1960

Related trends in music and painting of the twentieth century

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Boston University

http://hdl.handle.net/2144/18584

Boston University
BOSTON UNIVERSITY
GRADUATE SCHOOL

Thesis
RELATED TRENDS IN MUSIC AND PAINTING
OF THE TWENTIETH CENTURY

by
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(A.B., Swarthmore College, 1955)

Submitted in partial fulfillment of the
requirements for the degree of
Master of Arts
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ACKNOWLEDGMENTS

The warmest appreciation is extended to my three readers, Dr. Karl Geiringer, Assistant Professor John Hasson and Dr. George Levitine. They have given far more of their time and experience than their positions as readers required. I have learned a great deal from them, and cannot thank them enough for the very important part they played in the writing of this thesis.
PREFACE

The purpose of this thesis is to discover and present corresponding trends in music and painting of the twentieth century. The emphasis is on similarities of technique, rather than on the works of individual men or movements. The author has attempted to avoid inconsistent or "intuitive" comparisons. It is impossible to avoid over-simplification, however. Comparisons are founded on corresponding functions of factors basic to each media, irregardless of period, for example, melody and line are compared. It is hoped that this method of comparison may shed new light on twentieth-century music and painting, and help to point out some trends which will be lasting, and which express and reflect that which has value in the present civilization.
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CHAPTER I

METHODS OF COMPARISON

Before entering into the main discussion of this thesis, "Related Trends in Music and Painting of the Twentieth Century," let us first consider methods of comparing the two arts.

Surprisingly few attempts to compare music and art have been made. Comparisons of art and literature are far more frequent. Sypher's *Four Stages of Renaissance Style*\(^1\) is an excellent treatment of related trends in art and literature of the fifteenth through the seventeenth centuries, and Hauser's *Social History of Art*\(^2\) compares art, literature and thought of all periods, in the light of economic, political and sociological developments. In these comparisons of art and literature, the presence of a literary element in both arts, that of subject matter, has provided a useful foundation for the discussion. Subject matter serves as a point of departure for stylistic comparisons. In music, on the other hand, subject matter is not always present, for there is both instrumental and vocal music in many periods.


The music historian often cannot use subject matter as a guide to explanation of what the music expresses. Consequently, the music historian's conception of style is often an entirely technical one, based on the harmonic, melodic, rhythmic and formal techniques most common to individual composers and periods. Because of the direct, abstract nature of musical expression, it is very difficult and usually not valid to discuss the "meaning" of music in intellectual terms. The music historian may make certain important generalizations concerning a musical message, but he seldom discusses the "meaning" of music as specifically as do art and literature historians.

Historians of all the arts divide styles into regional and period groupings. The influences of time and place, of politics and economy, of religion and individual persons, on all the arts, are recognized by historians of each. Cultures and civilizations are made up of many interdependent factors. The importance of cultural determinants in the evolution of musical styles is acknowledged by music historians. A leading example is Paul Henry Lang's *Music in Western Civilization* which presents a brief account of art, philosophy and literature as a background to each musical period. Lang does not go into any actual comparisons between art or literature

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and music. His comments on art and literature serve merely as a stage-setting for his discussion of music history.

Curt Sachs, in *The Commonwealth of Art*, discusses the period divisions of music history on an equal basis with those of art history. Comparisons are made. The first section of this chapter must be devoted to a discussion of Sachs' work.

Sachs does not discuss any single period in detail. His discussion is based on cyclical alternations between certain stylistic features which tend to recur in art and music history, taking on different shapes at each recurrence. *The Commonwealth of Art* is a philosophy of art and music history, rather than a comparison of individual elements of art and music specific to certain regions and times, and not occurring elsewhere.

The province of this thesis is different from that of Sachs in that it attempts to discover what is distinctive in art and music of the twentieth century. Whereas Sachs is concerned with the similarities between periods, this thesis is concerned with the twentieth century only, and how it differs from all other periods. Consequently, it requires a more technical and less philosophical point of departure than Sachs' cyclical theory. However, the actual discussion of

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Sachs' work is occasionally specific and technical, and is relatively consistent in its comparisons of factors of one media, such as art, with factors of another media, such as music. Since the comparison of techniques basic to individual media, with those of other media, is necessary in a discussion of a specific period in any detail, Sachs' book helps us to establish a foundation for the comparisons made in this thesis.

In this, somewhat introductory chapter, we shall first briefly summarize Sachs' method of comparing music and art, in The Commonwealth of Art. Then we shall outline the method of comparing music and art employed in this thesis. We shall then be ready to discuss the twentieth century.

I. CURT SACHS AND THE CYCLICAL THEORY

The method of comparison employed by Sachs in The Commonwealth of Art, is an application to all arts of the polar contrasts of classic vs. baroque (or romantic) characteristics first expounded by Heinrich Wölfflin in Principles of Art History. Wölfflin concerns himself primarily with the contrast between sixteenth-century Renaissance and seventeenth-century Baroque painting, sculpture and architecture, with some references to the very late baroque style of the

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eighteenth century known as rococo. He mentions the return
of classic principles in the neo-classicism of the late
eighteenth century. He does not, however, discuss neo-
classicism with any detail, but limits the demonstration of
his theories to sixteenth and seventeenth centuries.
Wölfflin also adds occasional comments concerning the fif­
teenth century which he considers to be a "primitive" period,
manifesting some classical and some baroque principles with­
out full allegiance to either pole, and without any other
self-evident stylistic unity of its own. Such a "primitive" period, in the process of shaking off the baroque of Late
Gothic, has still not fully established the classicism of
the sixteenth century.

In the concluding chapter of Principles of Art His­
tory, Wölfflin considers the possibility of applying his
polar contrasts to other periods, notably to fifth-century
vs. Hellenistic Greece (and Rome), but also to High Gothic
vs. Late Gothic. This is usually called the "Cyclic" con­
cept of art history, that is, the recurring vacillation
between a rational, "classic" age on the one hand, and an
emotionalistic, "baroque" age on the other.

The "Cyclic" theory of art history is fully adopted
by Sachs (see Part III of The Commonwealth of Art). The
larger cycles of art, music and dance history are Antiquity,
Medieval and Later Ages. The Later Ages includes two inner
phases, Renaissance vs. Baroque, and Neo-Classic vs. Romantic.
Nineteenth-century Romanticism represents the last phase of the Later Ages, with its final aspect manifested in German Expressionism of the early twentieth century. The art forms following (and somewhat overlapping with) German Expressionism represent both a new Cycle and a new phase. Sachs describes this period, which is fully established in the 1920's, as classic and anti-romantic.

Within classic vs. baroque Cycles there are phases, and within the phases there are, according to Sachs, smaller generational reversals, all revealing the same contrasting characteristics. The polar oppositions of classic and romantic are by no means absolute. Art and music history are in constant evolution, never exactly repeating themselves. There are differences between individuals, regions and nations that affect the degree of classicism or romanticism expressed in the arts. Also, the natural tendencies of individuals, regions and nations, and the inherent natures of the various arts, as well as additional influences of economic, political and religious situations, all determine the incidence of cultural flowering. For example, the natural tendency of the Germanic north is towards a baroque art. This fact, plus the preoccupation with religious conflict due to the rise of Protestantism during the sixteenth century, helps us to understand the relative lassitude of German music and art during the basically classical sixteenth century. Similarly the Italian or Latin mind and temperament tend toward
classicism. Consequently the baroque style of the middle ages, the Late Gothic, does not flower in Italy, but with the rise of Renaissance classicism, Italy suddenly takes the lead. Both Curt Sachs and Heinrich Wölfflin agree in their descriptions of regional and national as well as historical tendencies. Neither Sachs nor Wölfflin attempt to type individual artists. Nor do they concentrate on what is individual in a particular period. Rather, they focus on the larger aspects of art history, and bring out the similarities between all classical periods as opposed to all baroque periods.

