A COMPARISON OF CERTAIN ASPECTS OF THE THEORIES OF
PAUL HINDEMITH AND FRANZ ALFONS WOLPERT

by

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ABSTRACT

Two twentieth-century music theorists, Paul Hindemith and Franz Alfons Wolpert, are unique in having independently developed their own systems of chord classification and principles of chord movement or succession. While Hindemith's ideas on these subjects are familiar among the majority of music theorists, Wolpert's theories remain relatively unknown. It was decided that since both men had attempted similar tasks at similar points in time, that a comparison of both theorists' ideas should be attempted. Therefore, both Hindemith's and Wolpert's systems of chord classification and chord connection were discussed in detail to attempt to determine the rationale behind each theorist's approach.

Firstly, both systems of chord classification were examined and compared. It was found that although there were many differences between Hindemith's and Wolpert's systems of chord grouping, both succeeded, each in his own way, in arranging all possible combinations of pitches within the twelve-note division of the octave.

Similarly, each theorist's ideas concerning chord movement were investigated. While it was reaffirmed that Hindemith's system rested on concepts which he invented and
developed such as "degree progression" and "harmonic fluctuation," it was discovered that Wolpert's system of chord movement was more traditionally oriented, and yet adhered to some rather disturbing notions about the desirability of certain kinds of voice-leading, e.g., "adhesion," "diversion," etc. Furthermore, while Hindemith had strong ideas about the necessity of tonal organization, it was found that Wolpert saw his system as valid for both tonal and atonal frames of reference.

Finally, it was recognized that Hindemith's theories contained a unity and cohesiveness through the extension of his system of chord connection to include his system of chord classification so that the way chords were classified influenced how they were treated in chord progressions. With Wolpert, however, there is no attempt to unify both systems and therefore his ideas about chord movement are completely divorced from his system of chordal groupings.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>II</td>
<td>CHORD CLASSIFICATION</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>A. Hindemith</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>B. Wolpert</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>C. Comparison</td>
<td>37</td>
</tr>
<tr>
<td>III</td>
<td>CHORD MOVEMENT</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>A. Hindemith</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>B. Wolpert</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>C. Comparison</td>
<td>85</td>
</tr>
<tr>
<td>IV</td>
<td>FURTHER CONSIDERATIONS</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>BIBLIOGRAPHY</td>
<td>102</td>
</tr>
<tr>
<td></td>
<td>APPENDIX I</td>
<td>105</td>
</tr>
<tr>
<td></td>
<td>APPENDIX II</td>
<td>106</td>
</tr>
<tr>
<td></td>
<td>APPENDIX III</td>
<td>107</td>
</tr>
<tr>
<td>Example Number</td>
<td>Page</td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>------</td>
<td></td>
</tr>
<tr>
<td>1. Hindemith's Series 2</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>2. Wolpert's Three-Note Chord Types</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>3. Wolpert's Concept of Contracted Form</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>4. Wolpert's Comparison with Hindemith's System</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>5. Wolpert's Four-Note Chord Types</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>6. Wolpert's Five-Note Chord Types</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>7. Wolpert's Six-Note Chord</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>8. Wolpert's Seven-Note Chord</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>9. Major Triads with the Fifth Split Various Ways</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>10. &quot; &quot; &quot; &quot; &quot; &quot; &quot; &quot; &quot; &quot;</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>11. &quot; &quot; &quot; &quot; &quot; &quot; &quot; &quot; &quot; &quot;</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>12. Summary of Split-Interval Terminology</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>13. The Concept of Dimension</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>14. Essential Dissonance</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>15. Problem of the ( {4} ) Chord</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>16. Possible Roots in a Seven-Tone Chord</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>17. Wolpert's Chordal Analysis</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>18. Chord Spelling Influencing Classification in Wolpert's System</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>19. Gradual versus Nil Harmonic Fluctuation</td>
<td>53</td>
<td></td>
</tr>
<tr>
<td>20. Two Chords from Sub-Group II whose Roots are a Tritone Apart</td>
<td>58</td>
<td></td>
</tr>
</tbody>
</table>
21. Possibilities of Voice-Pairing in Wolpert's Examination of Chord Connection ........ 66
22. Wolpert's "Non-connections" ............... 68
23. Types of Systoles and Diastoles ............. 69
24. Chord Spellings Determining Number of Possible Resolutions ................. 71
25. Diversion .................................. 72
26. Examination of All Possible Two-Voice Frameworks .................................. 73
27. Mixture of Adhesive and Non-Adhesive Voices in the Same Connection .......... 74
28. Bass Progressions with Most Likely Upper Voice Movement .......................... 75
29. Cadences with Split Chords .................. 77
30. Cadences with Split Chords .................. 78
31. Cadences with Split Chords .................. 78
32. Cadences with Split Chords .................. 79
33. The Cross-Relation ......................... 80
34. "Real" versus "Sound" Cross-Relations ...... 82
35. "Narrow" versus "Wide" Cross-Relations .... 83
36. Cross-Relations with the Neapolitan Sixth .......................... 83
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CHAPTER I

INTRODUCTION

Music theory in the twentieth century has been concerned with a wide variety of criteria in what has been a conscious attempt to systematize and clarify all of the conceivable raw materials of musical composition. Twentieth-century theorists have been involved in sometimes rather extended analytical investigations into melodic structure, rhythmic organization, timbre, formal logic, dynamics and the very nature of sound in itself. However, there has been a noticeable absence of effort on the part of these same theorists to attempt to come to terms with workable systems of classifying chordal material so as to include all possible arrangements of the sounds which are present within our twelve note division of the octave.

This situation is in direct antithesis to the activities and interests of theorists of the nineteenth century, one of whose primary concerns was in chords and systems by which they could be classified, arranged and labelled. During the nineteenth and the first part of the twentieth centuries all vertical structures were traditionally compared to the triadic frame of reference.
Notes which could not be accounted for within such a frame of reference were labelled non-chord tones such as passing tones, appoggiaturas, upper or lower neighbour tones, or the like, and were not really considered an integral part of the chord. As the harmonies became more complex this triadic frame of reference was to become more and more unworkable. Therefore, a need for the extension of the traditional system to include the possibilities of more complex vertical structures became evident.

Thus far in the twentieth century a small number of systems that could be called chord classification have been proposed by music theorists.\textsuperscript{1} Naturally, all of these systems are not constructed from the same point of view or with the same purpose in mind. However, the question of vertical simultaneity is one which concerns all composers and theorists of the twentieth century, no matter what their point of view or under what criteria their music has been written. Moreover, the classification of vertical structures does not necessarily depend on the context in which these sounds are employed. Thus, the writings of all theorists, whether serialist or non-serialist in orientation, are significant in this regard.

\textsuperscript{1} Generally, in the twentieth century, "chord" can be applied to any combination of three or more notes sounding simultaneously.
Among the former, one may point to the writings of Babbitt, Chrisman, Perle, Rochberg, Hauer, Schoenberg, Hába, and Gerhard, to name but a few. In an article which attempts to describe the problem of harmonic organization in serial music, Perle points out that both linear and harmonic properties and resources are available in the diatonic-tonal system while in the twelve-tone system only the linear ordering of the notes is specifically defined, it being possible to verticalize any number of adjacent elements in the set in any way which suits the composer. This limiting of the twelve-tone system to linear properties is perhaps one reason for the earlier noted lack of attempts at the classification of all possible vertical simultaneities. In a shorter article in *The Score*, Perle does list the number of total possible chords given our twelve note division of the octave. However, the only criterion in the classification is the number of distinct permutations being 351. Alois Hába and Roberto

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2 George Perle, "The Harmonic Problem in Twelve-Tone Music."

3 Here, Babbitt could be noted as one exception where verticalizations retain their "linear adjacencies."

Gerhard had proceeded along the same lines previous to Perle, but both made errors in their calculations which Perle has been quick to point out in his article.

Hauer's system of forty-four tropes can be considered a type of chord classification in a limited sense in that only six note chords (hexachords) are classified, and these only for content. The same can be said for Milton Babbitt's all-combinatorial source sets which are even more limiting than Hauer's tropes, as there are only six basic groups.

George Rochberg's study, among other things, sets out methods for constructing tone rows at least one of whose inversions will not repeat the first six notes of the original row: a study similar to Babbitt's principle of combinatoriality. Here again, the study is really not a classification unless one interprets the term in a rather limited sense.


Recently, some all-inclusive systems have been developed among serialists, for example, those by Forte and Chrisman. These, however, tend to be of a statistical nature and sometimes are even highly mathematical, as in Kassler's study. At any rate, all three of these studies are far from resembling systems of chord classification in the traditional nineteenth century sense in that arrays of numbers are used to represent the possibilities and, apart from the number of notes in each array, there is little in the way of additional criteria to further break down or simplify the arrangement. Rather, one is left with a list of all possibilities with no further guide to their practical use. These systems serve as more of a description—enlarging our concept of the body of material—than a classification.

Among so-called non-serialists who have developed systems of chord classification are men such as Paul Hindemith and Franz Alfons Wolpert. Unlike all of the above mentioned theorists, Hindemith and Wolpert deal with the question of vertical simultaneity in a manner which strongly resembles the theorists of the preceding century.

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That is, they both deal with the question of chords, chord classification and chord arrangement in much the same way as do traditional tonal theorists, and, because of this method of approach, can be distinctly set apart from many of the other theorists of this century.

Most twentieth-century theorists, when dealing with problems of vertical simultaneity, deal with these vertical structures (as we have seen) in either a statistical manner or in a manner which is very strongly controlled by linear considerations, e.g., the twelve-tone system. On the other hand, Hindemith and Wolpert are involved with chords as sound objects in themselves. Since they are thus among a small group of theorists who deal in an extensive way with these new verticalizations in a more or less traditional manner, they form an important link with the past and offer today's composer and analyst a means of understanding these new sound possibilities without necessarily implying or assuming a rejection of past musical traditions.

Hindemith's system of classification is presented in his treatise *The Craft of Musical Composition*, as

part of a larger discussion directed towards the serious student of composition.

The teacher will find in this book basic principles of composition derived from the natural characteristics of tones, and consequently valid for all periods. To the harmony and counterpoint he has already learned, which have been purely studies in the history of style . . . he must now add a new technique, which, proceeding from the firm foundation of the laws of nature, will enable him to make expeditions into domains of composition which have not hitherto been open to orderly penetration.

The book makes clear that for a well-intentioned but arbitrary arrangement of sounds the composer must substitute an order which only to the uninitiated will seem a restriction of the creative process.10

The significance of the Craft's contribution to music theory and, more specifically, to chord classification, has already been pointed out by William Thomson.

One of the most far reaching influences of the Craft has been its system of chord analysis, which for the first time offered a possible break in the stone wall of tertian harmony. Before the Craft there was no taxonomy of chord structure except that in which any tonal aggregate was classified either as some form of stacked thirds or else as a product of decorative melodic action in conjunction with a postulated "chord" . . . .11

In an article appearing subsequent to the publication of the Craft Hindemith attempts to justify part of what he had previously set out to accomplish.

10 Ibid., p. 9.

For the composer as well as for the hearer, tones and their connections are the beginning and end of musical activity. Not so for the theorist. He must enquire into the nature of the tones and study the principles of tonal connection. For the first of these two tasks, he is almost completely independent of the experiences of the practical musician; the second, on the other hand, is not to be achieved without a knowledge of compositional procedure, no matter whether a theorist obtains such knowledge by means of deduction - the analysis of already existing compositions - or through his own creative activity.12

More specifically, Hindemith speaks of the feasibility of a system of chord classification in which every note in any conglomeration of pitches can be incorporated within the terms of the system.

