by such a gap need not disturb the process of continuity. In fact, it might be better to consider such a break as a disturbance in continuity rather than as a structural gap. For instance, the hiatus created by the rests in measures 45 and 46 of the Minuetto from Haydn's Symphony No. 104 in D Major (Example 41) can be considered as a structural gap only in a Pickwickian sense. For the term "gap" implies the possibility of subsequent completion.



EXAMPLE 41

And though a temporal process can be broken off and then continued again, the subsequent continuation does not in any real sense fill the gap thus created. Such a break in process may arouse the keenest expectation, as indeed it does in this instance; but expectation is satisfied after the rests, not because something which was missing is introduced, but because that which was interrupted is begun again.

It should be noted that though this is not properly speaking an instance of a structural gap, it is an example of lack of closure. For the break in process is effective because, when it occurs, the figure is patently incomplete, not closed. Had the hiatus occurred two measures later, after the progression to D major, it would have been a weak, insipid anticlimax.

The tendency for structural gaps to be completed is most clearly seen in the case of melodic structure. It is to this aspect of the musical organization that we shall devote most of the ensuing discussion.

In the music of a culture the tonal materials given in the style system establish a norm of melodic completeness. That is, in any tonal system there is a normal repertory of tones which mark off the distance between tones of equivalence or duplication, usually the octave. The total complement of such tones constitutes completeness for the system. When the practiced or cultivated listener becomes aware that one of these steps has been passed over (left out) he expects, albeit unconsciously, that the missing tone will be forthcoming later in the series. He expects, in short, that the structural gaps created by such a skip will eventually be filled in.

This tendency for structural gaps to be completed and filled in is evident in the music of many different countries. "But a large number of these 'crooked' forms of Hindu *Rags* consisted in creating gaps in ascent to be filled up in descent, or vice versa. This not only avoids anticlimax, but includes climax. To pass over a note immediately creates a desire for it, and it then becomes a fit note to bear the climax." [1] Studying the intervallic motions of extremely diverse types of music, Watt found that the larger the interval (the larger the skip), the more likely that it will be followed by contrary motion (motion which will fill in the tones passed over). He also notes that

the studies of Turkish music made by Hornbostel and Abraham and the study of Swedish folk tunes made by Fox Strangways reveal similar tendencies.[2] In their article on "Muhammedan Music" in *Grove's Dictionary,* Lachmann and Strangways note that "after a third, return is usually made to one of the notes which have been leapt over."[3] In our own culture the rule of counterpoint which states that after a skip the melody should move by stepwise motion in the opposite direction is simply an application of the law of completion to a particular practice.[4]

Of course, different cultures as a rule have different style systems, different ways of organizing musical space. In one system the normal repertory of tones may be five, in another seven, and in still another only three; and the distances between the tones comprised in the system may be equal or unequal. For this reason, an intervallic distance which would constitute a skip or gap in one system might not be one in another system. In a style system in which the musical space between identical tones, the octave, is divided into seven steps, a skip of a third will probably be perceived as a structural gap. But in a tonal system in which the octave is divided into only five steps and in which one of the normal distances is a third, such an interval will probably not be considered as being a structural gap.

The preceding statements were intentionally conditional. The cultural criterion of completeness is by no means absolute. We are able to evaluate completeness aside from purely cultural facts. For if, as is the case in most tonal systems, the distances between tones are not equal, the mind will assume the smaller distance as a standard and accordingly judge the larger distances as having gaps which require completion. In short, a series which is differentiated into larger and smaller distances will, so to speak, have structural gaps built into it.

According to the present analysis, there would be a tendency for such a series of unequally spaced steps to become filled in. This is, in fact, what has happened to most unequally spaced scales. There is a strong tendency for tonal systems to become more complete. Most scales (the abstracted linearization of tonal materials) have developed in the direction of closure, toward the elimination of gaps in their structure.

The Chinese, for instance, have introduced *pièn* tones into their

essentially pentatonic tonal system, thus filling in the open thirds of the pentatonic scale. Other folk cultures and primitive cultures have done likewise.