Wölfflin's principles which include the addition of related factors subsidiary to the larger five are: 1) Linear vs. Painterly; Linear (Draughtsmanly, Plastic) and Painterly - Tactile and Visual Picture - The "Picturesque" and its Opposite, 2) Plane vs. Recession, 3) Closed and Open Form, 4) Multiplicity and Unity, and 5) Clearness and Unclearness. The entire Principles of Art History, all of the chapters save the conclusion, is devoted to the explanation of these principles as they apply to the sixteenth and seventeenth centuries in the visual arts.

The Commonwealth of Art, on the other hand, begins with "An Outline of Comparative Art History," pages 31 to 199, in which Sachs discusses cross sections, of one or two decades each, from each of the main phases. As previously stated, Sachs does not limit himself to sixteenth and
seventeenth centuries, but enriches our understanding of all Cycles and phases. In limiting himself to cross sections, Sachs is able to select those periods which most sharply illustrate the classic-baroque oppositions, and to avoid the evolutionary and transitionary stages.

At this point, it seems well to mention that, in addition to periods which Wölflin regards as clearly classical or baroque in type, he refers to a third type. He calls the fifteenth century a "primitive" phase. As such, it is neither classic nor baroque in character but bears features of each. To apply Wölflin, one might assume that just such a "primitive" phase customarily preceded a classic one, interceding after the baroque of a closing Cycle. If so, then the twentieth century, in following a large Cycle with a new one, and in being preceded by a baroque phase, would likewise be a "primitive" stage after a declining baroque and containing the seeds of the coming classicism. This "primitive" stage would not yet manifest any clearly-established stylistic unity. To mention other "primitive" stages we should include only the first stages of new Cycles, to avoid confusion with mannerism which occasionally arises between classic and baroque phases of a Cycle. Other "primitive" stages would include archaic Greek art, early Christian art (as it develops away from Late Roman), late fourteenth- and early fifteenth-century art...and art of the twentieth century. In terms of
Sachs' Cycles, archaic Greek art is the "primitive" phase of the Cycle of Antiquity and early Christian art is the "primitive" phase of the Cycle of the Medieval Period. Late fourteenth- to early fifteenth-century art is the "primitive" phase of the Cycle of the Later Ages, and twentieth-century art, after Expressionism, is the "primitive" phase of a Cycle not yet fulfilled.

As has been said, Sachs, in attempting to cover major stages of each Cycle, an enormous task in itself, necessarily omits transitions and ambiguous stages of art history where style is evolving rather than established, and where the classic-baroque oppositions cannot be justly applied. Sachs does include a twentieth-century cross section, 1921-1946 (pages 192-5). However, it is very much briefer and more cursory in treatment than are the other cross sections. In it, Sachs gives a rudimentary background to some of the multiple artistic manifestations of our time, without specifically comparing the arts. He characterizes the beginning of the twentieth century as late-nineteenth-century Romantic in German Expressionism, and classical and antiromantic in other aspects.

The relation of art and music at all, is an innovation of Sachs alone. Because he is pioneering he must justify the whole concept of comparing the arts. He does this by means of the Cyclical theory. His connecting link between the arts is Wölfflin's principles. Wölfflin had
shown how these principles apply to the visual arts. Sachs shows how these same principles can be applied to other arts such as music and dance. The classical phases also correspond. Thus, Sachs proves that a comparison of arts employing very different media, is in itself a valid topic for discussion. He also proves that an understanding of the similarities between different arts, in the same period, greatly helps a student to understand the period itself.

Sachs offers a tremendous contribution in his revealing of the classic-baroque principles in music history. Before The Commonwealth of Art this had never been done. Sachs' book is as helpful to the understanding of musical styles as Wölfflin's is to the understanding of artistic styles.

Part Two of Sachs' Commonwealth of Art, entitled "The Nature of Style," pages 199-319, explains the basic dualism of Cycles, phases and generational reversals not as classic-baroque (Wölfflin's terminology) but rather as Ethos and Pathos. His chapter heading within this section are Limitation and Boundlessness (Subtitles: Themes, Descriptiveness, the Mixing of the Arts; The Fusion of the Divine and the Secular; The Fusion of Art and Life; Size and Density; Redundancy; Symbols and Craft), Essence and Appearance (Subtitles: Immanence and Accident; The Plain and the Picturesque; Line and Color; Two and Three Dimensions; Presentation; Independence and Dependence), Close
and Open Structures (Subtitles: Contour; Addition and Unification; Disjunction and Conjunction; Tectonics and Atectonics). There is not room here to discuss the various points which are inherent in and compatible with the principles of Wölfflin. Naturally, Sachs had to extend and modify those principles to apply them to other arts and other periods than the sixteenth and seventeenth centuries. However, a comparison of these chapter titles and subtitles with those of Wölfflin just listed will reveal at a glance the relation between the two applications of a Cyclical theory to art and music history.

Sachs does not attempt to provide an acceptably systematic method of comparing specific stylistic techniques within the medium of painting, with equally specific stylistic techniques within the musical medium. He does not analyze media. However, certain comparisons between the two dissimilar media arise from the oppositions of classic and baroque. For example, it is a feature of baroque or Pathos periods, that instrumental idioms are of prominent importance to composers of music. This is unlike classical or Ethos periods in which the orchestra is less important than the melodic line. Similarly, in baroque or Pathos periods of painting, color is of greater importance than line. Line dominates in classical or Ethos periods. From these two oppositions, we have two comparisons of the techniques of the different media, (1) instru-
mentation and color are related and (2) melody and line are related.

Unfortunately, the oppositions of classical (Ethos) and baroque (Pathos) principles do not shed much light on the twentieth century. The twentieth century is obviously a "primitive" period, containing both classical and baroque elements. There is no single style of the twentieth century. Rather there are several styles. A comparison of art and music of the twentieth century demands that they be related by some other means than the Cyclical theory used by Sachs. The comparison of art and music in terms of related techniques, such as instrumentation and color, and melody and line, seems to be the more satisfactory method of discussing the twentieth century. Again, it seems best, like Sachs and Wölflin, to avoid the comparison of individual personalities, such as Stravinsky and Picasso or Stravinsky and Matisse. Readers will recognize relationships between individual composers and painters in terms of the techniques used by these composers and painters. There are instances, however, where the style of, for example, French painting, can be technically related to the style of French music at the same time....yet there may be more and greater French painters than composers in this style, or vice versa. The incidence of genius is unpredictable. One does not always find an artistic and a musical genius in the same time at the same place. Furthermore,
geniuses add elements which are contained in their individual musical personalities and which occur nowhere else. In order to avoid confusion of the characteristics of time and place, with those of individual personality or even individual greatness, we shall limit our comparison of the arts to related techniques and styles in general terms.

II. A METHOD BASED ON MEDIA

This comparison of related trends in music and painting of the twentieth century is based on technical similarities between the two. The emphasis shall be on form rather than content, with the understanding that form implies content. The way in which fundamental elements of music are used, is to be compared with the way in which corresponding fundamental elements of painting are used, in the twentieth century. It is assumed that the same elements of music and painting will correspond, regardless of period. For example, melody in music and line in painting correspond in every period of art and music history, not just in the twentieth century. It will occasionally be necessary to refer to correspondences between music and painting that occurred prior to the twentieth century, in order to explain what is unique in twentieth-century usage.

The influences of time, place and personality will be observed. Certain characteristics of modern art and music are general, for example, the tendency toward the clarification of note, part, shape, melody and line by
chamber orchestration and unblended color, or the tendency leading away from tonality toward atonality, and away from realistic representation toward abstraction. Other trends are limited in time and/or area, for example, the neoclassicism of the 1920's and 30's, which takes different forms in France, and Austria and Germany. We will find that certain correspondences fit France more than they do Austria and Germany, and vice versa. Polytonality and spatial multiplicity, ostinatos and all-over patterns, chordal melodies and flat linear strips, occur far more frequently in France than in Austria or Germany. Expressionism is a Germanic phenomenon. Atonality, like abstract art, occurs first in Austria and Germany, and both are outgrowths of Expressionism. National temperaments influence, in a similar manner, the separate evolutions of forms in painting and music in the twentieth century.