The postulate of the interval as the harmonic unit . . . may be used to explain every conceivable chord, and the theorist will be faced only with the question of how to apply this yardstick in order to appraise tonal combinations, and not, as formerly, with the necessity of dividing chords into those which can be measured and those which cannot.13

Wolpert's justification for his system of chord classification appears in the introduction to the new edition of his treatise Neue Harmonik,14 which is an expansion of the earlier (1950) edition. He admits at the outset that the major part of his treatise is directed

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13 Ibid., 28.
towards "the majority of musical listeners" and is not meant to be an innovative work apart from "the system of chord types and their variants." Part of Wolpert's justification seems to rest on his rejection of Hindemith's system. He insists that Hindemith's method of classification is "impossible" since he (Hindemith) regards the tritone as an essential distinguishing factor and does not recognize the general notion of "chord identity" through inversion.\(^{15}\) Also, Wolpert says that because of this refusal to recognize the inversion principle, Hindemith is forced into problems of defining roots for all possible conglomerations of intervals and that this gives him endless trouble. Wolpert also argues that Hindemith's chord chart is incomplete and must always end with the phrase "and similar chords."\(^{16}\)

Wolpert asserts that he has solved these problems in his system. He recognizes the traditional acceptance of chordal inversion through his "Principle of Identity" and avoids the confusion of defining chord roots. He accepts traditional roots and relates these to the notes

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15 Hindemith had rejected the principle of chordal inversion as a "purely arbitrary invention of Rameau's." See: "Methods of Music Theory," p. 27.

16 Wolpert, \textit{op. cit.}
in the system of classification which he develops. His chart is complete in the sense that all possible chords can be reduced to one of his fifteen basic chord types.

As well as classifying all possible vertical constructs in a manner remarkably similar to theorists of the preceding century, both Hindemith and Wolpert discuss certain "rules", "ideals" or "principles" to which one should attempt to adhere when connecting a succession of vertical structures. It seems only natural that given a new vocabulary of musical sounds in the form of "all possible chords," new principles would be evolved as a guide in connecting these sounds.

The basic differences in the work of the two men concerns the question of tonality. Hindemith believes that all "logical" music is tonal (whether or not so conceived by the composer) and his chordal system is thus organized into a tonal framework. Wolpert, on the other hand, involves no prejudgements about tonality or atonality, and carefully avoids putting a tonal framework around his chordal system.

Because of these differences and similarities it was thought a comparison of the systems of Hindemith and Wolpert would be appropriate.

In the introduction to the new edition of *Neue Harmonik*, Wolpert states that "many composers wrote in a very well-sounding atonality."
CHAPTER II

CHORD CLASSIFICATION

A. Hindemith's System.

Hindemith's purpose in constructing a system of chord classification is to expand the limits of the conventional theory of harmony.

Three resolutions are made at the outset:

1. Construction in thirds must no longer be the basic rule for the erection of chords.

2. We must substitute a more all-embracing principle for that of the invertibility of chords.

3. We must abandon the thesis that chords are susceptible to a variety of interpretations.¹

Also, a number of definitions and assumptions are stated or implied:

1. A chord is defined as a group of at least three different tones sounding simultaneously.²


² Ibid., 95.
2. There is a basic and essential difference between chords containing one or more tritones and those without. 3

3. Every chord, with a few exceptions, has a root. 4

4. Chords in which the bass tone and root are not identical are subordinate in value to chords in which the root and bass tone coincide, other factors being equal. 5

Hindemith then sets out to construct a Table of Chord Groups in which all vertical structures possible with the twelve-note division of the octave will be classified. Hindemith's aim is to provide a classification which is more than a mere catalogue. It is also an ordering of the "value" of chords so that the importance of the sub-groups diminishes as one proceeds from the first to the last. The higher the number of the sub-group, the higher the tension and the lower the value of the structure being considered. Conversely, the lower

3
Ibid.

4
Ibid., 96.

5
Ibid., 99.
the number of the sub-group, the lower the tension and the higher the value of the chord.

Hindemith orders his classification on the basis of the intervals contained in the chords under consideration. All possible interval relationships within the chord are taken into account and the resulting intervals are classified according to "value" on the basis of Series 2. This Series 2 is derived from the theory of combination tones and represents, according to Hindemith, the natural classification of the intervals according to value.

Example 1.

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6 Ibid., 58-64.
7 Ibid., 96.
8 Some of Hindemith's assumptions concerning acoustics in the derivation of Series 2 have been questioned by Cazdun. (Norman Cazdun, "Hindemith and Nature," The Music Review, Vol. XV, 1954, 292.) "Hindemith is not interested in real combination tones at all but only in fictitious ones, though even these give him endless trouble. Declaring without qualification that any two simultaneous tones produce combination
Generally, chords containing intervals from the first part of the series, according to Hindemith, have a higher value than chords containing intervals from later in the series. His system divides chords into two groups by the use of the tritone as the basic interval in classifying chords.

... the tritone ... stamps chords so strongly with its own character that they acquire something of both its indefiniteness and its character of motion towards a goal.9

Furthermore, chords have more value if their root and bass note coincide.

Hindemith's method for determining the root of a chord is unique. It consists in finding the best interval in the conglomeration of pitches according to his own Series 2. The root of each interval of the series is determined, according to Hindemith, by acoustical laws. The roots of the perfect fifth, the thirds and the sevenths tones, Hindemith finds that they usually are so weak that the superficial ear does not perceive them, but this makes them all the more important for the subconscious ear ... so Hindemith is not dealing with combination tones that exist, but only with those present to the subconscious ear. In fact, their non-existence seems to make them all the more important ... "

9 Hindemith, op. cit., 95.
are the lower note of the interval while the roots of the perfect fourth, the seconds and the sixths are the upper note of the interval. To find the root of a chord, one examines the given structure for the best interval contained therein according to Series 2. If there is no perfect fifth, one proceeds to look for a perfect fourth, then a major third, and so on. The first interval one encounters using this method, is the best interval and the root of this interval is the root of the chord. It should be emphasized that Hindemith expects all intervals in the structure to be considered. Thus, in three-note chords, there are three intervals to consider; in four-note chords, there are six intervals to consider; in five-note chords, ten intervals; in six-note chords, fifteen intervals; seven-note chords, twenty-one intervals; and so on to twelve-note chords, where there would be sixty-six intervals to consider.

The following should also be noted:

Doubled tones count only once; we use the lowest one for our reckoning. If the chord contains two or more equal intervals, and these are the best intervals, the root of the lower one is the root of the chord.\[10\]

Hindemith's scheme gives a list of two chord-groups which include six "chord sub-groups" separated into

\[10\] Ibid., 97.
Group A (Sub-groups I, II, V), chords without a tritone, and Group B (Sub-groups II, IV, VI), chords containing one or more tritones. In four out of six cases the subgroups are further sub-divided. In all these instances, chords with root and bass coinciding are in a higher sub-division than chords in the same sub-group with the root above the bass.

The only structures which satisfy the conditions of Group A, sub-group I (or simply "I"), that is, chords without tritones and without seconds or sevenths and containing roots, are the major and minor triads and what are traditionally called inversions. The chords of Section I.1. (triads in root position), would be considered higher in the scale of values than those in I.2. (traditionally considered their inversions) since the former are more stable and less in need of resolution.

The corresponding sub-group of Group B is numbered II and contains all those chords which have a tritone but do not contain any minor seconds or major sevenths. The reason for not excluding the major second and minor seventh, notes Hindemith, is because "the presence of the tritone

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11 Here the word "traditional" is used to emphasize the fact that Hindemith does not consider chords to be invertible.
always involves seconds or sevenths--except in the diminished triad and its inversions,"\textsuperscript{12} Accordingly, in the first section under sub-group II (II.a.), we have only the dominant seventh with and without the fifth in the traditional root position. The second section in sub-group II (II.b.) consists of structures which contain major seconds or minor sevenths or both, and is divided into three categories. In the first, the root and bass tones are the same; in the second the root lies above the bass and in the third, there is more than one tritone present, with the root being either in the bass or the upper voices. Examples of traditional chords common to this section are chords of the dominant ninth (II.b.1.), traditional inversions of the dominant seventh (II.b.2.), the so-called "half-diminised" chords (II.b.1.), the "French" augmented sixth (II.b.3.), and similar structures.

Sub-group III of Group A contains chords with seconds or sevenths, or both, but without tritones. This sub-group is further sub-divided into 1) structures where the root and bass are identical, 2) where the root lies above the bass tone. The chords in sub-group III include

\textsuperscript{12} \textit{Ibid.}, 102. Note Hindemith uses the term "inversions" here when in fact he claims not to recognize invertibility.
the secondary seventh and ninth chords (III.1.) and their traditional inversions (III.2.).

The chords of sub-group IV contain any number of tritones plus minor seconds, and/or major sevenths. Here, a distinction might be made between dissonance and tension. Hindemith considers (by definition) the chords of sub-groups V and VI as having a higher tension factor than those of sub-group IV. However, from an empirical point of view, most listeners would find the chords of sub-group IV, on the whole, more dissonant than those in sub-groups V or VI. Thus, tension is not necessarily the same as dissonance, according to Hindemith. Also, chords with substantial tension have a greater need to resolve, generally speaking, than those with less tension. As with sub-group III, sub-group IV is further divided into:

1) structures where the root and bass are identical and
2) where the root lies above the bass.

In sub-groups V and VI we encounter the exceptions to assumption 3, that is, those chords which have no roots. In the cases examined in these two sub-groups, Hindemith maintains there is no root, but only a "root representative" the identity of which is dependant on the context. Thus,

In sub-group V there are only two chords, the augmented triad and the chord consisting of two superimposed perfect fourths.

In sub-group VI there are only four chords, namely, the diminished chord and its two traditional inversions and the diminished seventh chord. Up to this point, whenever the tritone has appeared in a chord (Group B) it has subordinated itself to the best interval according to Series 2. Now, in sub-group VI, because of the nature of the chords in question, the tritone predominates.

Isolated intervals, says Hindemith, can also be assigned to the Table of Chord Groups. The perfect fifth and major and minor thirds belong to I.1., the perfect fourth and major and minor sixths to I.2., the seconds to III.2., the sevenths to III.1., and the tritone to VI.

Hindemith justifies his system of classification by asserting that it "does away with all ambiguity." Also, it is all-inclusive in that "there is no combination of intervals which does not fit into some division of our system." 15


B. **Wolpert's System.**

Wolpert's method of chord classification consists of a systematic breakdown of all combinations of musical sounds in the traditional tempered system\(^{17}\) into fifteen basic chord types.

It is self evident that the fifteen chord types gained in this way contain all possible harmonies for all future and can be employed by those who use them from now on, both synthetically and analytically. Supposed 'not yet seen' or existing chords are also, without exception, contained in this system.\(^{18}\)

These fifteen basic types consist of five different three-note chords, five different four-note chords, three different five-note chords, one six-note chord, and one seven-note chord. Before describing these basic types in detail, it will be necessary to state and clarify some of Wolpert's principles and assumptions.

Two basic principles are stated at the outset, namely, the principles of identity (**Identität**) and congruence (**Kongruenz**) of chords.

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\(^{17}\) Wolpert does not accept a twelve-note division of the octave for his system of classification, as does Hindemith, in that he (Wolpert) regards the spelling of a given chord tone as a significant factor in the classification of that chord. See p. 22.

\(^{18}\) Franz Alfons Wolpert, Neue Harmonik, (Wilhelmshaven: Heinrichshaften, 1972), 14 (Unpublished Translation, L. Medveczky, 5).
A chord is identical with itself when it always contains the same notes, no matter how transposed or how often doubled.19

In order to determine whether two chords are identical, says Wolpert, one contracts the chord to its closest possible or narrowest position (Kontrakturform). Obviously, contraction can only take place using octave transposition and the elimination of doublings. Finally, two chords are identical if their contracted forms are the same.

Concerning the principle of congruence:

A chord is congruent with another if its transposed contracted form is identical in quality [Qualität] and quantity [Quantität] to the intervallic mixture with the chord to be compared.20

Quantity, according to Wolpert, is more specific than quality when referring to intervals. For example, quality refers to all thirds while quantity specifies the type of third. Also, two chords are not identical unless the notes in both chords are spelled exactly the same. Similarly, two chords are not congruent unless the interval spellings in both chords agree exactly. (e.g. f-a-c is congruent with eb-g-bb, but not with d#-g-bb. EGB is identical with g-b-e', but not with g-cb-e').21

At the beginning of his section on the formation of

19 Ibid., 18 (7).
20 Ibid., 19 (7).
21 Ibid., 20 (8).
new chord types Wolpert makes it very clear that the following contracted chords all belong in the same classification, that is, "sixte ajoutée":

1. C, E, G, A.
2. C, E, G, Ab.
3. C, Eb, Gb, Ab.
4. C, E, G#, A.

Naturally, other chords could be constructed which would also belong to this classification. However, a chord such as C, E, G, G# would not belong in the above group, even though it sounds the same as number 2.

