

XVII. Harmony

Tenney's first installment in his investigation of the theory of harmony is a lengthy, primarily historical paper entitled A History of 'Consonance' and 'Dissonance'. The main thrust of this work is to provide an historical and developmental background for the formal notions of harmony that he is interested in, and as such attempts to show the development of the semantic and theoretical consonance/dissonance concept (CDC).

"It seems obvious that our first problem is indeed a semantic one, and that - among many other difficulties which ensue from this - until this semantic problem has been solved any speculative theory that might be developed in an effort to explain the nature of consonance and dissonance in musical perception is doomed to failure from the very start, since there is no common understanding about what it is that such a theory ought to "explain". What is perhaps not so obvious is that the semantic problems associated with consonance and dissonance are rooted in the complex historical development of what I will call the "consonance/dissonance concept" (or CDC) in western musical culture, and that a careful analysis of that historical development is the only hope we have of unravelling the tangled network of meanings and interpretations which so confuse the issue today."

(p.4 A History of 'Consonance' and 'Dissonance')

The paper is primarily composed of citations from historical theorists, outlining what Tenney calls the five stages of CDC. He is not so much interested in the compositional practices of consonance, but rather the theoretical and compositional "conceptions" of consonance/dissonance. As he says:

"First, it is absolutely essential that we distinguish between conceptions of consonance and dissonance, on the one hand, and on the other, explanatory theories of, esthetic attitudes toward, and practical uses of consonance and dissonance. In spite of the obvious and intimate interrelations between the various aspects of the larger problem of consonance and dissonance, they have each followed a relatively independent course of historical development. Thus, for example, the debate which raged in the early 17th century between Artusi and the brothers Monteverdi involved disagreements regarding the

proper use of dissonance - and thus also esthetic attitudes toward consonance and dissonance - but no essential disagreement regarding the meaning of these terms - and thus of the conception of consonance and dissonance. This paper is not intended to be a history of consonance/dissonance "treatment" as such, or a history of theories of consonance and dissonance, but rather a history of the underlying conceptions of consonance and dissonance, and these other aspects of the problem will be dealt with only to the extent that they may be helpful in clarifying the nature of these conceptions in a given historical period."

(p. 6)

The five historical stages can be briefly described as follows:

CDC-1. The consonances are thought of as those pitch intervals directly tunable using simple string-ratios, in particular those ratios which are found in the Pythagorean tetraktys:

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(4/3, 3/2, 2/1, 3/1, 4/1). The octaves, fifths and fourths are the only pure consonances. This is essentially (according to Tenney) a melodic consideration, "referring to a sense of affinity or relatedness between the pitches forming an interval" (p. 119). This earliest form of the CDC begins around the third century B.C.E and continues up until the Ars Antiqua at about the ninth century.

CDC-2. From about the ninth to the thirteenth century, the advent of polyphony and the resultant compositional techniques led theorists and composers to consider the "sonorous qualities of certain dyads" (p. 120). The rank ordering of the intervals was now made on the criterion of the tendency of a given dyad to merge into a single tone, but Tenney observes that at the beginning the particular intervals which were considered consonant did not change much. Later, thirds began to be included, and a major concept of this period is the introduction of a well-ordered rank to the intervallic set - the notions of perfect and imperfect consonances and dissonances, though of course different theorists had their own rankings. The important shift in thinking from the previous period occurs in the new concern with the vertical properties of pitches and intervals.

CDC-3. Tenney describes this stage as follows:

"This form of the CDC seems to have been shaped by two factors: (1) a tendency to reduce the number of distinctly labelled categories to a smaller set which would have an operational correspondance to the rules of counterpoint, and (2) the emergence of a new criterion for the evaluation of consonance and dissonance. As a result of the first of these factors, the five or six perceptually distinct categories in CDC-2 were reduced to three operationally distinct categories: "perfect consonances" (octave and fifth), "imperfect consonances" (thirds and sixths), and "dissonances" (all others, including the perfect fourth). Although in most other respects the new classification system looks simply like a reduced version of those in the 13th century, the change in status of the fourth cannot be explained in this way, and thus the second factor listed above is invoked - the emergence of a new criterion, involving another aspect of the sonorous character of simultaneous dyads."

(p. 121)

CDC-3 is the roots of functional harmony, and of the exploration of the functionality of the dissonance. The period of the CDC-3 was roughly the Renaissance.

CDC-4. In this Tenney sees the beginnings of a formulation of a theory of functional harmony, root relatedness, and the notions of resolution and harmonic motion, beginning in the early Baroque, and, in some sense, lasting until the present day. Here the notion of the triad becomes paramount, and consonance/dissonance relations revolve around that.