According to the "Cyclic" theory of Sachs and Wölfflin, the twentieth century is a "primitive" period. Certainly the twentieth century contains both classical (Ethos) and baroque or romantic (Pathos) characteristics simultaneously. Although the baroque or romantic (Pathos) factor dominated in German Expressionism, which was actually a last manifestation of late-nineteenth-century romanticism, it was replaced by the neo-classicism (Ethos) of the 1920's. Because of the rise of neo-classicism in music and art of both France and Austria and Germany, in the
1920's, Sachs characterizes the whole twentieth century (what we know of it) as a classical phase.\(^6\) Actually the 1920's was merely a dominantly classical generation. It was presaged by the formal concentration and decorative purpose of the Cubists and Matisse long before 1920, in spite of the tremendously energetic experimentation of these same works. In the dominantly classical 1920's there paradoxically occurs emotionalistic, subjective, anti-classical style, in France and Switzerland, that of Dada and Surrealism. Equally puzzling is the picture since 1945, which presents both classical (Ethos) and romantic (Pathos) tendencies, with neither dominating the other. Abstract expressionism, Tachism and action painting, and musique concrete, the "chance" music of John Cage, and the musical freedom of some music and art since 1945, is in direct and "romantic" opposition to the "classical" austerity of the followers of Mondrian and Constructivism, and of serial and electronic music. While there are many characteristics that abstract expressionism has in common with Constructivism, and which musique concrete has in common with serial music, one cannot call these common characteristics either classical or baroque (romantic). Abstraction and atonality dominate, since 1945, but they can be, and are, used in either a

\(^6\)Sachs, op. cit., p.
classical or a baroque manner.

The first, and simplest, correspondence to be discussed is that between text, in vocal and descriptive music, and subject matter in painting. The connecting link between text in music and subject matter in painting is obviously that both are literary. The correspondence between text and subject matter is relatively unimportant in the twentieth century, except for German Expressionism, which, as has been said, is a last manifestation of nineteenth-century tendencies. Painting in the twentieth century tends to lack subject matter, to become abstract, for the first time in art history. Painting in the twentieth century draws away from human representation. It become more "musical" and less "literary." Consequently, the discussion of comparisons between text and subject matter shall be limited to that area where these are most revealing, to German Expressionism.

Color shall be compared, not only to pitch, but also to instrumentation. The reason for this is that, whereas in painting forms and shapes are inconceivable without tone, which has three factors, hue, value and intensity in varying importance, in music notes can be imagined and indicated in writing in terms of pitch and rhythm without sound or sonority, without tone or instrumental timbre, in other words, without realization. There is no separation between the creation and the result of
painting as there is in music which is first imagined by
the composer and then performed for the listener. Occa-
sionally the instrumental color of musical notes is insepa-
rable from their original conception as pitches but this
is not always the case. And in a painting (as opposed to
a drawing), the gradations of value, that is, of dark and
light, cannot be separated from those of color.

Color, pitch and timbre are all the result of human
perception of vibrations, vibrations of light and vibra-
tions of sound. Comparisons of color to pitch, and of
color to instrumentation, are based on the scientific
analysis of the nature of light and sound vibrations given
in *Einstein's Colour-Music, the Art of Light.*

Sachs, in *The Commonwealth of Art,* points out that
in periods where color and painterly qualities dominate,
clarity of line and contour are subordinate, in "Pathos"
(baroque and romantic) phases, there is a corresponding
dominance of chromatic harmony with unresolved dissonances
and of rich instrumental sonority over melodic lines, clear
individual parts and strict voice-leading.

It is impossible to be too specific in a comparison
of color and pitch and instrumentation. Instrumental timbre
includes both texture and color (overtones or pitches).

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7Klein, *Colour-Music, The Art of Light* (London:
Technical Press, Ltd., 1930)
Sound involves, simultaneously, pitch (high or low), timbre, and dynamic intensity (loud or soft). In painting, color is inseparable from paint, from the texture of the surface. If we could separate color from pigment, or colored light, or surface texture; if the painter used hue without value or intensity; if pitch could be heard minus instrumental timbre, then we might find a more exact correspondence between the elements of color and the elements of musical tone. As it is, the constituents of color (or tone in painting), and musical tone, are inextricably related one to the other. Without attempting to separate the elements that make up painted color, and without attempting to decide which of these corresponds to pitch, and which to instrumental timbre, we still can come to several conclusions regarding these. Painters and composers show us the way. The answer is in the works themselves. Consistently, throughout history, certain uses of color have been compatible with corresponding uses of pitch (harmony) and/or instrumentation.

The correspondence between melody and line is more specific. Both can be understood as the extension or connection between two or more points. Points are comparable to isolated notes. If a line has thickness, it ceases to be a line and becomes mass. A collection of points, the edge of which is a contour, equivalent to a line, is a mass. A collection of notes is a chord. The chord can be
outlined, and this outline or contour is a melody. This can be explained in greater detail in the chapter on melody and line, and contour and counterpoint.

The most complex correspondence between music and painting, is that of systems of organization or form. In the four hundred years prior to the twentieth century, in western civilization, painting was organized with an emphasis on linear and atmospheric perspective, and on representation of human beings, architecture, objects and landscapes in terms of human sense-perception, with the illusion of the third dimension. There are many degrees and varieties of these principles of organization in western painting from 1400-1900. Yet these principles of organization stand out as belonging to that four hundred years. The same four hundred years witnessed the evolution of tonal harmony and consonances based on the overtone series. While there are as many styles of harmonic writing, in that four hundred years, as there are composers, still the principles of tonality and consonances based on the overtone series stand out as belonging to the musical evolution of at least 1600 to 1900, and the qualifications of their presence prior to 1600 will be explained when they are presented in a later chapter.

Because twentieth-century styles have only gradually, and in many, different ways, extricated themselves from past systems, it is necessary to explain in full the
correspondence between systems of formal organization in painting and music before the twentieth century. Perspective and spatial realism shall be compared with tonal harmony. Then the aberrations and changes from these systems of organization, which occur in the twentieth century, such as polytonality and spatial multiplicity, or atonality and abstraction, can be more clearly understood.

Finally, these several correspondences between features of twentieth-century painting and features of twentieth-century music, can be drawn together in a brief discourse on movements as a whole, such as Expressionism or Neo-classicism. After separating stylistic features from the contexts in which they occur, it will be necessary to restore them to their rightful places in twentieth-century movements.
CHAPTER II

TIME AND ABSTRACTION IN MODERN ART

Before the twentieth century, two factors strongly separated music from painting. The first was that music took place in time, while painting took place in space. Perhaps because of the emphasis placed by science and philosophy (Bergson) on continual change and flux and the relativity of time and space, art in the twentieth century frequently expresses the metamorphosis of forms which takes place in time as well as in space. The metamorphosis of forms, in a spatial art such as painting, requires distortion of realistic representation or else total abstraction. This brings us to the second factor which has traditionally separated music, particularly instrumental music, from painting and literature. Music generally has no subject matter, no literary content. Painting has traditionally represented people and things, and has implied a story or literary statement of some kind. But in the twentieth century, and never before in art history, there occurs abstract form in the visual arts.

These two factors belonging to the musical medium, time and abstraction assert themselves in variable degrees, in twentieth-century art. The visual arts in the twentieth century become less literary and more "musical." While the
main discussion of this thesis will be devoted to the comparison of elements occurring in music and painting of all periods, as they correspond in the twentieth century, the intrusion into the visual medium of factors traditionally associated with the musical medium should not be ignored. This chapter, "Time and Abstraction in Modern Art," shall for the moment suspend the comparison between twentieth-century art and twentieth-century music. Let us, for the moment, take a look at the occasional changes in the visual medium which make it more "musical" and less "literary." A correspondence between twentieth-century music and twentieth-century art is not implied here. The point is simply that twentieth-century art, as a medium, occasionally draws closer to the musical medium of all periods.