Although such an explanation may seem premature at this point, Wolpert seems to be preparing us for the fact that his system, at the outset at least, is far from resembling familiar concepts that we may have learned in traditional harmony. He goes on to state that all traditional triads in root position belong to another classification, which he calls \( 5 \). It is important to note that the "qualitative" interval structure in a chord is what is essential in classifying it according to basic type.

Although Wolpert does not give an explanation of chord roots here, he acknowledges that such roots must exist, and states "the problem of the root of a chord is in fact connected with the tonality."\(^{23}\)

\(^{22}\) Ibid., 21 (8).

\(^{23}\) Ibid., 13 (4).
According to Wolpert, all three-note chords can be classified as belonging to one of five basic types. Conveniently described, these five types are as follows (the numerals are put in parenthesis, says Wolpert, to distinguish them from the old thorough-bass numbering):

Example 2.

Such types as \( (5) \) and \( (6) \) are not included because one discovers on inversion that they become \( (5) \) and \( (4) \) respectively, and therefore are already contained in the system. Further examination reveals the group to be all-inclusive.

To determine into which classification any three-note chord would fall, one proceeds as follows:

1. Reduce the chord to its contracted form. Arrangement of notes must be in the narrowest possible position.

---

24 Any group of three or more notes may be considered a chord, and every combination of three notes is reducible to one of these five basic types, always with the proviso that accidental signs do not affect the classification.

25 Ibid., 29.
Example 3.

2. Transpose the contracted form so that its bass note is C.

3. Accidentals, for the time being, are not considered—only the qualitative interval structure is considered.

4. Match it with one of the types \( (5), (3), (2), (4), \ldots \) in the example above.

At this point Wolpert digresses to discuss certain structures in Hindemith’s system of classification of chords. The following four illustrations of three-note chords in Hindemith’s system are examined to "make clear the basic differences in our methods," says Wolpert.

\[ \sqrt[\text{of}]{\text{"contracted form"}} \]

\[ \text{Ibid.}, 23 (9). \]
Wolpert points out that according to Hindemith's method, there exists between the above four chord forms no connection that in any way makes them similar. What Wolpert fails to mention, however, is that 1, 3 and 4 all fall in the same classification, that is, III.1. The second belongs to V, and its root is not defined, according to Hindemith. Wolpert emphasizes that all of the above chords are basically the same and all belong to the same classification in his system. When considered in their contracted forms, they all reduce to the basic type of \( (5) \). Accordingly, Wolpert concludes:

\[ ... \text{because of this, and on the basis of numerous other examples, chord identification by Hindemith's method is practically impossible.} \]

Wolpert then proceeds with his classification of four-note chords. Again, these fall into five basic types and are notated as follows:

---

28 Ibid., 23.

29 Ibid., 23 (10).
Example 5.

\[
\begin{align*}
(6a) & \quad (2a) & \quad (4a) & \quad \left(\frac{4}{3}\right) & \quad \left(\frac{5}{4}\right) \\
\end{align*}
\]

The "a" stands for "ajoutée" and should be translated literally as a "piece added on." Wolpert emphasizes that (6a) should not be thought of as an added sixth chord, but in the larger context of a chord type. For example, the chord with the notes C, Eb, Gb, Ab would fall into the type (6a) but would certainly not sound as an "added sixth" chord. The method for determining into which classification a given four-note chord falls is the same as that outlined above for the three-note chords.

The five-note chords fall into only three basic categories. These are as follows:

Example 6.

\[
\begin{align*}
\left(\frac{4}{2}a\right) & \quad \left(\frac{6}{2}a\right) & \quad \left(\frac{6}{4}a\right) \\
\end{align*}
\]

30 Ibid., 29.

31 Ibid. Here a vertical line is used to separate the numerals from the "ajoutée" symbol. It was not necessary in the four-note chords as only one numeral was present.
All six-note chords are reducible to the same basic type, according to Wolpert. This basic type is as follows:

Example 7.  

\[
\begin{pmatrix}
6 \\
4 \\
2 \\
\end{pmatrix}
\]

The same is true for all seven-note chords:

Example 8.  

\[
\begin{pmatrix}
6 \\
4 \\
2 \\
\end{pmatrix}
\]

All of these chord types can be altered from their above "normal" forms by the use of accidentals. Again, it is emphasized that this alteration (unless it takes place on the lowest note), does not affect the chord's classification according to basic type.

When a given chord contains a note with an accidental preceding it and the same note without the accidental, or

---

32 Ibid.
33 Ibid.
with a different accidental, it is termed a "split chord,"
(Spaltakkorde) according to Wolpert.\textsuperscript{34} The concept of split
chords is introduced by him in order to expand the idea of
his basic chord types so that the system will include all
possible combinations of musical pitches.

If, for example, a basic $\left(\begin{array}{c}5 \\ 3 \end{array}\right)$ chord whose lowest note
is C contains both a G and a G#, the chord is termed a split
chord since there are two forms of the note G present. It
is notated as follows:

Example 9a.

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{example9a.png}
\caption{Example 9a.}
\end{figure}

The numeral 5 tells us that it is the G that is split while
the ascending tag on the right tells us the direction of
the split, that is, upward. If the two split notes are
more than an octave apart, the split sign is preceded by a
"w" (weit), as in the following example:

\textsuperscript{34} Ib\textit{id.}, 32 (11).
Example 9b.

If, in the above example, the notes G and G# are reversed, the symbol used is:

If neither of the split notes is the natural form of the note, an x or < is used as the tag, depending on the arrangement of the notes:

Example 10.

If a Gb and a G are present, the direction of the split is downward, and is notated as follows:

Example 11.
If, in the above example, the notes G and Gb are reversed, the symbol used is: \( \text{\textbackslash - 5 - \textbackslash /} \)

This exhausts the combinations with G, G#, and Gb, except when all three are present. Wolpert does not deal with this possibility here.

A summary of the possibilities of the split chord symbols follows:

Example 12.

\[
\begin{array}{cccc}
\flat & \# & \flat & \flat \\
\flat & \# & \flat & \flat \\
\text{\textbackslash /} & \text{-} & \text{-} & \text{w} \\
\text{w} & \text{w} & \text{-} & \text{-} \\
\end{array}
\]

The above examples elaborate only on a basic chord whose upper note is split. Split notes can occur in any chord type on any note or notes. Unfortunately, few examples are provided by Wolpert at this point, and, as a result, the concepts are not as clear as would be desirable.

The idea of split chords leads Wolpert naturally to
his concept of "dimension" (Dimension).\textsuperscript{35} Although a chord such as that in the last example contains four different pitches, its basic form (when accidentals are ignored) is considered by Wolpert as having essentially only three different notes. In this example, he says, the chord has four sounds but is only "three dimensional."\textsuperscript{36} To take another example, the following chord has seven different sounds, but is only four dimensional.

Example 13.

\begin{center}
\begin{tabular}{c|c}
\hline
| \textbf{Example 13}. | \\
\hline
& \includegraphics[width=0.4\textwidth]{example13.png} \\
\hline
\end{tabular}
\end{center}

It follows, says Wolpert, that the "root form" (that is, reduction to basic chord type) of a split chord cannot be greater than seven dimensions. Also, a chord with twelve different notes must always be a split chord.\textsuperscript{37}

Wolpert continues with a discussion on "Dissonance

\begin{itemize}
\item \textsuperscript{35} \textit{Ibid.}, 35 (12).
\item \textsuperscript{36} \textit{Ibid.}, 35 (13).
\item \textsuperscript{37} One may wonder why Wolpert did not state the more obvious fact that a chord with more than seven different sounds must be a split chord.
\end{itemize}
Values and Degrees.\footnote{Ibid., 36 (13).} He begins by stating that the traditional major triad is "the most complete of all sounds possible" and of all the traditional triads, it is the only one he considers consonant. The other three triads are dissonant and are arranged in degrees as follows:

- I minor triad least dissonant
- II diminished triad medium dissonance
- III augmented triad most dissonant

Wolpert's rationale for the above classification of triads is the sensation of hearing:

> the ear is the foremost standard in the gauging of dissonance . . . very little can be proven physically.\footnote{Ibid., 37 (14).}

Likewise, with intervals, there are three degrees of dissonance:

- I Major second, minor seventh - least
- II Tritones - medium
- III Minor second, major seventh - most

The perfect fourth is termed an "accidental dissonance" (akzidentielle Dissonanz) when it appears outside the context of a major or minor triad, and is less dissonant than all of the above intervals. Other intervals are considered consonant.
The above intervals and triads are what Wolpert terms "simple" dissonances (einfache Dissonanzen). Simple dissonances are distinguished from other types of dissonance termed "essential dissonances" (essentielle Dissonanzen).\(^{40}\) Essential dissonance is defined by the following conditions:

1. Each sounding consonance arising from an alteration is, according to its essence, "essentially dissonant."

2. Each sound derived from a simple dissonance is also essentially dissonant—even if its enharmonic equalization appears consonant.\(^{41}\)

The following examples will illustrate these conditions.

**Example 14.**

\[\text{\footnotesize \begin{align*}
\text{1 and 3 - essentially dissonant and unstable} \\
\text{2 and 4 - consonant and stable}
\end{align*}}\]

\(^{40}\) Ibid., 38 (14).

\(^{41}\) Ibid., 38-9 (14-15).
The significance of the interval of a second when speaking of dissonance is noted, since all chords with the exception of traditional triads contain some form of this interval. Wolpert believes that the smaller the seconds and the greater their number in a given chord, the greater the degree of dissonance. Also, dissonance is ameliorated by distance and worsened by proximity, that is, generally, the closer the notes are together the greater the dissonance while the greater their distance apart, the less the dissonance. Thus, generally speaking, sevenths are less dissonant than seconds. Also, consonance is equated with stability and dissonance with instability. Wolpert labels the minor second the "diabolus in musica," and not the tritone, as traditionally recognized from medieval music theory. Both tritones as well as perfect fourths "lose their dissonance," says Wolpert, when they appear in the context of traditional triads. This concept is termed "dissonance according to condition."

Wolpert now sets about to find the root (Grundton) of each of his basic chord types according to traditional harmony. He converts his fifteen basic types so that they

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42 Ibid., 40 (16).

43 Ibid., 42-3 (16-17).
are arranged as superimposed thirds in the narrowest possible position. Where thirds are missing, the spaces are marked with arrows. When one of the basic chord types is converted to the narrowest possible third arrangement, it is said to be in "fundamental position" or "root position" (Grundakkord) and the root is the lowest tone.

With most of Wolpert's basic chord types, there is no problem in converting to the traditional root position. One exception occurs with the chord, which has three "narrowest possible" arrangements.

Example 15.44

\[
\begin{align*}
&\text{Since strictly speaking, there is no "narrowest possible arrangement," any of the three examples may be considered in root position. The other exception is the seven-note chord, in which any tone can be considered the root and a suitable structure of thirds erected.}
\end{align*}
\]

\[44\text{Ibid.}, 51.\]
In the final tabular surveys, all of the basic chord types and the corresponding Grundakkorden are presented in two different types of orders of classification. Some examples of Wolpert's method of chordal analysis follow:

**Example 16.**

![Musical notation](image)

(7 | 6 | a)

etc.

**Example 17.**

<table>
<thead>
<tr>
<th>Given Chord</th>
<th>Contracted</th>
<th>In Thirds</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>(5/2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(2a)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(6/4</td>
</tr>
</tbody>
</table>

---


C. Comparison.

Upon examination of both Hindemith's and Wolpert's systems of chord classification, certain basic differences are immediately evident.

Hindemith, in his classification of all possible chords, forms categories on the basis of combinations of intervals and ranks these categories in terms of "tension" and "value". His own highly evolved system of roots and the interval of the tritone play significant roles in this ranking.

On the other hand, Wolpert, in his classification of all possible chords, forms categories on the basis of numbers of notes and combinations of intervals according to spelling but does not rank his categories in terms of value or tension. Furthermore, roots are assigned no importance in the categories, while the intervals of the augmented and doubly augmented prime play a rather curious role and are involved in his theory of split chords.