> It has no doubt been noted . . . that the Quechua musician often fills up one of the minor triads of his pentatonic scale with an extra tone which he uses in an ornamental capacity—usually as a passing tone between two more important melodic notes. . . . Often a kena-player will take a well known pure pentatonic melody and ornament it *ad libitum* with these extra tones.[5]

In his book, *A Theory of Evolving Tonality,*[6] Joseph Yasser traces the growth and development of tonal systems, attempting to show that this development follows certain characteristic mathematical patterns, but he does not attempt to account for this process. The present analysis would seem to present an explanation for the gradual increase in the tonal materials comprising the octave. For the new tones, introduced at first for the sake of both completion and, as we shall see later, expression, eventually become fixed parts of the tonal repertory—norms of the tonal system. If this new repertory of tones also exhibits inequalities of distance, then new "filler tones" will be required, since the system will still be felt to have structural gaps.

But there is another possible course which the development of a tonal system may follow, and this raises questions as to the necessity for the mathematical evolution prescribed by Yasser. This is the possibility of equal temperament. The Javanese, for instance, eliminate structural gaps from their music, not by adding new filler tones, but by making all tones equally distant.

> It is surely worthy of note once again to see this tendency to equidistance at work in Malay music; the same tendency which once before, i.e. in Further India, had already turned the same basic scale into an equidistant sequence of tones. In the latter case, however, this was not done by inserting two new tones, but by dividing up the octave into seven equal intervals of approximately 171C, each.
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> A third instance of this tendency to equidistance may be observed . . . in a number of slendro scales.[7]

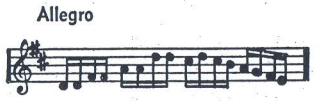
A seven-tone tempered scale can, according to Tracey, also be found in Portuguese East Africa.[8] This inclination toward temperament also appears to have been felt in the Near East.[9]

Thus the tendency toward equal temperament and the propensity to add new tones to a scale with unequal distances both seem, from this point of view, to be products of a more general psychological need for structural completeness—for the elimination of structural gaps not only in the melodic line of the individual piece but also in the tonal system itself. This, to borrow a term from Kunst, is the "tendency toward equidistance."

If a general tendency toward equidistance does in fact exist, and there seem to be reasonable grounds for believing that it does, and if the continued development of tonal systems, the gradual accretion of new tones which fill structural gaps, is a manifestation of this tendency, then Yasser's supposition of a kind of inevitable growth (up to the limits of the physio-psychological ability of the human ear and mind) would be open to question. For the process of accretion would logically cease once the need for completion was fulfilled in equal temperament. An important proviso must, however, be made: Should all the tempered tones of a system become structural points (norms), then new tones, tendency tones, would have to be introduced into the system so that meaningful relationships would exist within the tonal system.

A structural gap, then, creates a tendency toward "filling in." And if this tendency is delayed, if the completion of the pattern is blocked, affect or the objectification of meaning will probably follow.

If, for instance, we compare the opening theme of Bach's Brandenburg Concerto No. 5 with a part of the aria "Che faro senza Euridice!" from Gluck's *Orfeo ed Euridice* we find that the opening notes



EXAMPLE 42

EXAMPLE 43

of both themes create the same structural gaps. In the Bach theme, however, the filling in of these structural gaps begins immediately;

and, partly for this reason, this theme, though definite and forceful in both mood and character, is not itself affective. The affective experience of this movement is rather a product of the progression of the larger parts. But the fragment from *Orfeo* is, Hanslick's derision notwithstanding, notably affective.[10] The poignancy of this passage is due in part to the tensions which arise, the tendencies which are inhibited, because there is a delay in the filling in of the structural gaps created by the opening motive. And it is only after all the skipped tones have been presented that these tensions subside and the melody concludes.