The major portion of this chapter will be devoted to the musical features of time and abstraction as they occur in the visual arts. Ironically, the first introduction of the musical features of time and abstraction into the visual arts was made by a musician, Scriabin.

I. SCRIBABIN AND THE COLOR-ORGAN

Scriabin's Prometheus: the Poem of Fire, opus 60 in F#, composed in 1910, included among the instruments of the orchestra, a "Tastiera per Luce." The "Tastiera per Luce" is a keyboard of colored light-rays, invented by an Englishman, A. Wallace Rimington in the 1890's. It is more commonly
called a "color-organ."

Rimington had divided the spectrum in different ways in different color-organs. One instrument was equipped with a five-octave keyboard similar to a piano. Each octave was progressively brighter in its presentation of colors, with the same colors for the same notes within each octave. In his performances he used ordinary musical notation, for the visual presentation. Rimington also invented an instrument wherein the spectrum was spread over the five octaves of the keyboard. Rimington's third invention was a color-organ requiring special notation. The three primary colors were controlled in their respective intensities by special levers.

Scriabin used Rimington's instrument but his own color scale. He founded his scale on the cycle of fifths, giving the strongest colors to the keys he considered strongest; C Major, D Major, B Major, F# Major. ¹

Red Orange Yellow Green Blue Violet
C G D A E B F#

In Prometheus Scriabin based his colors on his musical harmonies. The harmony in Prometheus is based on a six-note chord. The colors follow the tonalities of the bass line, with the same colors for the same harmonies. His color allocations for Prometheus thus vary somewhat from his original concept of color-relations,

but still suggest the circle of fifths.²

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<td>Rosy Orange</td>
</tr>
<tr>
<td>D</td>
<td>Yellow</td>
</tr>
<tr>
<td>A</td>
<td>Green</td>
</tr>
<tr>
<td>E and B</td>
<td>Pearly Blue, the Shimmer of Moonshine</td>
</tr>
<tr>
<td>F#</td>
<td>Bright Blue</td>
</tr>
<tr>
<td>Db</td>
<td>Violet</td>
</tr>
<tr>
<td>Ab</td>
<td>Purple</td>
</tr>
<tr>
<td>Eb and Bb</td>
<td>Steely with the glint of metal</td>
</tr>
<tr>
<td>F</td>
<td>Dark red</td>
</tr>
</tbody>
</table>

As can be immediately seen, Scriabin's choice of color-tone relationships is emotional and personal. We are not sure exactly what he means by "Pearly Blue, the Shimmer of Moonshine."

Scriabin was in the process of writing his largest work at the time of his sudden death. Mystery was to combine a musical symphony with symphonies of color (the color-organ), words, gesture and perfume, in a work of religious or Theosophic import.

The first thought that comes to mind in relation to Scriabin's synthesis of dissimilar arts is the typically Romantic nature of it. It resembles the Wagnerian theory of a universal art work or Gesamtkunstwerk. Scriabin's intention, like Wagner's, was to transcend the limitations of a single art form by combining several arts, such as painting, dance, poetry, etc. This so-called "art of the future" of Scriabina actually looked backward to the nineteenth century.

²Kleif, op. cit., p. 42.
Scriabin was, first of all, a musician. He tied in his progression of colors exactly with the harmonic progression of the music. The music of Prometheus was created according to artistic and technical considerations. The color-aspect of the symphony followed the music automatically. Prometheus can be performed independently without the color-organ, but the reverse is not true. Scriabin was not a painter. The artistic value of the color aspect of the music could only have been assured if the relations of notes and colors used by him were scientifically established. Yet, as we have seen, Scriabin was subjective and unscientific in his relation of tonalities of sound and color. On one occasion he chose bright blue to represent F#, on another, violet. Koussevitzky, who conducted the first performance of Prometheus, said in a newspaper interview that, "F# is decidedly strawberry red." Louis Castel compared F# to orange!! This was typical of the self-contradictory, unscientific, semi-mystical attitude toward color and sound.

Discrepancies and contradictions abound in the color-sound relations selected by various experimenters. Rimington's was not the first color-organ. Isaac Newton, in his Opticks of 1704, suggested that there might be an inherent relationship between sound vibrations and light.

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Ibid., p. 42.
vibrations. In 1734, Louis Bertrand Castel invented a "Clavessin Oculaire," also a keyboard. Castel's scale was as follows: C - blue, C# - sky blue, D - green, D# - olive-green, etc. There is no need to give all of Castel's scale. His color allocations are approximately in reverse of the vibrational affinity of C to red, etc., which shall be discussed later.

Analytical pamphlets by D.D. Jameson in 1844 and Rev. H.R. Haweis in 1875, discussed the possibilities of a color-music. The next experiment was that of Rimington, whose first instrument appeared in 1893.

Rimington was originally an artist, and was thus equipped to "paint" by means of colored light - as Scriabin was not. He too, however, tried to create an exact and automatic relationship between specific colors and specific tones. He gave several "concerts," interpreting the coordinated musical performances of works by Wagner, Chopin, Dvorak and others.

Since Rimington, there have been several experiments, all at variance with each other as to the relationship between pitch and color. There are seven diatonic tones, and six colors in the spectrum. There are only these six colors and admixtures of them while there are several octaves of audible pitch. Gradations of pitch, that is, intervals or distances between pitch, are exactly established in present-day musical writing.
There is no similar science of color, and the spectrum blends one with another. Although both pitch and color are basically vibrations, there are no exact correspondences between the two, as Goethe perceived in his *Zur Farbenlehre* of 1810. Furthermore, the ear perceives sound at a much faster rate than the eye perceives color. The consequence of this differing rate of perception in the case of color-organs exactly linked to musical performances has always been that the colors seem to go by extremely fast in a meaningless hodge-podge. Lastly, color has not been analyzed and organized to the same extent that music has - its usage has, for the most part, been intuitive, in art.

It is hardly worth our while to investigate the few twentieth-century attempts to coordinate music and color by means of color-organs, and for the most part nineteenth-century music, in an automatic, mechanical, but not at all scientific or even creative manner. We will leave here, the problem of an exact correspondence between color and musical tone or pitch. That there is some correspondence, in the nature of parallel ratios, will be discussed in Chapter IV, "Color and Pitch."

II. WILFRED AND THE COLOR-ORGAN

Two predominantly musical features have found their way into modern painting and the visual arts, via the color-organ. The color-organ of Scriabin produced abstract forms
undergoing metamorphosis in time. Divorced from its automatic alignment to musical harmonies, as it was used by Scriabin, the color-organ still offers interesting potentialities for twentieth-century art. In 1875, Rev. H.R. Haweis discussed these potentialities:

The only possible rival to sound as a vehicle for pure emotion is colour, but up to the present time no art has been invented which stands in exactly the same relation to colour as music to sound. . . Yet there exists no colour-art as a language of pure emotion. The art of painting has hitherto always been dependent upon definite ideas. . . The composer's art makes sound into a language of pure emotion. No method has yet been discovered of arranging colour by itself for the eye, as the musician's art arranges sound for the ear. We have no colour pictures depending solely upon colour as we have symphonies depending solely upon sound. . .

The constantly-changing procession of colors on a screen in Scriabin's Prometheus created an entirely abstract pattern. No one seems to have expected anything else. Yet although abstract form in music is as old as history, abstract form in the visual arts is new to the twentieth century. Thus, art in its twentieth-century abstract movement, is closer to music in purpose than it has been at any previous stage of civilization. Abstract art is, however, still in its infancy. It has not reached the self-conscious, organizational complexity of musical

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4Fried, op. cit., p. 5.

5That is, of course, with the exception of abstract geometric patterns in the minor, primitive arts such as pottery-painting and basket-weaving.
technique, which is divided into concepts of rhythm, harmony, etc. Perhaps it is not the nature of the visual arts to be as complex in technique of organization as is music. It is interesting to note, on the other hand, the increasing interest in aesthetic and psychological properties of non-representational line and color, in modern avant-garde art training centers, such as the Bauhaus of the 1920's. The modern school of constructionist sculpture, entirely abstract in form, was initiated by artists who had studied engineering, Naum Gabo, Alexander Caldwell and Hans Uhlmann, in Russia, America and Germany. These sculptures are both exquisite from an aesthetic point of view, and interesting from an engineering point of view. In this, although they are non-functional, they resemble architecture. In observing definite and complex rules as to force, weight and support, and balance, they resemble music which also observes definite and complex rules, whether they be the rules of tonal harmony, modal counterpoint or twelve-tone composition.