With these basic differences in mind, the two systems can be contrasted according to the following five distinguishing areas:

1. Roots.
2. Significant Intervals.
3. Enharmonics.
4. Number of Notes.
5. Consonance and Dissonance.
As has already been stated, Wolpert does not consider roots--traditional or otherwise--in his categorization. However, the fact that he does recognize traditional roots is evident when he converts each of the categories or basic types in his system of classification to the "narrowest possible third arrangement" or Grundakkord. Here the root which he describes corresponds to the traditional concept of root as the lowest note of a group of superimposed thirds. Wolpert does not, however, attempt to relate this root to its corresponding note in the basic type--a process which might have proven helpful in our overall understanding of the system. Instead, he states that when thirds appear in the Grundakkord a tonal relationship is definable.\(^\text{47}\) Just what is meant by the term tonal relationship is not elaborated on at this point. When thirds do not appear in the Grundakkord, however, (for example, when category \(\begin{pmatrix} 5 \\ 2 \end{pmatrix}\) built on C is converted to a Grundakkord it becomes C-G-D, and the missing thirds (E and B) are marked with arrows), a tonal relationship is undefinable.\(^\text{48}\)

In contrast to Wolpert, Hindemith does not recognize traditional roots, but has evolved his own system of roots

\(^{47}\)Ibid., 50 (19).

\(^{48}\)Ibid., 50 (19).
both for intervals—and, as an extension of intervals, for chords—whereby the root is derived from the "best interval" in his Series 2, which in turn has been derived from "nature." Hindemith's system of roots bears directly on his system of classification, so that chords are separated into categories where a) the root and the bass tone are identical and b) the root lies above the bass tone. Furthermore, in contrast to Wolpert, Hindemith does not discuss the traditional concept of building chords in thirds. Indeed, one of his foremost resolutions was that the construction of chords in thirds should no longer form the basis for any system or discussion of chord classification.

The second point concerns significant intervals and how they relate to each theorist's system of organization. While with Hindemith, the most significant interval is certainly the tritone, with Wolpert, it can be argued that the augmented and doubly augmented primes play an almost equally important role. Although Wolpert discusses the importance of the minor second under "dissonance values and degrees," the augmented and doubly augmented prime are of great significance in his system of classification.

49 Hindemith, op. cit., 95.

50 With the difference, however, that the augmented and doubly augmented prime play no role in assigning of chords to categories, and in fact are ignored in this process.
as he builds his entire unique theory of split chords around these intervals. We have already recognized that a split chord contains an altered note and the same note unaltered, or with a different accidental. Since in all split chords the interval of an augmented or doubly augmented prime is involved, these intervals can be considered to have special significance in Wolpert's system of classification, just as the tritone has in Hindemith's.

Hindemith's rational in choosing the tritone as a significant and therefore distinguishing interval has already been mentioned. The primary division in his system of chord classification is based on this distinction, so that Group A includes all chords that have no tritone while all remaining chords, that is, those containing one or more tritones, are assigned to Group B. However, it should be noted here that both Hindemith and Wolpert recognize the importance of the tritone when they come to discuss "harmonic fluctuation" and "chord succession and connection" respectively.

The next distinguishing characteristic involves the treatment of what is traditionally referred to as enharmonics. In Wolpert's system the spelling of a chord effects the category into which it is placed. For example, in the following:

Example 18.

the first chord reduces to the three-note category (5) while the second chord belongs to the four-note category (6a). Thus when considering his system of classification, Wolpert does not recognize the enharmonic equivalence of notes such as g# and ab.

On the other hand, in Hindemith's system, a twelve-note division of the octave is accepted and enharmonics such as those above are considered equivalent. Thus Hindemith would consider the chords in the above example identical for purposes of classification, and both would be assigned to his sub-group III.1.

Another basic difference between Hindemith's and Wolpert's systems of chord classification concerns the number of notes in given chords within a specific category. In Wolpert's system, all chords within a category always contain the same number of notes. For example, there are five basic three-note chords, each representing a category, five basic four-note chords, each representing a category, and so on, up to one basic seven-note chord. Therefore,
each of Wolpert's fifteen categories contains a specific number of notes—three, four, five, six or seven.

In Hindemith's system, however, some of the sub-groups (for example, III), contain chords which can have anywhere from three to six different notes. In this sense, Hindemith's system is less orderly than Wolpert's in that he must use the word "etc." following sub-groups in his Table which are non-finite (for example, II.b.1, 2 and 3; III.1 and 2; IV.1 and 2). Wolpert merely has fifteen basic categories to which all possible chords reduce. He thus avoids presenting endless examples by simply classifying the divisions for all the possible combinations.

Perhaps the most controversial point of distinction is the last—the problem of consonance and dissonance. Hindemith does not define either term objectively. He does state that the value order laid down in his Series 2 approaches the problem of the consonance and dissonance of intervals. However, he does not specify any point at which consonance stops and dissonance begins.

The consonant intervals would then appear at the beginning of Series 2 and the dissonant at the end. But the rate at which the consonance of the intervals near the beginning decreases and the dissonance of those near the end increases cannot be determined exactly.\textsuperscript{52}

\textsuperscript{52} Ibid., 85.
The consonance or dissonance of one interval relative to another, then, is all that can be determined by this series. According to Hindemith, a major third may be dissonant when compared to a perfect fifth, but it is consonant in relation to a minor seventh, and so on. The tritone, not included in Series 2, is a special case and is neither consonant nor dissonant. In Hindemith's words, "it belongs neither to the realm of euphony nor to that of cacophony." 53

Hindemith does not extend his treatment of consonance and dissonance of intervals to chords in the way that he extended his concept of roots from intervals to chords. He avoids the use of the term "dissonance" and instead, in the Table of Chord Groups he arranges chords in order of "tension." 54

If one were to extrapolate from Hindemith's Series 2 to try to determine a scale of consonance and dissonance for chords one might come up with a scale of values approximating Hindemith's chord table. However, one would encounter all sorts of difficulties and ambiguities, partly

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53
Ibid.

54
See Chapter II, p. 17.
because of the obvious fact that there are more chords than intervals. Hindemith is very careful in his discussion of chord types and does not use the word "consonant" or "dissonant" once in this section of his discussion. Even though he believes that the "minor triad should rank higher in the scheme of tonal values than the major," major and minor chords are of equal value in his table.

Hindemith acknowledges that the concepts of consonance and dissonance have never been satisfactorily explained and that throughout history the definitions have varied.

At first thirds were dissonant; later they became consonant. A distinction was made between perfect and imperfect consonances. The wide use of seventh chords has made the major second and the minor seventh almost consonant to our ears. The situation of the fourth has never been cleared up. Theorists, basing their reasoning on accoustical phenomena, have repeatedly come to conclusions wholly at variance with those of practical musicians. 56

As mentioned earlier, Wolpert's ideas concerning consonance and dissonance involve the ear as being the ultimate standard of measurement and he believes that very little about consonance and dissonance can be proven physically. 57 As a result, his ideas concerning these


57 Wolpert, *op. cit.*, 37 (14).
concepts rest mainly on his own empirical observations. He makes no attempt, as Hindemith does, to evolve a logical system, but simply states his own subjective opinions as having a kind of common sense validity.

Although Wolpert does not go so far as to give a Series 2 by piecing together his generalizations, one is actually able to come up with a partial scale of values of intervals which proceed from the most consonant to the most dissonant, just as in Hindemith. Wolpert gives three degrees of dissonance. He also says that generally seconds are more dissonant than sevenths. From the information he gives, one can construct the following series:

(Least Dissonant) m7, M2, T, M7, m2 (Most Dissonant)

Also, the perfect fourth is considered an "accidental" dissonance when it does not appear as part of a major or minor triad. Because it can be considered either consonant or dissonant, the perfect fourth acts as a kind of bridge between Wolpert's consonant and dissonant intervals. As one would expect, the other intervals—octave, perfect fifth, sixths and thirds—are all considered consonant. (Here we must assume Wolpert means only the major and minor thirds and sixths.) However, no clues are given as to which consonant intervals are more consonant than others. Since

58 See p. 32.
Wolpert gives us three degrees of dissonant intervals one wonders why he does not (using his ear) give us three or more degrees of consonant intervals. If he does have them in mind, one can only guess as to what the ordering might be. A comparison of the latter portion of Hindemith's Series 2 with Wolpert's scale above (both "series" proceeding from the more consonant to the more dissonant intervals) shows that:

Hindemith:  m3  M6  M2  m7  m2  M7  
Wolpert:  P4  m7  M2  T  M7  m2  

1. Wolpert believes the minor seventh less dissonant than the major second. In Hindemith's series, the opposite is true.

2. Also, Wolpert believes the major seventh less dissonant than the minor second. Again, the opposite is true in Hindemith's series.

3. While Wolpert believes the tritone to be of medium dissonance (more dissonant than M2 or m7 but less dissonant than m2 or M7) Hindemith believes it to be unique and neither consonant nor dissonant.

4. With Wolpert, the perfect fourth can be classified as a dissonance and comes after the thirds and sixths in terms of consonance. With Hindemith, however, the perfect fourth is always more consonant than all of the thirds and sixths.
Wolpert does not systematically extend his ideas of consonance and dissonance to all possible chords or even the categories in his system of classification, and apart from discussing the four traditional triads, he goes no further.

Wolpert's discussion of "essential dissonances" as distinguished from "simple dissonances" invites criticism. He believes that even if an interval which is spelled as a dissonance sounds consonant because of enharmonic equivalence to a consonant interval, it is still "essentially dissonant" on account of its spelling. His conclusion regarding these "essential dissonances" is that "they are unstable and cannot be used for cadence formation."59 It would seem that Wolpert is persistent and determined to distinguish between enharmonic spellings, both in his categories of classification and in his treatment of dissonance. However, although he would have us believe that a "g#" for example, sounds different from an "ab" he does not specifically make this statement. Also, it would seem that the interval C-Eb would be an essential dissonance if altered from C-E.60 The group of "essentially

59 Ibid., 38 (14).

60 See proposition 1, p. 33.
dissonant intervals," then, can include a whole variety of types and the concept does not apparently serve any practical purpose, at this point at least, apart from telling us which intervals are "unstable." However, the instability of some essential dissonances, as we have seen with the interval C-Eb, is questionable. Also, Wolpert has previously admitted that even simple dissonances are all unstable. It would seem, then, that the concept of essential dissonance is of little value.

We now come to Wolpert's concepts regarding the dissonance of chords. Even though he specifically discusses only triads, he seems to be treading on ground which Hindemith has carefully avoided—that of the relative consonance and dissonance of chords. He believes the major triad "the most complete" of all sounds possible. So uncompromising is Wolpert's belief in the major triad's supremacy, that he considers it alone to be the consonant triad. The other three triads are all considered dissonant in the degrees previously explained. Wolpert sees the minor triad as a "clouding" of the major, a concept,

61 See p. 32.
62 See p. 32.
63 Ibid., 36 (13).
interestingly enough, with which Hindemith agrees. The augmented triad puzzles Wolpert and he cannot understand why the interval C-G# does not sound dissonant, while the chord C-E-G# has a "very tense sound." This apparent contradiction, he says, is "not validly explainable" and is one of the arguments he uses to justify his belief in the ear as the final judge in differentiating dissonance from consonance. One wonders why Wolpert does not label the diminished triad more dissonant than the augmented triad. This seems to be inconsistent with his discussion of the consonance and dissonance of intervals. The tritone and seconds and sevenths have been classified as dissonant intervals, while the thirds and sixths are consonant. Since the augmented triad contains no intervals which Wolpert would call dissonant sounding, while the diminished triad contains the dissonant tritone, one would expect the augmented triad to be more consonant than the diminished triad. (In Hindemith's Table the augmented triad comes before the diminished.)

The difficulties in attempting to come to terms with basically subjective notions of consonance and dissonance should by now be apparent. There is disagreement

64 Hindemith, op. cit., 78.

65 Wolpert, op. cit., 38 (14).
between Hindemith and Wolpert on almost every point apart from general beliefs such as the consonance of octaves and fifths and the dissonance of seconds and sevenths.

Although there are many differences between Hindemith's and Wolpert's systems, both theorists have attempted and succeeded in classifying all possible combinations of musical pitches, i.e., all possible chords. Obviously the traditional method of building chords in thirds has been subordinated in both classifications and does not form the basis of either Hindemith's or Wolpert's systems.
CHAPTER III

CHORD MOVEMENT

A. Hindemith.

Hindemith's study of chord movement involves the examination of three main points, all of which, when considered, come to bear on the effectiveness of a given chord progression. These are:

1. Harmonic Fluctuation
2. Degree Progression
3. The Two-Voice Framework

It has already been mentioned with respect to Hindemith's system of chord classification that chord value and chord tension are inversely proportional to one another. The higher the number of the sub-group, the higher the tension and the lower the value of the chord to be considered. Conversely, the lower the number of the sub-group, the lower the tension and the higher the value of the chord.