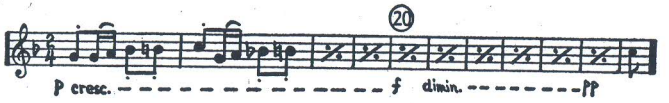
Notice that disturbances in process continuation also play an important part in creating the affective quality of this passage. For the repetition of the C after the triadic motive creates a break in both melodic and rhythmic processes. That is, we expect the triadic motion of the opening motive to continue. The powerful effect of the high E is partly a result of the fact that it was unconsciously expected at the beginning of the first complete measure. The eighth-note motion is also expected to continue, and for this reason the quarter note C becomes a particularly effective appoggiatura.

SATURATION

The principle of saturation is related, on the one hand, to the laws of good continuation and completion and, on the other, to the beliefs which the listener entertains as to the nature of aesthetic experience. Since the meaning of any sound term is a function of its relationships to other consequent terms which it indicates, our normal expectation is of progressive change and growth. A figure which is repeated over and over again arouses a strong expectation of change both because continuation is inhibited and because the figure is not allowed to reach completion. Our expectation of change and our concomitant willingness to go along with the composer in this apparently meaningless repetition are also products of our beliefs in the purposefulness of art and the serious intentions, the integrity, of the composer. We believe that he will bring about a change.

A particularly clear example of the arousal of expectation through saturation is to be found in the first movement (measures 16–26) of Beethoven's Symphony No. 6, where the same motive is repeated

ten times with only minimal dynamic and orchestral changes (see Example 44; also see the development section of this Symphony and that of Beethoven's Symphony No. 8). The use of saturation is common particularly in the slow introductions and development sections of eighteenth- and nineteenth-century works where there is expectation of a return to a theme already heard. For at such places the fragment need only be repeated one or two times in order to achieve the desired effect.



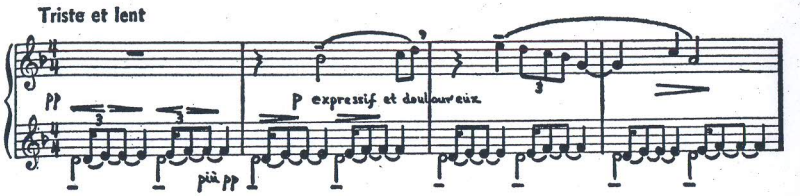
EXAMPLE 44

Koffka observes that there is an intimate relationship between saturation and emotion: "Saturation is emotional behavior. Its analysis revealed an interplay of forces leading to increasing tension within the Ego system. . . ." [11] Although it was found that, generally speaking, these tensions could be relieved by varying the tasks being performed, it would seem that in the case of musical perception tensions may arise even though variation is present. That is, even with variation in harmony or range or dynamics a very marked figure may, in the proper context, give rise to saturation if it is repeated with great enough insistence.

It is necessary once again to emphasize the importance of context upon these processes. A repeated pattern at the end of a work need not give rise to saturation, since at this point the listener understands, or thinks he understands, the significance of the repetition: that is, because this is the end of the piece, lack of forward motion, a composed fermata, is expected and desirable. Thus the law of saturation is conditional: In a situation where repetition is not normal and understandable, the longer a pattern or process persists, the stronger the expectation of change.[12]

In the last analysis everything depends upon our ability to comprehend the significance of the repetition. If it is understandable, then there will be no saturation. For instance, a repeated pattern or figure may, because of its position in the work and its relationship to other patterns, be understood as an ostinato. If it is to be heard

in this manner, the composer must so articulate the texture that the listener grasps the significance of the figure as an ostinato, He must as a rule make evident the fact that the repeated pattern is a ground, e.g., it must be more homogeneous than the other patterns and will, as a general rule, surround the other figures temporally, begin before they do. An ostinato must also have a less palpable, well-figured shape than the other figures of the work so that it is clear that it is not the chief pattern. In other words, it must not develop tendencies of its own, as did the figure in Example 44. This relative weakness of figure is what distinguishes an ostinato, such as the one employed by Debussy in his Piano Prelude "Des Pas sur la Neige," from a ground bass. For a ground bass develops tendencies of its own; it has shape, and it is a shaping and controlling



EXAMPLE 45 *

force in the articulation of the musical progress and growth. That is, the ground bass changes its meaning as it forms new and changing relationships with the other parts of the texture. It is not simply a given static entity.