The other radical contribution to modern art made by the first color-organ is the introduction of the time element into the visual arts. In Prometheus, the time element was unpleasant because it is a basic law of human perception that changing colored forms cannot be seen as rapidly as changes of musical pitch can be heard. Also the problems of form and harmony were not faced in Rimington's
experiment, due to the automatic but unscientific tieing-in of notes and colors.

These problems were resolved in the 1920's by Thomas Wilfred who separated the color-organ from any musical relationship. Wilfred's "clavilux" was again equipped with an organ-like keyboard which controlled powerful projectors effecting changes in form, color and motion, as they appeared on a large, white screen. The basic make-up of colors passing over a screen, controlled by a keyboard, was the same as in all preceding color-organs, but the control of form and shades were very much more subtle. Wilfred was the first to create independent works of art by means of the color-organ. Ironically, his productions resemble the art of music more than the performances of color physically and automatically linked to previously-composed music had been able to do!

In the Museum of Modern Art in New York City, there is a lumia composition entitled Vertical Sequence, opus 137, created by Thomas Wilfred in 1941. It is incredibly beautiful and fascinating. One no longer has the impression of a stunt or a novelty as one had had with color-music. This is a work of art with its own, individual integrity.

In Vertical Sequence, opus 137, the mechanically-controlled form cycle repeats automatically every seven minutes; the color cycle every 7 minutes and 17 seconds. One thinks instantly of the medieval isorhythmic tenor,
where the talea (rhythm) and color (melody) need not necessarily coincide, but overlap, thus constantly varying the short repeated melody rhythmically - until they eventually end together in the final instance. In Wilfred's *Vertical Sequence*, the color and form cycles coincide every two days, two hour and 59 minutes. The projection principle in *Vertical Sequence* is compound reflection. Form and motion are achieved through a series of moving reflector surfaces. The color sequence is fused into a slowly rotating glass record.

The effect of the lumia composition is an endless sequence of ever-new abstract pictures in a state of flux and continuous transformation. The colored forms are luminous and vaporous, rather than solid. They are transparent and have some spatial effect (without volume) in moments of superposition. One sees, for example, green, a mixture of yellow and blue, until the blue moves out from in back of the yellow, gradually leaving it behind. There is the effect of waves under the sea, or clouds in a visionary sky. The factor of motion is all-important. It is the constant changing, the metamorphosis of one form into another, of one color into another, the continual state of "becoming" that is so fascinating and indeed moving. It is a developmental art, not an art of statement. It is an art of abstract form and an art that takes place in time.
III. FILMS; PHOTOGRAPHIC AND ABSTRACT

Most modern movies introduce time into the art of photography. These movies, unlike Wilfred's color-organ composition, are not abstract. They are literary and realistic, in the manner of traditional drama, reproduced on a screen. They are the twentieth-century visual art form that has replaced realistic painting. Painting itself, has developed in an abstract direction.

Abstract movies, freely created, are comparable to the lumia compositions of Thomas Wilfred. Thus we have another development in the trend toward an abstract, temporal visual art. The experiments of Hans Richter involve films where organic or geometric forms undergo development and metamorphosis on a screen. Unfortunately the films of Richter have not become known by the public at large and are rarely shown. Walt Disney's very popular Fantasia also crossed the barrier between a realistic representation and an abstract film in its introductory sequence - indeed the picture seemed to be an expression of the accompanying music, and vice versa. Other attempts have been made to create an abstract, moving visual expression of film, of music, by making use of the diagrams that record musical vibrations.
IV. THE EXPRESSION OF TIME

In the color-organ compositions of Scriabin and Wilfred, and in the art of the film, both photographic and abstract, the physical element of time has been introduced. The colored lights, and the motion picture, actually move and change before our eyes.

In paintings of Picasso and the Futurists, and in sculptures and reliefs by Arp, time is expressed without being actually and physically incorporated in the artistic medium. Picasso, the Futurists and Arp employ the traditional media of painting and sculpture. They convey, by static representation, the change or metamorphosis of form from time to time. More than one point of view, or position, is represented side-by-side. Natural appearance is thus distorted. In modern art, the expression of the effect of time on forms, which change therein, is a means to abstraction.

In the accompanying print of Picasso's painting, By the Sea, we see representational figures distorted to indicate time. The radical foreshortening of the figure in the background, gives the appearance that the enormous legs and feet are very much closer to the spectator than are the tiny head and arms. Foreshortening is the means of perspective, indicating distance and intervening space by reducing the size of figures as they move farther and farther away. The Picasso figure seems to be standing on
Picasso. By the Sea.

By the Sea. (Juan-les-Pins, summer 1920) dated by error "1923." Oil on wood, 32 x 39½". G. David Thompson, Pittsburgh
the beach but the head appears to be far out to sea. By
implying that the head is farther away than the feet, we
are given the impression that the figure is running. In
a single figure, Picasso has condensed two spatial orienta-
tions, and has introduced time into the painting.

The *Running Monster*, also by Picasso, similarly in-
dicates motion. Distortion has been carried further than
it has in *By the Sea*. We can no longer fathom the exact
nature of the monster's shape. We find that much of
Picasso's distortion (predominantly decorative in effect),
is the result of a synthesis of two points of view of a
figure. The metamorphosis of our third example, the *Nude*
by Picasso, includes time in quite a different sense than
does *By the Sea*. Here, the observer is experiencing time
while the figure remains in a static position. The observer
is given multiple aspects of the figure, as though he
(the viewer) had had time to observe the figure from all
sides. Several sides of the figure are presented simul-
taneously, in a kind of turning metamorphosis of the form.

We have seen evidence of the time element in modern
art in (1) actuality (Wilfred, Richter), (2) representation
of a moving figure (Picasso, *By the Sea*) and (3) synthesis
of multiple points of view as though the observer had
walked around the subject (Picasso, *Nude*). Each of these
involves a metamorphosis of the visual image or representa-
tional form.
Picasse. Running Monster.

Above: Running Monster. April 1928. Oil on canvas, 63¾ x 51¾". The artist
Picasso. Nude.
Hans Arp introduces time in still another sense in his sculptures and reliefs. Beginning as a Dadaist, Arp was much moved by the mortality of human existence and even of artistic expression. (His paper collages had begun to disintegrate almost as soon as completed.) He said,

I had accepted the transience, the dribbling away, the brevity, the impermanence, the fading, the withering, the spookishness of our existence. Not only had I accepted it, I had even welcomed transience into my work as it was coming into being. These torn pictures, these papiers déchirés brought me closer to a faith in things other than earthly.\(^6\)

The positive result of Arp's sensitivity to the transience, change and flux of life, was an increasing interest in growth. Nature's forms and processes fascinated him. The cycle of growing, becoming, being, and disintegrating became his subject-matter. Arp is one of several modern artists who represent a synthesis of the processes and forms of nature in their art. Arp's forms are non-representational and abstract, yet obviously organic and biomorphic, (in contrast to the opposite trend in abstract art toward tectonic, angular, constructional forms). His forms are the forms of Nature, but they are general rather than specific.

Three excellent examples of Arp's non-representational expressions of Nature's forms in a state of becoming, are given in the book, \textit{Arp}, edited by James Thrall Soby.

Metamorphosis, done in 1935, Growth and Awakening in 1938, all three in bronze, show, each in its own way, the effect of time, the flux and development of organic, biological form. Growth expresses the process of growth rather than something grown or about to grow. Each form, similar in shape to the preceding, rises transformed, and develops, grows, out of the other. In the abstract sculpture below, called White Form, 1950, we see a less specific expression of becoming and metamorphosis.