... the tension of chords increases from section to section and from sub-group to sub-group in the same proportion as the value decreases ... it is this up and down change of values which we shall term 'Harmonic Fluctuation.' The fluctuation may be gradual or sudden according to the relative values of the chords that make up the progression.¹

According to Hindemith, sudden fluctuations occur when the progression skips a sub-group (e.g., I.1 to III.2 or II.b.1 to IV.2). On the other hand, gradual fluctuations are those, for example, when the progression occurs within one of the sub-groups (II.a to II.b.3) or, even between two different chords from within a section of a sub-group (e.g., both from II.b.2). Between the "sudden" and the "gradual" fluctuations are those which move among consecutive sub-groups (III.1 to IV.2 or I.2 to II.b.3). These might be termed "medium" fluctuations.

Hindemith states that for harmonic fluctuation to occur, "chords of different value" are required. To understand this statement more fully, one should examine its converse. Hindemith states: "In the connection of chords of identical structure, there is no harmonic fluctuation."\(^2\) Thus, harmonic fluctuation occurs whenever a chordal structure moves to any other chordal structure, but does not occur when a succession of identical chordal structures appears. In the example below, (a) constitutes a gradual fluctuation while at (b) there is no harmonic fluctuation.

\(^2\) Ibid., 117.
Hindemith does not appear to give any definite rules as to what constitutes good harmonic fluctuation, apart from the generally implied notion that in a given musical passage there should be a gradual rise and fall of harmonic tension. This apparent lack of information has been noticed by Herman Hensel:

... the information (Hindemith) gives us relative to what constitutes good organization of harmonic fluctuation is rather sparse and at times ambiguous. ... 3

Hensel also sees Hindemith's implication of the desirability of a rise and fall of harmonic tension. However, difficulties arise when one tries to relate harmonic fluctuation to phrase structure:

Hindemith regards the arch type harmonic tension-repose design as one which shows a good organization. At this point one cannot be sure whether the arch should or should not parallel the phrase, however. Also, this investigation suggests that Hindemith regards as good a design which is out of phase with the other elements, i.e., a design that brings about

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an equilibrium of tensions as the various elements of music interact with each other.\(^4\)

In the *Craft*, Hindemith does warn against movement between certain sub-groups, specifically, V or VI and III or IV:

\[
\ldots \text{as a counterpoise to the stable and tensionless chords of Group I, a chord from group V or VI may be useful; it can almost always be successfully juxtaposed even against chords from group II. But in using it with chords from groups III and IV, care must be exercised. In the midst of such chords, a chord of group V or VI often puts us completely off the track: it seems to cause the whole chord structure to collapse \ldots \text{. Progressions of this type must accordingly be handled with extreme care \ldots}.\(^5\)
\]

Apart from this it seems it is left to the composer's musical intuition to ensure good fluctuation, as no further specific rules are given.\(^6\)

Hindemith helps justify his theory of harmonic fluctuation by explaining that only with this theory is there an "explanation for chords of varying harmonic tension upon the same root."\(^7\) In the final analysis, harmonic fluctuation can be considered as simply an extension of Hindemith's system of chord classification. It takes no

\[^4\] Hindemith, *op. cit.*

\[^5\] Ibid.


\[^7\] Hindemith, *op. cit.*, 119-20.
account of voice leading or root movement but concerns itself simply with the varying tensions in a chordal sequence.

In considering the second point, i.e., "degree progression," we shall adopt the view of Victor Landau in interpreting this term in the broadest sense to include all successions of chord roots. Both Series 1 and Series 2 are used; the latter particularly when considering the roots of adjacent chords in a progression as related in the "tonal sphere" or to a tonal centre.\(^8\)

**SERIES 1:** (Based on Root "C") C, C, G, F, A, E, Eb, Ab, D, Bb, Db, B

**SERIES 2:** P8, P5, P4, M3, m6, m3, M6, M2, m7, m2 M7

By considering the intervals between the roots of successive chords (not yet assumed as being related to a tonal centre), Hindemith comes to conclusions regarding the value of certain chord progressions: "a progression based on the interval of a fifth between its roots naturally has a surer foundation than one based on a minor sixth . . . . \(^9\)

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\(^8\) Landau points out that the term "tonal amplitude," used in Book II of Hindemith's *Traditional Harmony* and defined as "the amount of tension between the tonic chord and each of the other chords in a tonal sphere which is dominated by it," describes the above concept in which Series 1 is used as the determining factor. See Landau's article "Hindemith the System Builder: A Critique," *Music Review* XXII (1961), 147.

\(^9\) Hindemith, *op. cit.*, 122.
Hindemith's rationale here again follows the logic of Series 2. The best progression is that which is based on roots a fifth apart, the next, that based on roots a fourth apart, then that based on roots a major third apart and so on through the series until one comes to the chord progression based on two roots a tritone apart, which Hindemith sees as the "least valuable of all."10 In a chord which has no root (Sub-groups V and VI), a "root representative" is chosen which best connects it (according to Series 2) to the roots of the chords preceding and following it.11

Hindemith points out the disadvantage of assessing the value of chord progressions merely from an examination of the movement of their roots. The fact that a large number of chords can be constructed over the same root helps testify to this drawback. However, Hindemith dismisses the limitation in one sentence: "... here an investigation of the two-voice framework and the harmonic fluctuation will clear up all ambiguity."12

Progressions which contain tritone chords are of

10 Ibid., 123.
11 Ibid., 125.
12 Ibid., 123.
special significance to Hindemith and treated as separate cases. In these progressions, a knowledge of Hindemith's concept of "guide tones" is essential.

A guide-tone is, in a chord from group B, that member of a tritone which stands in the best relationship, according to Series 2, to the root of the chord in question. Whenever a chord from group B is followed by a chord of group A, Hindemith states "the tritone is thereby resolved." If the resolution is to be satisfactory, the guide-tone must move by a good melodic interval (preferably a second) to the root of the following chord. When successions of several group B chords occur, there is no resolution of the tritone but instead a prolonging of the tension. This type of succession is treated like the progressions already discussed except that the interval made by the guide tone in the first chord moving to the guide tone in the second is considered a secondary assessment (after root progression) of the value of the chord progression. Hindemith also points out the

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interesting fact that in the succession of two tritone chords from sub-group II (only occasionally with those from sub-group IV) whose roots are a tritone apart there is also a tritone between the guide-tones of the two chords as well as the fact that the tritone contained in the first chord must also be contained in the second. This important observation leads Hindemith to exclaim: "This chain of tritones links these two chords so closely together that they seem almost like fractional parts of the same chord."\textsuperscript{16}

\textbf{Example 20.}

\begin{center}
\begin{figure}
\begin{center}
\includegraphics[width=0.5\textwidth]{example20.png}
\end{center}
\end{figure}
\end{center}

Roots: D Ab

Common Tritone: C - F\# (Gb)

● = Guide Tones

Thus far Hindemith has made no attempt to relate these concepts of "good" root progression to the concept of tonal centre or tonal sphere. Before beginning to discuss these "harmonic family-relationships," Hindemith admits that certain rhythmic considerations are necessary in

\textsuperscript{16} Ibid., 130.
attempting to discern such tonal centres. "Duration and position in the measure are of decisive importance in determining the tonic: the stressed portion of the measure, the longest note or the final note is needed to tell us which is the principal tone of the group."\textsuperscript{17}

Following this necessary concession, however, there is no further discussion of the element of rhythm in the section concerned with chord movement. Instead, two rather significant definitions are stated regarding the harmonic aspect of tonal organization. These are:

1. A succession of chords from Group A must consist of at least three chords if it is to represent a tonal entity.

2. Only one chord from Group B is needed to produce a feeling of tonality since the "tritone in it forces the ear to assume a chord of resolution."\textsuperscript{18}

Here a distinction must be made between the terms "tonal entity" in definition 1 and "feeling of tonality" in definition 2. Hindemith states that although a "feeling of tonality" is created in the sounding of a single chord from group B, a "tonal entity" (or "tonal centre") is not defined

\textsuperscript{17}\textit{Ibid.}, 133.

\textsuperscript{18}\textit{Ibid.}, 134-5.
since "the ear does not know in which direction to resolve the tritone." Thus, "the sounding of a single tritone chord is enough to create a feeling of tonality, but the tonal centre is not defined. Only when the tritone is resolved can one know which chord root is the tonal centre." 19 When a chord from group B resolves to a chord from group A, the root of the latter is considered the tonal centre. In a succession of chords from group B the tonality is not determined until the chord of resolution. However, in a series of unresolved chords from sub-group II, the tonal centre may be regarded as the fifth below the root of the final chord in the series since "the unresolved tritone of the final chord would resolve most naturally into an interval whose root would be a fifth below the root of the tritone chord." 20 Hindemith's summary in chart form of the number of chords needed for determining a tonal centre is reproduced in the Appendix.

It has already been mentioned that Series 1 is used when considering chords related to a tonal centre, although Hindemith does not fully explain his rationale in choosing

19 Ibid.
20 Ibid., 136.
it. As Series 2 was derived basically from his interpretation of combination tone curves, so Series 1 was derived basically from his interpretation of the overtone series. Whereas Series 2 consisted of a row of intervals, Series 1 consists of a row of tones and represents the degree of relationship these tones have to a given tone. The further a tone is away from the first tone, the more distant the relationship.

SERIES 1: (Based on "C") C,C,G,F,A,E, Eb,Ab,D,Bb,Db,B

A degree progression may be restricted to the high-ranking degrees of Series 1 (Tonic, Dominant and Subdominant) or it may consist of a variety of both high and low ranking degrees. As the degree of relationship between the chord roots and the tonic chord root varies, so does the tension. As Landau has pointed out\(^\text{21}\) this "tension" is not the same "tension" used in discussing chord classification. In the latter, "tension was inherent in the structure of the chord\(^\text{22}\) while with degree progression, "tension" refers to

\[\ldots\] the conflict between the authority of the tonal centre and the urge of the individual harmonies to escape from that authority. When this urge is gratified, of course, a new tonal centre is established and modulation takes place.\[\ldots\]\(^\text{23}\)

\[\text{\quad 21} \quad\text{Landau, op. cit., 150.}\]
\[\text{\quad 22} \quad\text{See p. 18.}\]
\[\text{\quad 23} \quad\text{Ibid.}\]
Landau summarizes Hindemith's views on the establishment of tonality (or a tonal centre) in a complete composition:

... the prevailing tonality is established by the interplay of the same factors which serve that purpose in a tonal sphere, i.e., repetition, finality, and the confirmation of related tones. Thus, the tonal centre which is must repeated or which appears at the end, or which is strongly supported by its dominant and sub-dominant, is revealed as the principal tone of a movement or of an entire work.24

The third point to be mentioned with respect to chord movement is the two-voice framework, i.e., the bass line and the most prominent upper part at a given moment. Hindemith believes that a chord progression is affected very little by the inner voice movement.25 It is principally the setting of the "two-voice framework" that is the most influential and it is to this factor that he devotes his attention. "If writing in several voices is to sound clear and intelligible, the contours of its two-voice framework must be cleanly designated and cogently organized."26

The extent of Hindemith's desire for such strict organization is evident in Volume 2 of the Craft where a

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24 Ibid.
26 Ibid., 114.
total of sixty-five rules are listed as a guide for writing the two-voice framework. Many of these rules have to do with the construction of good melodies while there are only a few which have a direct bearing on the principles of chord movement or succession. Landau, in his study, has chosen only twelve for reasons which he states below:

Hindemith abrogated . . . rules gradually throughout Book II as the student was presumed to have exhausted the benefits of observing them . . . . There are, however, several rules in Book II which were not rescinded and some which were expressly reaffirmed. 27

Of the above explained "unrescinded" and "reaffirmed" rules Landau chooses the following:

1. Distribution of intervals between the voices (thirds and sixths should balance seconds and sevenths)
2. Relative activity: less movement in bass
3. Alternation of activity: (if one voice moves, keep other still)
4. Interval root below at beginning, end, important points
5. No crossing of Voices
6. No Parallel Octaves
7. No Delayed Parallels
8. No Covered Octaves
9. No Covered 5ths or 4ths
10. No Delayed Covered Parallels

11. No leaps to or from 2nds 7ths or the tritone (Most violated rule in Landau's study).

12. Upward resolution of suspensions only to certain intervals (See Rule 50, Book II).  

In addition to these, the present writer feels the following two rules should also be included, partly because of possible comparisons which may be drawn with Wolpert:

1. Rule 22 The two voices may not skip in the same direction at the same time...  

2. Rule 23 Cross Relations must be avoided.  

Book II of The Craft is only concerned with two-part writing, and Hindemith maintains that the two-voice framework as defined should be governed by these rules. To further clarify this point, Landau maintains that these rules, however, cannot be applied to any combination of two voices in a structure of three or more parts, but rather only to the two-voice framework as Hindemith

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28 Ibid., See insert p. 46.