CDC-5. This "final" form of the CDC is based almost entirely on the "theory of beats" postulated in the nineteenth century by the great German scientist Hermann Helmholtz. "Helmholtz equates the dissonance of a simultaneous aggregate with the "roughness" of the sensation caused by beats between adjacent partials (and to a lesser extent, between combinational tones") in the combined spectrum of the tones forming the aggregate." (p. 107). Tenney tries to show that since Helmholtz's CDC involves "generally dyads or other simultaneous aggregates isolated from any musical context" (p. 109), it is essentially different from the four CDC's preceeding it and constitutes an entirely new form (CDC-5). Tenney discusses at length some of the interesting ramifications of this form of the CDC, particularly the current psycho-acoustical controversy surrounding it, since so many of today's notions of harmony and consonance/dissonance are derived, at least in part, from Helmholtz's revolutionary work. In particular, CDC-5 is the only version which accounts for, or at least tries to incorporate to some extent, other musical parameters than "pitch", like timbre and intensity, which play an equally important role in the "spectra" of a simultaneous dyad.

Tenney relates this to the historical process of integrating other acoustical parameters more significantly into the musical domain, with a concurrent loss of importance (or maybe predominance) of harmony.

"CDC-5 was not 'invented' by Helmholtz, of course. It is conceivable that it was always present, in some degree, as a component in earlier forms of the CDC (excluding CDC-1, of course), and merely obscured by other, momentarily stronger components. But it seems to have developed gradually during the first half of the 19th century, as a result of (or in parallel with) several of the stylistic and other innovations characteristic of that period. Its emergence as a dominant component may have only become possible after the appearance of new factors - new aspects of the musical experience - that were unique to this half of the 19th century. Several such factors suggest themselves immediately: the increasingly dramatic rhetoric of Beethoven, and the radical experiments of Berlioz, had created a new discipline - "orchestration" - in which the specific characteristics of each instrument acquired a new importance in the compositional process; the development of the modern "piano-forte", improvements in certain instrumental mechanisms, the invention of new instruments, and the rapid growth in the sheer size of the orchestra - all these had resulted in a considerable extension of range in several parameters (pitch register, timbre, dynamics - precisely those parameters that are of such importance in CDC-5); in addition, with the increasingly chromatic character of the harmonic language, some of the expressive and formal harmonic devices available to the 18th-century composer were undermined by assimilation or "absorption" into the ongoing texture, harmony became less and less effective as a means of formal articulation, and some of the functions of formal articulation formerly carried by harmony alone now had to be taken over by other factors, including dynamic and timbral or textural contrasts, etc."

(p. 116-117)

Tenney distinguishes early in the paper between the "entitive" and "qualitive" referents for the CDC. The qualitive refers to "the property, attribute or quality associated with a sound or aggregate of sounds" while the entitive "refers to the sound or aggregate itself which manifests that quality" (p. 6). Tenney's summary of the whole historical process is quite interesting, and is stated below, with Tenney's Figure 6 reproduced here (Example XVII.1).