Arp. White Form.
Arp/ Growth.
The Futurists developed a technique of representing figures in motion quite different from that of Picasso's *By the Sea*. Picasso's figure undergoes a transformation in depicting time. The Futurists, on the other hand, repeat the figure in all of its different positions. They do not synthesize the different positions of a figure in a single representation. Rather, their method is related to the film technique wherein several photographs of the moving image are taken, and the separately-photographed images shown rapidly in succession, thus giving the impression of movement. The Manifesto of Futurist Painters declared,

> The gesture we seek to represent on canvas will no longer be an arrested movement. ... all is in a state of flux, of headlong change. ... objects in movement multiply themselves endlessly and become distorted as they overflow each other like vibrations launched into space and weaving through it. Thus a trotting horse has not four legs but twenty and their movements are triangular. ...

Sarah Newmeyer describes the results as follows:

In its most elementary form, Futurism depicts simple forward motion by a multiplicity of nearly similar, slightly overlapping images—very like a series of stroboscopic camera shots of a person walking or running. Or like a strip of motion picture film.

To this, I would add the appearance of the propellor

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8 Ibid., p. 151.
of an electric fan in motion - we see not four blades but many. The most satisfactory examples of Futurism are by Umberto Boccioni. On the next page, Boccioni's *Unique Forms of Continuity in Space*, 1913, bronze, transforms the soldierly figure by means of force lines, and the same muscles are represented more than once, in a multiple image of more than one position. Sculpture does not allow the actual representation of the stroboscopic camera image of some of the paintings of the Futurist, Marinetti. Nevertheless, the Boccioni sculpture is highly successful in its representation of a figure in motion. Unfortunately the photograph destroys some of the effect of motion by its head-on collision with the figure. Marcel Duchamp adds to the repertoire of Futurism with *Nude Descending a Staircase*, shown on page 44. Duchamp utilizes the planes of Cubism, multiplying them to indicate motion, until it is nearly impossible to find the figure in the painting.

In each of the examples given, the introduction of motion and time expression into visual art has resulted in either unrealistic distortions or in fully abstract form. These examples resemble music not only in that they express time. They also resemble the art of music in the degree to which they are abstract.

The tendency toward abstract form in the visual arts of the twentieth century is not only due to the desire to express the flux of time. The desire to express time is
Boccioni. Unique Forms of Continuity in Space.
Duchamp. *Nude Descending a Staircase.*
but one of several roads by which twentieth-century painters
and sculptors have approached the general goal of all modern
art, which is, abstract form.

V. THE SPIRITUAL CONTENT OF ABSTRACT ARTS

Conservatives have complained that abstract art has
no meaning, that it is merely decorative like rugs or wall-
paper or drapery. True, there seems to be much abstract
art that is only decorative in purpose. But the same people
who object to abstraction in painting do not hold the same
objection against music. The reason is obviously that it
is not possible for music to be imitative or representa-
tional to any great extent, in spite of the nineteenth-
century attempts in that direction. On the other hand,
the visual, everyday world is easily imitated in paint.
The everyday world of sound, except for language, the
province of poetry, is an ugly, chaotic world. The every-
day world of sight is frequently beautiful and, by compar-
ison, highly organized. But what the opponents of modern
art fail to realize is that realistic, representational
painting is only art to the degree that it is more than,
other than, different from the world of everyday appear-
ances. The artificial ordering of forms and colors, the
execution of line, the brushwork, the focus and emphasis
on some details and the subordination of others, the slight
exaggerations that add nuance and expression - these, and
not the fact that the objects represented can be recognized -
these qualities are what makes a painting satisfying and meaningful. If western artists prior to the twentieth century aimed at the realism of the photograph, they nevertheless contributed their own aesthetic organization and converted the flat surface into the world of solid objects by means of paint. And the quality that makes one work of art greater than another is the spiritual quality, which is elusive and indescribably, and which is the same in all painting and all music.

However, without the guide of familiar objects, the opponents of modern art are bewildered. They fail to recognize the fact that abstract visual form is as capable of moving the hearts of men as is abstract musical form.

Several modern artists have attempted to counteract the prejudice against abstract art, by describing the purpose of their art as either a spiritual or a musical one. This same purpose was first described by Rev. H.R. Haweis, at the beginning of the chapter, where he called for an abstract language of pure color as there is an abstract language of sound.

Ozenfant says:

The material world has become immaterial: spiritual. Yesterday sun, moon, stars, oceans, and mountains were necessary for poets' dreams: their Muses needed mass and matter! Today we think there is in the tiny dot that ends this sentence more organized worlds than stars that glitter in heaven.

In the preceding quotation, Ozenfant has associated abstract form, and an "immaterial" world, with spirituality. In the following quotation by Paul Klee, an abstract formal cosmos is considered an expression of religious feelings.

In the end a formal cosmos will be created out of purely abstract elements of form quite independent of their configurations as objects, beings, or abstract things like letters or numbers. This formal cosmos, itself an expression of religious feelings, resembles the Creation so closely that only a breath is needed to bring it to life.¹⁰

The great pioneer of abstraction in modern art, Wassily Kandinsky, felt strongly that an abstract painting was the most direct expression possible of the deepest and most religious emotions. Kandinsky felt that modern abstract art had spiritual content in the same sense as music. He considered representational art to be turning outward to the material world, and abstract art to be turning inward, to the human spirit. Painting, and particularly abstract painting, was an act of inner necessity. Kandinsky's descriptions of his paintings and of artistic factors, are filled with musical references, which are intended to convey the spiritual nature of the new abstract forms. In the following quotation, Kandinsky explains three different categories of his own painting. All three are abstract. Notice the emotional and musical

language in which Kandinsky describes his painting.

(1) A direct impression of nature, expressed in purely pictorial form. This I call an "Impression."
(2) A largely unconscious, spontaneous expression of inner character, non-material nature. This I call an "Improvisation."
(3) An expression of a slowly formed inner feeling, tested and worked over repeatedly and almost pedantically. This I call a "Composition." Reason, consciousness, purpose, play an overwhelming part. But of calculation nothing appears; only feeling. What type of construction - conscious or unconscious - really underlies my work, the reader will readily understand.

I should like to remark finally that, in my opinion, we are fast approaching a time of reasoned and conscious composition, in which the painter will be proud to declare his work constructional - this in contrast to the claim of the impressionists that they could explain nothing, that their art came by inspiration. We have before us an age of conscious creation, and this new spirit in painting is going hand in hand with thought towards an epoch of great spirituality.¹¹

Discussion of the introduction in the visual arts of factors typical of the musical medium, such as time, abstraction and spiritual purpose, in the twentieth century, was a brief digression from the main topic at hand, which is "Related Trends in Music and Painting of the Twentieth Century." Although art, in this century, has drawn closer to music as a medium, music has not drawn any closer to art. The tendency of art to include musical factors, such as time, abstraction and spiritual purpose, has not been matched by a "related trend" in music.

Let us turn now to related trends in music and painting of the twentieth century. We will begin with a comparison of musical text and subject matter in painting, especially as these correspond in the Expressionist movement.
CHAPTER III

TEXT AND SUBJECT MATTER

Because of the tendency toward a non-representational expression, subject matter is of far less consequence in the twentieth century than at any other period in art history. In the twentieth century we do not have the dominating problem, in relating painting and music, of a representational art on the one hand and a non-representational one on the other. In all periods, whether "realistic" and representational or not, it seems most logical to relate painting and music, in terms of a third art, that of literature. Subject matter and text need not be crucial determinants of form. Certainly, however, the literary purpose of a creator influences his choice of forms to some extent.