29 Hindemith, op. cit., II, 26.

30 Ibid. Hindemith, however, later permits cross-relations (Rule 37, pp. 46-7) if one of the notes involved is passing tone of relatively short duration falls on the weak part of the measure.

31 Hindemith, op. cit., I, 114.
has defined it, i.e., the bass and most prominent upper part.  

Furthermore, 

On materials on three part writing which Hindemith distributed to his students at Yale, parallel 4ths were allowed between the top and middle voices and between the middle and bottom voices - also, parallel 5ths were allowed between top and middle voices when the tones in either pair of fifths have different functions (when one is a non-chord tone). Parallel octaves, however, were not allowed at all. 

B. Wolpert. 

Throughout Wolpert's discussion of "The Principles and Hindrances of Chordal Connection and Succession," it is implied that the connection of chords is most satisfactory when all the voices (with the exception of the bass), if they proceed at all, proceed by step. Wolpert treats voice movement by second in a most systematic and thorough way, yet the other possibilities of movement in the upper voices (by 3rd, 4th, etc.) are hardly discussed. This would seem to disallow, at the


[33] Landau, op. cit., 51.  

outset, many possibilities of chord movement which even traditionally one has come to accept. Using the "two-voice framework"\textsuperscript{35} (Zweistimmigkeit) as a method of investigation, Wolpert examines possible combinations of paired voices in the connection of two chords. Note that in the example given, all voices except the bass move by step or remain stationary.

\textbf{Example 21.} \textsuperscript{36}

1. \textbf{Reihung} - parallel movement of intervals of equal quality (thirds, seconds, fifths, etc.) by step, ascending or descending.

2. \textbf{Konstante} - one note common in two chords in the same voice.

\textsuperscript{35} It should be noted that "two-voice framework" in the general sense is different from Hindemith's special definition of the same term discussed earlier in Section "A" of this chapter. Wolpert's definition of the term may apply to any combination of two voices.

\textsuperscript{36} Wolpert, \textit{op. cit.}, 65.
3. **Diastole** - two voices expanding by step.
4. **Systole** - two voices contracting by step.
5. **Bas-Kadenz** - when the bass does not move by step.

(1) Concerning the Reihung, parallel thirds, fourths and sixths are acceptable in part-writing, according to Wolpert. Even parallel major seconds or minor sevenths are permitted. However, parallel fifths, octaves and "the small second values and their inversions" (aug. prime, dim. octave, minor second, major seventh) constitute a hindrance to agreeable chord movement and are therefore not acceptable. Later, under the sub-heading "mixtures" (Mixturen), Wolpert explains that consecutive octaves and fifths do, however, appear in music, especially in the impressionists (Debussy and Ravel) and in Reger, but also in Bartok and Stravinsky, and often serve as a "colourful strengthening of the melody."

(2) Concerning the Konstante tone: Wolpert states two "Laws of Inactivity" as follows:

1. A tone which is common in two chords should remain in the same voice.
2. In the connection of two chords, voices should move the shortest possible distance.

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37 Ibid., 66 (23).
38 Ibid., 69 (23).
39 Ibid., 70 (24).
Wolpert implies, then, that the less activity in the voice leading of a chord progression, the better. He flatly states that "jumps (intervals greater than a second) have a cumbersome effect" and goes so far as to give the following examples of what he says are "successions which cannot be called connections" because "their parts are standing for themselves, unconnected" and "no hearing logic is to be recognized in them."  

Example 22.

Here a distinction should be made between the terms "connection" and "succession," although it appears that Wolpert does not. A succession can involve any series of sounds. A connection, it would seem from the above, is a desirable succession, which, according to Wolpert, would involve as little voice movement as possible (except for the bass).
"Our task now" he states, "is to realize possible future connections on the basis of these already known logical hearing processes."\(^{42}\)

(3,4.) One can now examine the **Systolen** and **Diastolen**, which Wolpert discusses as a group. Firstly, distinctions are made among three different types of **Systolen** and **Diastolen**. These are named "complete" (**ganze**), "half" (**halbe**), and "whole-tone" (**ganzton**). With complete **Systolen**/**Diastolen**, the contracting/expanding voices both move by half step. In the half **Systolen**/**Diastolen**, only one voice moves by half step while the other moves by whole step. In the whole-tone **Systolen**/**Diastolen** both voices move by whole step.

**Example 23.**\(^{43}\)

\begin{figure}
\centering
\includegraphics[width=\textwidth]{example23.png}
\caption{Example 23}
\end{figure}

\(^{42}\) *Ibid.*

Next, the concept of "adhesion" (Adhäsion) is introduced. In simple terms, "adhesion" is the name used to describe either a complete Systole or a complete Diastole. Thus, whenever two voices both expand or both contract with a half step movement in each voice, adhesion is said to have taken place. It is assumed that this "adhesive process" is a good quality in chord connection since, according to the "Laws of Inactivity" half-step movement is more likely and desirable than jumps of a major second or larger.

Adhesion may lead to either a stable or an unstable ending. When it leads to the latter, it is termed "diversion" (Diversion). However, there is no term which describes the opposite of diversion, i.e., leading to a stable ending. Moreover, there is a distinction in this

44 Ibid., 73 (25).
45 See Chapter III, p. 67.
46 In order that adhesion can take place with traditionally correct voice leading the term Umopolung is invented by Wolpert (see German text, p. 74). A specific note is "transpoled" so that the voice leading is traditionally acceptable. This "transpolation" is nothing more than enharmonic substitution.
47 Unstable is the same as "dissonant." See Chapter II, p. 34.
unnamed classification between "ambivalently adhesive" and "unequivocally adhesive" penultimate intervals, depending on the spelling of this interval.

Two rules are stated regarding adhesion leading to a stable ending:

1. Unaltered penultimate intervals can resolve in two ways. (These are called ambivalently adhesive.)

2. Altered penultimate intervals can resolve in only one direction. (These are called unequivocally adhesive.)

In simpler terms, some spellings allow one possible resolution, while other spellings allow two. The following example illustrates this fact:

Example 24.49

Unaltered Unaltered Altered

\[\text{Example 24.} 49\]

48 Ibid., 73.

49 Ibid., 74.
All adhesive processes which lead to dissonant or unstable endings are called "diversive"—the process itself is called "diversion." Some examples of this process follow:

Example 25.  

To demonstrate adhesion in its "full efficiency," Wolpert gives an example of a four-note chord connection. There are six possible two-voice frameworks and all are examined in detail—first the outer voices (peripherie); next, the two pairs of voices separated by one intermediate voice (ubernächste); and finally, the three pairs of adjacent voices (benachbarte). The following example will help illustrate Wolpert's procedure:

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50  
Ibid., p. 75.

51  
Ibid., p. 76.
Example 26.

In the above four-note chord connection, four of the six possible two-voice frameworks are adhesive (systoles) and non-diversive; they all lead to stable endings. The remaining two possibilities involve Reihungen - #5 being consecutive third values while #6 involves consecutive fourths.

Here, the second of the "Laws of Inactivity" (i.e., voices moving the shortest possible distance in chord connection) can be seen to operate. For this reason it can be assumed that the examples given illustrate good connections.

As one would expect, non-adhesive interval connections can be mixed with adhesive interval connections as in the following example. Note that although the lower interval pair is non-adhesive it is still systolic.

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52 Here spelling does not seem to bother Wolpert. Although he recognized the diminished fourth he regards it as a "third value" (Terzwerte).
(5) One can now turn to Wolpert's discussion of bass movement. It has already been noted that in chord connection it is most desirable for the upper voices to move the smallest possible distance. The ultimate of this ideal (apart from all voices remaining stationary) is manifested in the concept of adhesion. However, Wolpert informs us that bass movement must be considered "fundamentally independent from adhesion" although when the bass does move by step it can be considered as part of the adhesive process. It would seem, then, that the bass is treated separately from the other voices and in fact, does not follow the "rules" laid down for them. However, it does not have its own rules. Instead, Wolpert lists the most frequently occurring and therefore most desirable possibilities of upper voice movement related to the bass.

After numerous analyses of 'classical' and 'modern' cadences it was discovered that in each upper part the following possibilities of voice movement in relation to the bass made for a satisfactory cadence.  

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53 Ibid., 77.

54 Ibid., 78 (28).

55 Ibid., 78 (28). It is not mentioned what "classical" and "modern" works were analyzed.
Example 28.  

Ibid., p. 80-1. It should be noted that the upper voice movement is not always stepwise although not surprisingly in the majority of cases it is. It might also be noted that if all possibilities of upper voice movement were to be listed, the number for each bass movement would total 11 X 12 or 132.
Wolpert thus seems to imply that the bass voice may move as other voices (by step), but also, particularly at cadential points, may move by third, fourth, or fifth. He is, in fact, not complete in the treatment of the bass voice as he was also not complete in his treatment of the possibilities of upper voice movement.

The bass possesses the "greatest stabilizing power" according to Wolpert, in cadences where it moves by fourth or fifth. When it moves down a perfect fifth or up a perfect fourth, it is considered a "descending cadential bass" and is notated L 5→ or 4→. Conversely, when it moves down a perfect fourth or up a perfect fifth it is considered an "ascending cadential bass" and notated 4→ or 5→.

Next, in examining cadences with split chords, Wolpert discusses the following three simple possibilities.

57 *Ibid.*, 82 (29). Here the word "stabilizing" has no connection with the earlier notions of "stability" and "consonance" but merely denotes a quality inherent in bass movement by fourth or fifth.

using many examples.\textsuperscript{59}

1. Cadences where the penultimate chord contains a split fifth.

2. Cadences where the penultimate chord contains a split third.

3. Cadences involving multiple splits in the penultimate chord.

An example illustrating each possibility mentioned is included:

\textbf{Example 29.} \textsuperscript{60}

Expanding on the above concept, Wolpert illustrates cadences where the penultimate chord contains a split interval and is related to a constant bass progression.

\textsuperscript{59} See Chapter II, pp. 28-30.

\textsuperscript{60} \textit{Ibid.}, 85-6.
Then in order to obtain stable fifths from split thirds, Wolpert presents the following solutions: Inherent is the problem that it is not always possible for upper voices to move only in a stepwise manner.

Example 31. 62

In the first example, if one split tone leads upwards by a half step, the other must fall a minor third; but if one tone moves downward by a half step, the other must

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61 Ibid., 87.

62 Ibid.
rise a minor third. Wolpert then takes the above split thirds which lead to stable fifths and works out all the desirable possibilities of bass movement:

Example 32.

He continues and asserts that hearing a logical "progression" among adjacent voices in a chordal connection is affected by a "penetrating" or "permeating" quality which is characteristic of the leading-tone movement. In discussing this penetrability, Wolpert implies that half step movement is such a powerful force that it does not have to be always in the

63 Ibid., 87 (31).
64 Ibid., 88
65 Here it must be noted that "leading note" is not used in its traditional sense but rather, more generally, implying half step movement ascending or descending in one or more voices.
same voice to be perceived by the ear as the significant and penetrating movement. The leading-note (in this modified sense) seeps through the musical texture, so to speak, even though it may change voices. Wolpert cites Orlando di Lasso, the Gabrieliis and Gesualdo as examples of composers who early recognized the importance of this penetrating quality and incorporated it in their music.\(^66\)

The following short example from Gesualdo is included as an illustration of this principle:

Example 33.\(^67\)

\begin{center}
\includegraphics{example.png}
\end{center}

The "\(\uparrow\)" indicates that the Bb acts as a "leading-tone" to the B. Furthermore, since the movement apparently involves a change in voices, unless it is assumed the voices cross or skip, the leading note is called "transverse"

\begin{flushright}
\(\text{\textsuperscript{66} Ibid., 89 (31).}\)
\end{flushright}

\begin{flushright}
\(\text{\textsuperscript{67} Ibid.}\)
\end{flushright}
Traditionally, the above occurrence would simply be called a "cross-relation" or "false-relation."