Example XVII.1

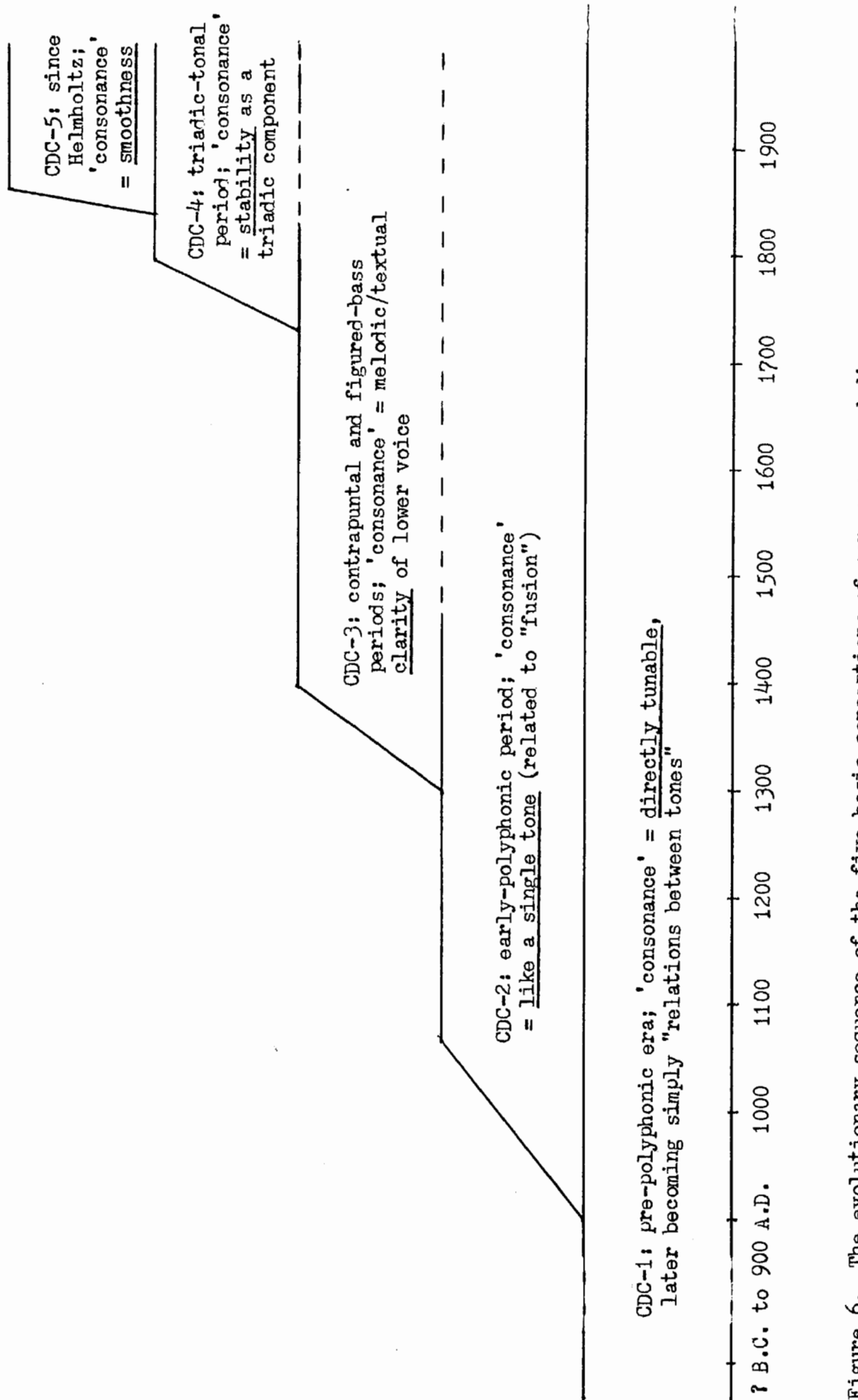


Figure 6. The evolutionary sequence of the five basic conceptions of consonance and dissonance.

"Thus, in the course of the two-and-a-half millennia since Pythagoras, the entitive referents for 'consonance' and 'dissonance' have changed from melodic intervals (in CDC-1) to simultaneous dyads (in CDC-2 and CDC-3 - eventually extended to larger aggregates as well), and then to individual tones in a chord (in CDC-4), and finally to virtually any sound (in CDC-5). The qualitative referents have changed correspondingly from relations between pitches, through aspects of the sonorous character of dyads (and then larger aggregates), to the tendencies toward motion of individual tones, and then again to still another aspect of the sonorous character of simultaneous aggregates. The implicit definition of "consonance" has gone through a sequence of transformations from directly tunable (in CDC-1), to sounding like a single tone (in CDC-2), to a condition of melodic/textual clarity in the lower voice of a contrapuntal texture (in CDC-3), to stability as a triadic component (in CDC-4), and finally to smoothness (in CDC-5) - with 'dissonance' meaning the opposite of each of these. In only one instance did the semantic transformation involved in the transition from one form of the CDC to another result in a clear replacement of one set of meanings by another, and that was with the shift from an essentially "horizontal" orientation in CDC-1 to a "vertical" one in CDC-2. In all other cases the process was cumulative, with the newly emergent set of meanings simply added to the earlier ones, and thus contributing to the current confusion. This brief summary of the general evolution of the CDC is represented schematically in Figure 6."

(pp. 124,125)

All of this, it should be said, stands by way of prelude towards a "new terminology" for consonance and dissonance:

"That a new, more precise terminology is urgently needed, however, is beyond dispute, and the distinctions that have been made here on the basis of a historical analysis might be useful in developing such a terminology. The inelegant acronyms used in this paper to designate the different conceptions of consonance and dissonance ("CDC-n") were chosen quite deliberately for their neutral and essentially uninformative character, and I never expected or intended that they should be adopted for use outside

of the present context. But the distinctions between the qualitative referents in the various forms of the CDC - and between their implicit definitions of 'consonance' and 'dissonance' - suggest one possible approach to the solution of this problem of terminology. That is, qualifying words or phrases might be used which reflect the different meanings more clearly, and I will suggest the following: for CDC-1, monophonic or melodic consonance and dissonance; for CDC-2, diaphonic consonance and dissonance; for CDC-3, polyphonic or contrapuntal consonance and dissonance; for CDC-4, triadic consonance and dissonance (this form is often called "functional", but this is not altogether accurate either, and might better be reserved for the more purely functional conception articulated by Riemann - although his might also be called tonic consonance and dissonance, if not simply "stability/instability"), and finally - for CDC-5 - timbral consonance and dissonance."

(p. 127-128)

In an earlier form of the paper, Tenney proposed a rather detailed set of what might be called "acoustical correlates" for the five forms of the CDC. These took the form of equations which would measure the relative consonance/dissonance of a dyad according to certain mathematical criteria corresponding to the theoretical criteria he outlines in the paper. This entire section of the paper was withdrawn and Tenney says that the complete treatment of this subject will await a later, more detailed treatise. If these early results, along with some of the other surprising conclusions of "John Cage and the Theory of Harmony" (a recent work which I will not examine in this current paper), are any indication of what is to come, I would venture to predict that Tenney's "theory of harmony" will have rather important resonances in the musical world.