The most important group of linked subject matter (painting) and text (vocal music) in the twentieth century is that of expressionism. Other areas of twentieth-century representational painting and vocal music present far fewer instances of similarity in choice and treatment of topics.
I. EXPRESSIONISM

Expressionism, though the name indicates a movement in painting and music, as well as literature, is primarily a literary movement. The recurrence of certain attitudes and themes distinguishes Expressionist plays, operas and paintings from non-Expressionist. Apart from the preoccupations of subject matter there is no single style that may be called Expressionist. Expressionist paintings range from detailed realist (Grosz, Dix) to cubist (Marc, Feininger), to color-symbolist (die Brücke), to the linear, semi-abstract fantasies of Klee and the non-objective paintings of Kandinsky. The term, "Expressionist music" refers to certain atonal, dramatic works of Schönberg and Berg, all written in Vienna between 1918 and 1925. But Expressionist painting stretches from 1900 to 1930, has several phases and aspects, takes place all over Germany and includes several non-Germans in its ranks. Opera texts, similar in subject matter and attitude to those of Schönberg and Berg, have been set by such varied composers as Richard Strauss, Bartok, Shostakovitch, Hindemith, Krenek, Schreker, Weill and Brand, between 1900 and 1930 in Germany and its environs, including Hungary and Russia. The musical settings of these operas show the experimental variety and link with tradition likewise apparent in the German Expressionist painting to which
they are contemporary. Consequently it seems reasonable to include them in this comparison, extending the normal definition of "Expressionist music-drama" thereby.\(^1\)

Other reasons for extending the definition of Expressionist music to include the predecessors and contemporaries of Schönberg and Berg in Germany and its environs are: (1) the majority of Expressionist painting is in a representational, though distorting and non-naturalistic style, that must be classified as Late Late Romantic, (2) this style evolves to the Abstract Expressionism of Kandinsky (which established a continuing tradition of non-representational painting in Germany), (3) the predecessors and contemporaries of Schönberg and Berg write in a tonal style (though it is a tonal style that all but breaks its bonds) that might be classified as Late Late Romantic, whereas (4) Schönberg and Berg write in an atonal musical style that can only be compared to abstract painting. In a later chapter the comparison between tonality and realistic or representational painting will be made.

\(^1\)The inclusion of the Russian Shostakovich or the Hungarian Bela Bartok is no less legitimate in this fundamentally Austro-German movement than is the accepted designation of the Russians, Chagall and Kandinsky, the Norwegian Munch, the American Feininger, or the Swiss Paul Klee as German Expressionist painters. Expressionism is considered a German movement because of its stylistic affinity with German traditions, because its major centers were in Germany (Berlin, Dresden, Cologne, Munich and Vienna), and because more of its members were German than any other nationality.
Before turning to the literary links between Expressionist painting and music, let us very briefly review certain stylistic affinities which characterize the "Expressionistic attitude." We will in later chapters discuss the emotional use of color in Expressionism; symbolic color in painting, full of variety and intensity; and in music, excessive, emotionally-charged use of chromatic dissonance, and expressive orchestration. We will see that extremes of color have been used in a non-naturalistic manner. **This is the most important single stylistic element in Expressionism...that nature is represented but distorted and intensified for purposes of emotion.** The distortion of nature occurs not only in the use of color, but also in the actual forms themselves. Forms are elongated, angularized, generalized, pulled this way and that to the extent of highly-aesthetic caricature of mankind. There is no need to illustrate this point here; succeeding examples of Expressionist paintings will illustrate it. The relation to African masks is immediately apparent. The emotional effect is direct, and intuitively received by the spectator. Similarly, the space is very cramped in Expressionist paintings. The space of the natural world crowds in on the figures in an uncomfortable, oppressive and unnatural manner. **The distortion of natural shapes, and the cramping of space, meets a comparison in music that is tonal, but dissonant.**
achieved by the alternation of dissonance and resolution in consonances has been compressed into constant, unrelieved dissonance. We still have a link, in early Expressionism, with the representational painting and tonal music of Romanticism. The distortion of natural forms and of tonality, reaches such extremes in the course of Expressionism that both break to an entirely new means of artistic organization, abstract painting and non-tonal music. The course of this evolution will be illustrated, in the chapter on color and instrumentation. The vocal line from Elektra, with its chromatic step-wise movement alternating with octave-displacement of chromatic steps, is still tonal in character. The vocal line from Herzgewaechse, although similar to that of Elektra, is no longer tonal, nor is the vocal line of Berg or Webern.

The distortion of tonality and natural forms is used to express emotional extremes. A quotation from Strauss' Elektra shows an almost psychopathic, abnormality of emotion. At the same time, Elektra's speech (translated from the text by Hofmannsthal) is full of visual imagery that recalls Expressionist painting, at its most nightmarish, such as the picture of blood from severed throats falling on Agamemnon's tomb, or the dance of the three children of Agamemnon on his tomb. Notice also how often colors are mentioned, the "purple vault of vapors", "the sun when it burns red."
Elektra -

..."Agamemnon! May your day be born,
As from the stars a rain of fire descends,
And may the blood from severed throats fall upon
thy tomb!

And like urns upturned,
May it flow from out the assassin's side;
Like a swollen brook or like a river in flood,
Thou shalt eome forth,
0 life of dead lives... .

"And thy war horses, O my father,
They also shall to thy tomb be led.
They shall neigh aloud, foreseeing their fate,
And knowing their hour of death has come,
We shall offer up to thee thy dogs,
The dogs that licked thy feet,
That went with thee to hunt, that thy hands caressed,
Their blood shall be before thee, to save thee again;
And we, thine offspring, they son Orestes
And thy two daughters, their duty done.
Under the purple vault of vapors,
Like those of the sun when it burns red,
We three shall dance around thy tomb.

"Skipping high, I shall e'er leap the dead,
And all who there behold me,
Dancing like a shade, shall say:
'Tis a mighty monarch
Who is here extolled today
By those who are his kin and offspring,
Ah! happy parent, whose children thus
Do honor at his tomb and dance the royal dances.
Agamemnon! Agamemnon!

Equally vivid in emotionalized imagery are the stage
instructions preceding the entrance of Klytemnestra,

CHRYSOTHEMIS makes her escape through the door of
the court. - Before the windows brilliantly illuminated
a noisy procession passes rapidly; sounds of animals
which are being led and driven, harsh cries that are
immediately suppressed, the cracking of a whip.
KLYTEMNESTRA appears in the large bay-window. Her
sallow, bloated countenance is paler on account of

2Hofmannsthal, Elektra
the fire of the torches and the purple color of her tunic. She leans on one side upon the arm of a companion dressed in dark violet, on the other upon an ivory cane encrusted with precious stones. A yellow figure, whose black hair, drawn back from the face, suggests an Egyptian, and whose posture recalls that of a serpent raising itself, supports her train. The Queen is covered with precious stones and talismans, her arms are hidden under bracelets, her fingers sparkle with rings. Her eyelids are unusually large and she seems unable to keep them open without effort.

The fascination with horror and abnormal psychology, usually considered a result of social oppression, is only one aspect of Expressionistic literature, subject matter and text. Elektra has been used as an example of the farthest extreme of emotion, and its greatest distortion of human nature. It also has been used to legitimatize the inclusion of other composers than Schönberg and Berg in the explanation of Expressionistic subject matter and text. Usually, however, Expressionistic subject matter has more idealistic connotations than does Strauss' Elektra. If the Expressionist exploits emotional extremes, he does not do so just for the sake of excitement or sensationalism... he usually expresses some human value thereby.

Expressionists unite in their intensely emotional, sometimes tragic, often anguished, despairing and hopeless, just as often mystical concern with the problems of humanity. The concern for humanity, in a machine age, links German Expressionism with the Late Romanticism of the nineteenth century. What distinguishes Expressionism from the
late-nineteenth-century attitude is the concern with the problems of man in general, as opposed to the Romantics' self-concern and individualism. The tragedy of human life, and the nightmare-world of the subconscious mind (discovered by the great German psychologists of the turn of the century, Freud and Jung) are common to all men. Consequently, the characters of Expressionist art are frequently generalized. J.M. Cohen speaks of the plays of Kaiser, Toller, von Unruh and Werfel as follows:

With a violence that showed their kinship with the Sturm und Drang generation, they wrote plays in which characterization was entirely sacrificed, and the actors were no more than voices urging the needs, the sorrows, and the desires of generalized man.²

One is instantly reminded of Schönberg's Die Glückliche Hand in which the chorus of six men and six women is seen only as greenish faces through little holes in a background curtain of dark violet velvet. The concern for generalized man is not abstract, however. Usually human beings are portrayed as human beings, but in terms of the emotions and social victims they represent.