It should, however, be observed that an ostinato-like pattern may at times seem ambiguous, though it need never do so. The listener understands that the function of the pattern is to establish a continuous and repeated ground against which other more clearly articulated figures are to be projected. If no other more substantial figures are forthcoming, then the listener may begin to entertain doubts as to whether the motive in question really is an ostinato. Then as the repeated figure becomes the center of attention, the listener will begin to expect changes to take place. And if the figure remains stable or is subjected to only minor variations, saturation

may set in. This would seem to be what takes place in the opening section, "Prélude à la nuit," of Ravel's *Rapsodie Espagnole*, where the ostinato figure is dominant even during the brief appearances of the theme.

MELODIC COMPLETENESS AND CLOSURE

One of the most powerful and persuasive forces conditioning and controlling the sense of completeness which a melodic pattern gives is the tonal organization or scale of the culture. It "establishes a system of order, a system of expectancies, a system of tonality. . . ."[13] Since the importance and functioning of tonality has been discussed in chapter ii and will be the subject of further discussion in chapter vi, its overwhelming significance need only be recalled at this point: Tonality is probably the most important single facet of style, the *sine qua non* of even the most primitive musical organization.

It is important also to recall that the norms of style, of tonality, important as they are, can be altered through training and knowledge. For the individual musical work also establishes norms which condition our feelings and opinions as to completeness and closure, and these norms of the individual work may be unusual within the style. A composer may, for instance, by dint of repetition within a work, establish as final, as representing closure, a melodic pattern which might not normally seem finished or final. The listener's sense of closure and finality can, as Farnsworth has shown, be altered through training.[14] W. V. Bingham[15] has shown that opinions as to the finality of a series of tones can be influenced by information stipulating the number of tones to be heard in the series. If, for instance, listeners were told that the fifth tone of the series was to be the last, it appeared to possess a finality which it did not as a rule have otherwise. This furnishes experimental evidence, if any was needed, for the statement that what we know, either because we have been told or have learned through practice and experience, influences our judgment of what we perceive and hence our feeling of completeness and our expectation based upon that feeling.

Our sense of completeness is directly related to our ability to understand the meaning of a particular pattern. A stimulus series

which develops no process, awakens no tendencies, will, if it becomes the focus of attention, always appear to be incomplete. A sustained tone, for instance, will give rise to expectations of change, unless, of course, it is not the main object of attention or can be understood more easily in another way, e.g., as a pedal point.

Moreover, the direction in which the tone may be expected to move is also related to our sense of completeness. "The direction of expectation, whether to a tone below the first tone of a melody or above it, depends largely on the absolute pitch of the latter. In general, the lower this is the less will the melody be expected to descend on the next following tone; while correspondingly the higher it is the less will the melody be expected to rise on the next tone."[16] Actually the situation is somewhat more complicated than this. For our expectations depend upon our awareness of potential range as well. That is, a tone which would be "high" for one voice or instrument, and would consequently be expected to descend, might be low for another voice or instrument and would consequently be expected to rise.

Although not directly related to the Gestalt principles of pattern perception, our sense of closure is in part a product of the general configuration of relaxation and quiescence. Melodically speaking, relaxation is associated with the decline in tension which is effected when pitches are lower—when a progression descends at its close.[17]

Curiously enough, however, the lowering of the dynamic level, which is also a normal concomitant of relaxation, does not necessarily accompany closure. The reason for this would appear to lie in the fact that the dynamic level is intimately associated with those aspects of the musical materials which tend to designate the character of the piece. More particularly, the dynamic level would seem to be linked to tempo and general range. These elements are themselves interassociated so that fast tempi, loud dynamics, and high ranges (but not necessarily ascending melodic lines) are usual together, while slow tempi, soft dynamics, and low ranges are also usual together. Of course, there are pieces that get softer at the end as well as ones that become slower; and both of these changes play a part in making closure more emphatic. But, on the whole, the slowing down which brings a piece of music to its close is not a