Apel defines this term as:

... the appearance in different voices of two tones that, owing to their mutually contradictory character, would normally be placed as a melodic progression in one voice. In other words, cross-relation means the use in 'diagonal' position of what properly is a 'horizontal' element of musical texture. The most important progression of this kind is the chromatic progression, e.g., Eb-E, which is so strikingly horizontal that the ear is disturbed if it hears the first tone in one voice and the second in another.

From this definition, it is easy to see how Wolpert arrives at his concept of the penetrating quality of the leading-note movement. Indeed, he is probably speaking of the same thing that Apel is describing above and does later use the German equivalent of "cross-relation" (Querstand) in describing this process. He then digresses momentarily to talk about "the master composers since the beginning of harmonic polyphony in the Renaissance" as often disregarding the traditional rule against the use of the cross-relation. He says, moreover, that he believes in "the hearing of these Renaissance masters" and considers the cross-relation and its "leading-note-like quality" not only as permitted or even desirable

68 Ibid., 89 (32).

but as a means of chord connection "without any reservation."70

A distinction is then made between a "real" or "pure" cross-relation (echter Querständ - symbol, "Q") and a "sound" cross-relation (Klangquerständ - symbol "q"). The former (see Example 34a below) involves a split tone or augmented prime (E-Eb) while the latter (Example 34b) involves a minor second (Fb-Eb). A real cross-relation (Q) must be spelled as an augmented prime; a cross-relation "in sound only" (q) occurs when the same interval is spelled as a minor second. In both cases, for the definition of cross-relation to hold, the notes involved must be in different voices. The symbol for leading-note, again in its qualified sense, is "L":

Example 34.71

\[
\begin{align*}
Q - L &= E\#_b E_b \\
q - L &= F_b E_b
\end{align*}
\]

70 Wolpert, op. cit., 90 (32).

71 Ibid., 91.
A further distinction is made between narrow (engen) cross-relations and wide (weiten) cross-relations. The former involves a half step while in the latter the two notes under consideration lie at least a diminished octave away from each other.\textsuperscript{72}

\textbf{Example 35.}

\begin{center}
\begin{tikzpicture}
\draw[thick] (0,0) -- (1,0) -- (2,0) -- (3,0) -- (4,0);
\draw[thick] (0,-1) -- (1,-1) -- (2,-1) -- (3,-1) -- (4,-1);
\draw[thick] (0,-2) -- (1,-2) -- (2,-2) -- (3,-2) -- (4,-2);
\draw[thick] (0,-3) -- (1,-3) -- (2,-3) -- (3,-3) -- (4,-3);
\draw[thick] (0,-4) -- (1,-4) -- (2,-4) -- (3,-4) -- (4,-4);
\draw[thick] (0,-5) -- (1,-5) -- (2,-5) -- (3,-5) -- (4,-5);
\draw[thick] (0,-6) -- (1,-6) -- (2,-6) -- (3,-6) -- (4,-6);
\node at (1.5,-2) {\textbf{L Q (e)}};
\node at (3.5,-2) {\textbf{L Q (w)}};
\node at (1.5,-3) {	extbf{narrow}};
\node at (3.5,-3) {	extbf{wide}};
\end{tikzpicture}
\end{center}

Wolpert then points to the Neapolitan cadence (i.e., cadence using a neapolitan sixth) as a classical solution of leading-tones in cross-relation.

\textbf{Example 36.}\textsuperscript{73}

\begin{center}
\begin{tikzpicture}
\draw[thick] (0,0) -- (1,0) -- (2,0) -- (3,0) -- (4,0);
\draw[thick] (0,-1) -- (1,-1) -- (2,-1) -- (3,-1) -- (4,-1);
\draw[thick] (0,-2) -- (1,-2) -- (2,-2) -- (3,-2) -- (4,-2);
\draw[thick] (0,-3) -- (1,-3) -- (2,-3) -- (3,-3) -- (4,-3);
\draw[thick] (0,-4) -- (1,-4) -- (2,-4) -- (3,-4) -- (4,-4);
\draw[thick] (0,-5) -- (1,-5) -- (2,-5) -- (3,-5) -- (4,-5);
\draw[thick] (0,-6) -- (1,-6) -- (2,-6) -- (3,-6) -- (4,-6);
\node at (1.5,-2) {e: I bIII, V I I I bIII, V I I I F# Q(e)};
\node at (3.5,-2) {L = F W F# Q(w)};
\node at (1.5,-3) {L = F W F# Q(w)};
\end{tikzpicture}
\end{center}

\textsuperscript{72} \textit{Ibid.}, 91.

\textsuperscript{73} \textit{Ibid.}, 92.
This solution, says Wolpert, is of the greatest significance for all new kinds of chord connections involving real and sound cross-relations. He then cites various passages in Act III of Tristan as containing sound cross-relations (q) while "beautiful examples of real cross-relations (Q) can be found in Bartok." Wolpert proceeds with an analysis of cross-relations from a portion of Webern's String Quartet, Opus 28. He points out that only certain extremely wide (greater than an octave) cross-relations prove to be "hostile to the hearing" and cites Stravinsky as an example of a composer who prefers "hostile" and "strange" cross-relations. Unfortunately, no examples from Stravinsky are given to justify this statement. The chapter on "Chordal Connection and Succession" concludes with four statements concerning chord connections involving cross-relations:

1. When cross-relations are involved in the chord connection, they should be carefully handled.

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74 Ibid., 92. Diese Lösung ist für alle neuartigen Akkordverbindungen von der allergroßten Bedeutung, und zwar für Querstände ebenso wie für Klangquerstände.

75 Ibid., 92-3 (33).

76 Ibid., 93 (33).

77 Ibid., 95 (34).
2. The ear hears a real cross-relation as a leading tone resolution even though it may not be spelled as such.

3. Because of the penetrating quality of half step movement, all cross-relations can be used both in narrow and wide positions without obscuring the tonality.

4. Extremely wide cross-relations (two octaves and more) are to be avoided.78

C. Comparison.

While the distinctions between Hindemith's and Wolpert's systems of chord classification were quite clear, the differences between their ideas on chord connection are not as immediately evident.

Hindemith's ideas on the connection of adjacent chords rest on the three basic points previously discussed, namely, harmonic fluctuation, degree progression and the two-voice framework. He treats individual chords as entities and extends his theories of classification to his theories concerning chord movement.

On the other hand, Wolpert's ideas on chord connection seem to be founded on two basic ideals, namely,

78 Ibid., 95-6 (34).
the smallest possible movement in the upper voices and more or less traditional bass movements (as established in "classical" and "modern" music). Unlike Hindemith, Wolpert does not treat individual chords as isolated entities as he does in his system of classification. Instead, he breaks them down into their component parts, i.e., he does not extend his system of chord classification to apply also to chordal connection. This is a rather disturbing omission since it tends to detract from the continuity of the entire system.

With these basic differences in mind, one can examine both systems in greater detail according to the following six points:

1. The "Two-Voice Framework."
2. Interval Resolution and Half Step Movement.
3. Root Movement or Degree Progression (Versus Bass Movement).
4. Enharmonics.
5. Chords as Entities.
6. Variations in Chordal Tension and Tonality.

Hindemith considers the two voice framework to exist between the bass and the most prominent of the upper voices. He does not examine other possible two-voice frameworks and goes so far as to state that a chord progression is affected very little by inner voice

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79 See p. 76 of present text.
movement. He does, however, mention inner voice movement with respect to the "guide tone," but only to the extent of saying that it must move by a good melodic interval if the tritone resolution is to be satisfactory. For Hindemith, then, there is basically only one two-voice framework.

Wolpert, on the other hand, examines all possible two-voice frameworks in the connection of adjacent chords. In a progression involving three voices, there are three significant two-voice frameworks, four voices provide six two-voice frameworks, and so on. In addition, Wolpert isolates what he found to be the most common two-voice frameworks to occur between the bass and an upper voice in an attempt to suggest desirable cadence procedures with respect to bass movement.

Regarding the second point, i.e., interval resolution and half-step movement, Hindemith’s concern is mainly with the tritone. Its proper resolution is most important if one is to proceed successfully in establishing a tonal centre. Generally, he considers the movement of voices by

80 Hindemith, op. cit., 115.
81 Ibid., 127.
82 The number of significant "two-voice frameworks" in Wolpert's theory follows the same number sequence as in Hindemith's consideration of all possible interval relationships in determining the root of a chord. See Chapter II, p. 15.
half-step to be a desirable quality. He states that "[a progression] in which all the tones move in minor seconds ... produces the smoothest and most flowing progressions; it acts like a magic formula to make every imaginable chord progression usable." 83

Wolpert also sees chromatic voice leading as a desirable occurrence, but his enthusiasm takes him beyond Hindemith, to the point where almost the entire chapter on chord connection is concerned with half-step movement. For example, in his "Laws of Inactivity," Wolpert implies that the smaller the movement in the upper voices, the better the voice leading. In his discussion of systoles and diastoles, he develops the concept of adhesion as a desirable quality. His obsession with half-step movement is further evident in his extended discussion on the significance of different kinds of cross-relations and in his assigning a penetrating-like quality to half-step motion, even when it occurs between different voices. As far as interval resolution is concerned, Wolpert does not seem to worry. In fact, systoles and diastoles can move to stable or unstable intervals; that is, they can resolve in the traditional sense, or not, hence the concept of diversion or adhesion leading to an unstable interval.

83 Ibid., 124.
Both Hindemith and Wolpert, then, recognize the importance of half-step movement in producing good chord connection. However, while Hindemith treats the resolution of the tritone as a significant aspect of chord movement, Wolpert accords the tritone no special place of importance. Rather, its resolution is just a special case in the larger discussion of systoles and diastoles.

Hindemith is concerned with root movement to the extent that it is perhaps the most important criterion for determining the "value" of a given chord progression: both among the adjacent chords and in the larger framework of the tonal setting.

On the other hand, Wolpert does not consider the movement of chord roots in his discussion of chord connection. This is perhaps a reasonable omission since he does in fact consider all possible two voice frameworks. Wolpert does consider bass movement (as distinct from root movement) and tabulates what he considers to be the "most frequently occurring" or "desirable" upper voice movements with the few (he considers 5th, 4th and 3rd) bass movements he discusses. However, root movement as such is not touched on.

Concerning spelling of notes, Hindemith, as before, adheres to the twelve-note division of the octave in which
enharmonics such as G# and Ab are equivalent, i.e., the way a note is spelled has nothing to do with the way it influences chord movement.

Conversely, as with chord classification, Wolpert is concerned with proper spelling in discussing chord connection. In the section on adhesion, chord movement is affected by the way a note is spelled, i.e., some spellings allow two resolutions while others allow only one. Wolpert even invents his own term (Umpolung) to effect proper voice leading (i.e., with correct spelling) in adhesion. Also, he makes distinctions in his discussion of cross-relations with respect to spelling which seem unessential to the understanding of the concept as a whole (e.g., "sound" vs. "real" cross relations).

Hindemith breaks chords down, so to speak, in presenting his theories on the two-voice framework, but he also carries his system of classification over into his discussion of chord connection, especially in his treatment of the unique theory of harmonic fluctuation.

Again conversely, and perhaps the most disturbing point in Wolpert's discussion of chord connection, is his failure to relate his theories to his previous discussions of the classification of chords. In discussing chordal connection, he breaks chords down into their component parts (for example, all possible two voice frameworks—
systoles and diastoles—bass movement, etc.), but he fails to discuss the chord as an individual entity.

Our final point concerns variations in chordal tension and tonality. Beyond his earlier discussion on the consonance and dissonance of intervals and chords, Wolpert gives no further elaborations on these concepts as they might affect chord connection. In fact, Hindemith's theory of harmonic fluctuation has no counterpart in Wolpert and remains as a unique contribution to contemporary music theory. The only possible point of reference is that what Hindemith would call zero harmonic fluctuation, would at the same time be Wolpert's ultimate ideal with respect to his "Laws of Inactivity." However, this is perhaps stretching a point simply to make a comparison.

In conclusion, as Wolpert implies at the beginning of his treatise,\(^ {84} \) he does not mean to suggest a kind of "harmonic style" (as does Hindemith). He evidently sees his system as suitable for both tonal and atonal compositions, and thus, a detailed consideration of chord organization, i.e., tonal logic, would be out of place.

Hindemith, however, does relate very closely his ideas about chord connection to his theories of classification, since he has very definite ideas about the necessity and even inevitability of tonality.

\(^ {84} \) Wolpert, *op. cit.*, 13-15.
Chapter IV

Further Considerations

We have reached the point in this study where comparison of Hindemith and Wolpert along similar lines is no longer possible. Because of his strong beliefs about the necessity of tonal organization, Hindemith's discussions are unwavering. He asserts that tonality "is a natural force, like gravity"¹ and flatly states that "there can be no such thing as atonality."² He dismisses "bitonality" and "polytonality" as "catchwords" and insists that "every simultaneous combination of sounds must have one root, and only one . . . the ear judges the total sound and does not ask with what intentions it was produced."³

Hindemith's belief in the inevitable condition of some sort of tonal organization in all music necessitates the formulation of a principle or principles describing large scale tonal relationships. The term "tonal sphere"

¹ Paul Hindemith, The Craft, I, 152.
² Ibid., 155.
³ Ibid., 156.
is used to describe "the grouping of chord tones (or root tones) around a tonal centre." However, this tonal centre may and often does vary in the course of a musical composition. To describe this occurrence, Hindemith redefines the concept of modulation saying that "when we allow one tone to usurp the place of another as tonal centre of a degree progression, we are modulating." Modulation, he continues, can be determined simply from the construction of the degree progression. But, before modulation can take place, a "firmly established tonal centre" must be evident, otherwise, the modulation will not be effective. In other words, "the clearer the way leading from one tonal centre to the next, the more satisfactory the modulation." The fact that it is not always clear at what point a given modulation takes place does not seem to bother Hindemith.

... one listener hears the change as occurring at one place, another at another. But this is not a shortcoming; on the contrary, one of the greatest

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4 Ibid., 149. See also Chapter III, p. 62
5 Ibid., 149.
6 Ibid., 151.
The charms of modulation lies in the exploitation of this very uncertainty in the transitional passages.\textsuperscript{7}

Perhaps the most far-reaching aspect of Hindemith's theories about tonal organization is the fact that a single most important tonal centre in the larger framework of a musical composition can be determined.

The tonal centres of all the tonalities of a composition produce, when they are connected without the inclusion of any of the intervening tones, a second degree-progression which should be constructed along the same lines as the first one, built of the roots of all the chords. Here we see the full unfolding of the organizing power of Series 1. The entire harmonic construction of a piece may be perceived in this way: against one tonal centre chosen from among many roots others are juxtaposed which either support it or compete with it. Here, too, the tonal centre that reappears most often, or that is particularly strongly supported by its fourth and its fifth, is the most important. As a tonal centre of a higher order, it dominates a whole movement or a whole work.\textsuperscript{8}

Because of his acceptance of both tonality and atonality, Wolpert has no need to expand his system beyond the discussion of the principles of good chord connection. Therefore, the remainder of his book is devoted to other topics of interest, some of which are presented below.

\textsuperscript{7} \textit{Ibid.}, 151.

\textsuperscript{8} \textit{Ibid.}, 151.
Wolpert's discussion of scales and rules for scale formation is interesting because of his unique approach. All presently recognized modes and scales are discussed along with possible "new scales" using seven, eight, nine, ten and eleven different tones. Wolpert concludes that scale structures other than the ones discussed are not possible in staff notation, i.e., with a twelve-note division of the octave.9

Two concepts are defined by Wolpert which also are interesting because of their uniqueness. The first is the idea of "Personanz":

The essential notes of a chord continue to be effective in the ear, even though these notes are no longer sounding.10

Wolpert gives examples from Mozart, Franck and Wagner to illustrate this concept of "continuability." Although this does not essentially say anything which would not be assumed in traditional analysis, it is still important in an attempt to understand Wolpert's thought processes, keeping in mind the fact that he was a self-taught scholar.11


10 Ibid., 184.

11 Erich Valentin, "F.A. Wolpert" Die Musik in Geschichte und Gegenwart, XIV (1968), 838.
The second concept, in no way related to the first, concerns the idea of "Koharenz":

In the connection of two unstable chords - when there is a leading note but no adhesion, then coherence is said to exist.12

The simplest example of a coherent connection might be the V-I cadence where the seventh is not present in the penultimate chord. Here a leading note is evident but there is no adhesive process occurring since there are no whole systoles or diastoles in the connection.

Twenty experiments which follow involving the connection of chords in root position,13 conclude the expanded (1972) version of the text and illustrate the rules of good chord connection discussed in Chapter III. The first nine experiments illustrate possibilities with all the three part chords while experiments ten to sixteen do the same for all four part chords. The final four experiments illustrate connection of three and four part split chords.

In attempting to come to terms with the principles brought out in this study, the difficulties and limita-

12 Wolpert, op. cit., 198. The term "coherence" is discussed here and not in Chapter III because Wolpert does not include it in his discussion of chord connection.

13 Ibid., 201-23.
tions of discussing two contemporary German musical theorists in a language other than that in which their original works were written must first be acknowledged. Many of the ideas expressed in the original German have not been cogently stated or clearly expressed because of the inherent difficulty involved in translation.

Hindemith and Wolpert have developed systems of chord classification and both have succeeded in classifying all possible chordal material within the twelve-note division of the octave. In Hindemith's system of classification there is an attempt to be as objective as possible. His notions of consonance and dissonance, for example, are derived from the overtone series and combination tone curves and are put forward in his Series 1 and 2. Conversely, Wolpert's concern is subjective, in that he uses his ear to determine a scale of dissonance for intervals and triads. Whereas Hindemith's classification is concerned with the particular combinations of intervals in a given chordal structure, Wolpert's basis for classification is the number of distinct notes in the chord as well as the interval combinations produced when they are reduced to their narrowest possible position.

"Distinct" here refers to letter names; for example, G and G# are not distinct, whereas G and Ab are.
While Wolpert's system of classification greatly emphasizes correct spelling to the point where the spelling of a chord member determines into which category the chord is placed, Hindemith's system of classification does not distinguish between enharmonics but regards them as being equivalent for purposes of classification. Whereas Hindemith's logically evolved theory of chord roots is involved in his system of chord classification to the extent of determining subgroup divisions, chord roots play no part whatever in Wolpert's system of classification. While Hindemith uses the tritone as a distinguishing feature in his categorization of chords, Wolpert does not, but instead evolves his highly individual theory of split chords based on the intervals of the augmented and doubly augmented primes.

Both men have also developed their own principles of chord movement. While Hindemith's ideas on the connection of chords rest on three distinct criteria--harmonic fluctuation, degree progression and the two-voice framework--Wolpert's theories on chord connection rest on two main ideals--smallest possible upper voice movement and more or less traditional bass movement.

Since Wolpert does not extend his system of classification to cover chordal connection, there is a lack of overall cohesiveness in his treatise. This is
in direct contrast to Hindemith, whose principles of chord movement are a direct extension of his system of classification. While Hindemith only considers one "two-voice framework," Wolpert takes all possible "two-voice frameworks" into account. Whereas Hindemith is concerned with tritone resolution in chord movement, to Wolpert the tritone is only a special case in adhesive or whole systole/diastole "resolutions." As with his system of classification, again in his system of chord movement, Wolpert seems overly concerned with the way a particular note is spelled, while with Hindemith enharmonics are again equivalent. In describing the adhesive process Wolpert illustrates how one spelling will allow two resolutions while another will allow only one. This concern for spelling is again evident in the distinctions made among the various types of cross-relations. While Hindemith admonishés against cross-relations in chordal connection, Wolpert strenuously encourages their use. While Hindemith's theories of chord connection are based on the movement of roots or degree progressions and their deviation and return to a tonal centre, Wolpert does not consider root movement, since to do so might be to contradict his original position on the acceptance of both tonality and atonality as valid frames of reference.
On the whole, then, both men succeed in classifying all possible chords within the twelve-note division of the octave while working from somewhat opposite points of view. On the one hand, Hindemith works from the original premise of the inevitability of tonality. He attempts to build a logical system starting from nature and progressing through chordal construction to an all-embracing natural system.

Wolpert, on the other hand, combines interest in logical patterns with a redefinition of more or less traditional advice and rules and apparently shows no interest in developing an overall coherent and cohesive system. His classification of chordal structures is obviously logical rather than practical whereas his discussion of chordal movement is simply a restatement of traditional procedures and is not connected to his system of classification. Accordingly, his chapter on classification seems to be directed towards the philosopher or logician whereas his section on chordal progression is more like a collection of helpful advice to the aspiring composer.

Thus, the two men, using different approaches to the same problem, both realize a complete system of chordal organization and progression within the twelve-note division of the octave. Their conservatism in theoretical matters shows a link with past traditions and
ideals, yet, their contribution is both necessary and appropriate for our time, and thus is of value in our overall understanding of twentieth-century music theory.
BIBLIOGRAPHY


APPENDIX I

SUMMARY OF HINDEMITH'S

TABLE OF CHORD GROUPS

Group A - Chords Without Tritone Group B - Chords With Tritone

I. Also have no 2nds or 7ths
   1. Root and Bass Identical
   2. Root above bass

II. Also have
   a. m7 only
   b. M2 and/or m7
      1. Root and bass identical
      2. Root above bass
      3. More than one tritone

III. Also have 2nds and/or 7ths
     1. Root and Bass Identical
     2. Root above bass

IV. Also have m2 and/or M7
    1. Root and Bass identical
    2. Root above bass

V. Indeterminate, i.e. no root

VI. Indeterminate, tritone predominating
APPENDIX II

How many chords are needed to produce a tonal center?

How is the Tonic found?

A Chords without Tritones

B Chords containing Tritones

<table>
<thead>
<tr>
<th>I</th>
<th>II</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3 Chords</strong>&lt;br&gt;Tonic: Principal tone of the group formed by the chord-roots</td>
<td><strong>3 Chords</strong>&lt;br&gt;Tonic: Root of the chord of resolution</td>
</tr>
<tr>
<td></td>
<td><strong>2 Chords</strong>&lt;br&gt;The last of a group of chord-roots is the Dominant of the Tonic lying a fifth lower</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3 Chords</strong>&lt;br&gt;Tonic: Same as in I</td>
<td><strong>2 Chords</strong>&lt;br&gt;Tonic: Root of the chord of resolution</td>
</tr>
<tr>
<td><strong>2 Chords</strong>&lt;br&gt;Tonic: Same as in II</td>
<td></td>
</tr>
</tbody>
</table>

V After determination of the root, to be treated the same as I

VI After determination of the root, to be treated the same as II

Tonic: Indeterminate
APPENDIX III

Wolpert - Sonata No. 1 (Meas. 1 - 3)

<table>
<thead>
<tr>
<th>Wolpert's System</th>
<th>Hindemith's System</th>
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<tbody>
<tr>
<td>1.</td>
<td>(5/3)</td>
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<td>2.</td>
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<td>3.</td>
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<tr>
<td>4.</td>
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<td>5.</td>
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<td>6.</td>
<td>(6/5a)</td>
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<td>7.</td>
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<td>8.</td>
<td>(4/5)</td>
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<td>9.</td>
<td>(4a)</td>
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<td>10.</td>
<td>(5/5)</td>
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<tr>
<td>11.</td>
<td>(6a)</td>
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<tr>
<td>12.</td>
<td>(5/5)</td>
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</tbody>
</table>
APPENDIX III

Hindemith - Sonata No. 1 (Meas. 1 - 4)

With quiet motion, in quarters (\( \frac{1}{96} \))

<table>
<thead>
<tr>
<th>Hindemith's System</th>
<th>Wolpert's System</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I. 1</td>
</tr>
<tr>
<td>2.</td>
<td>III. 2</td>
</tr>
<tr>
<td>3.</td>
<td>I. 1</td>
</tr>
<tr>
<td>4.</td>
<td>III. b. 2</td>
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<tr>
<td>5.</td>
<td>IV. 1</td>
</tr>
<tr>
<td>6.</td>
<td>III. 1</td>
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<tr>
<td>7.</td>
<td>II. a</td>
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<td>III. 1</td>
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<td>III. 1</td>
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<td>15.</td>
<td>I. 1</td>
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