Bernard Myers says, "This burning preoccupation with a new humanity, the driving force of Expressionism, may be presented positively as an ideal or negatively as opposition to the forces denying its emergence." ³ When "presented

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positively," Expressionism reaffirms its belief in humanity, brotherly or motherly love, and God. On close examination, these positive subjects of Expressionist art occur very early in the century, reaching a pitch of the greatest intensity, as artists feel more and more hopelessly engulfed in the negative forces of the modern world, which oppose society to the individual, and the machine to the human spirit. Instances of spiritual affirmation become increasingly rare and isolated, and all but vanish with World War I. The early twentieth-century "strain of God-seeking" has occurred in all the greater periods of German art; medieval, seventeenth-century and late nineteenth-early twentieth-century. Here it is a last great effort to recapture the dwindling faith and order of a fast-declining set of values. It is consequently Late Romantic in character. One thinks of the earnest God-searching of Bruckner and Mahler, and Mahler's accompanying sense of tragedy and despair. In the early part of the century, Barlach's sculptures depict God resting on The Seventh Day and Schiller's praise of brotherly love in the print, Ode to Joy. Emil Nolde treats such subjects as The Prophet and The Great Gardener and Schmidt-Rotluff's

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5Ibid., p. 93.

6Illustrations in Myers, op. cit., pp. 79 and 80 respectively.

7Illustrations in Myers, op. cit., pp. 157 and 165 respectively.
finest print is Christ on the Road to Emmaus, illustrated below, while a large percentage of the works of Christian Rohlfs are religious.

No discussion of the expressionistic treatment of religious themes would be complete without mentioning the great body of work by Rouault, who was associated by location, though not by spirit and technique, with the Parisian "Les Fauves."
Rouault. Crucifixion.
Religious feeling is closely allied with death, in Mahler's works. The first symphony contains a funeral march, and the second, the "Resurrection" Symphony was inspired by the death of Hans von Bülow, and contains, in the fourth movement, a folksong originally entitled "Eternal Light" and calling upon heaven to accept this man of God. Berg's Violin Concerto, inspired by the premature death of a young girl, Manon Gropius, and dedicated "To the Memory of an Angel," contains Bach's setting of "Es ist genug" in a movingly spiritual work.

The subject of death and bereavement occurs alone, without religious overtones, in Expressionist music and art, for example Mahler's Das Lied von der Erde and Kindertotenlieder, and Schöenberg's Erwartung with its long "Liebestod." Death and bereavement are the subject of several paintings by the Norwegian, Edward Munch, notably The Death Chamber, and by Kathe Kollwitz, i.e. Widow and Ernst Barlach on His Death-bed and Barlach's The Dead Day. Could there be any more fitting comparison to Mahler's Kindertotenlieder than Christian Rohlf's Death and a Child or the illustration on the following page, Woman with Dead Child, done by Kollwitz in 1903?

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8 Illustrations in Myers, op. cit., pp. 31, 24, Figs. 84, 112.

9 Illustration in Myers, op.cit., p. 76.
Kollwitz. Woman With Dead Child.
Klee. *Angel of Death.*
Religious subjects with social overtones link the positive (religious and humanistic idealism) with the negative (protest against inhumane and corrupting social forces) aspects of Expressionism's concern for humanity. Such are Emil Nolde's *Christ and the Woman Taken Into Adultery, So That You Do Not Become as Children*, *Life of Maria Agyptica, Wise and Foolish Virgins* and Max Beckmann's *Christ and the Adulteress*.\(^0\) This Expressionist trend was anticipated in the late nineteenth century by James Ensor's shocking depiction of Christ's dissentors in modern-day dress, *Entry of Christ into Brussels*.\(^1\)

Hindemith's *Mathis der Maler* contains both religious ideals and a social protest. The central character is Mathias Grünewald, 16th century German-Expressionist painter of the Isenheim Altarpiece depicting scenes from the life of Christ, notably the Crucifixion, the Holy Ghost, and the Temptation of St. Anthony. We know no facts about Grünewald's life. (As a painter, he was much-admired by the twentieth-century expressionists for his spiritual intensity, expressionistic distortion of form and emotionally-charged color) It is not with Grünewald as a painter that Hindemith is concerned, but rather he is concerned with the possibility that Grünewald may have been associated with:

\(^0\)Illustrations in Myers, *op. cit.*, Figs. 167, 168, p. 159, Figs. 157 and 229 respectively.

\(^1\)Illustration in Myers, *op. cit.*, Fig. 9.
with the Peasants' revolt of Luther's time. Mathis, in the opera, is a leader of the peasants in this revolt. The peasants are crushed as many non-Germanic peoples were crushed by Hitler in the twentieth century. This analogy to the contemporary social and political situation in Germany was probably Hindemith's reason for setting the text. The moral and religious element occurs in Mathis' resistance to temptation, and his painting of the altarpiece as a series of visions, the night before battle. There is, of course, no more universal or more profound symbol of suffering and tyrannical oppression than the Crucifixion (as Rouault has shown us), and Grünewald's Crucifixion is one of the most inescapably tortured and poignant treatments of the subject in the whole history of western art.

Schoenberg's opera, *Moses und Aron* uses religious subject matter but without the undercurrent of human suffering that associates religious themes with Expressionist art. Allen Forte says of the opera:

... Moses and Aaron are symbols of freedom and subjugation, respectively, as shown in their different relations to God's message for the people of Israel - the word of God. ... Moses represents the word in all of its directness, in all of its ideality, whereas Aaron represents the word in its literal sense, in its translation into immediate realities: wasteland, promised land, rod, leprous hand - and finally into the golden calf, the ultimate degradation of the God-concept, represented by Moses. Because of Moses' inability to communicate with the people (which is symbolic of his concept of God as a being that cannot be conceived, much less described) he cannot
bring God's word to them in its pure form. Instead, it is Aaron who interprets God's word to the people in the form of words and - more important - in the form of deeds which are far removed from Moses' concept of God's reality.\

We have quoted Myers as saying that the concern for humanity which was the driving force of Expressionism might be presented positively, as an ideal (either religious or humanitarian), or negatively as opposition to the forces denying its emergence. The positive presentation takes the form of ecstatic religious paintings, or of human symbols bearing such generic titles as The Mother or The Wanderer (any mother, any wanderer). The negative presentation is just as general and humanistic and reveals the Expressionist sympathy with oppressed types; the sick, the prostitutes, beggars, prisoners and mad people, produced by society. In spite of the tremendous emphasis on the suffering of the common man, in Expressionist art it is not until after World War I that this takes the form of a political protest. Then, the griefs of mankind lose hope of relief and salvation in Christianity, peace on earth and good will toward men. In the 1920's the "verists," also called "Activists" or artists of the "New Objectivity," Grosz and Dix, portray

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13 Myers, op. cit., p. 38.
not the symbols of the oppressed with whom they sympathize, but rather the symbols of oppression and social corruption in its most disgusting aspects. Much of Max Beckmann's work is also devoted to the exposé portrayal of social corruption.


In the examples on the following pages, note the generalized characterization of suffering, expressed in the titles as well as in the works themselves.

Heckel's portrait of *The Man* could be any man in twentieth-century Germany. With his anxious look and gesture, and the narrow, confining space to which he is restricted, he reminds one of Wozzeck.

The link between oppression and social corruption, often reaching portrayals of nightmarish disorder, murder and horror, is expressed in such works as Kokoschka's *What Are We Fighting For?* and his *Self-Portrait As A Soldier* (again we are reminded of Wozzeck) with its tired

\(^{14}\)Illustrations in Ritchie, *Sculpture of the Twentieth Century*, p. 93, and Myers, *op. cit.*, Figs. 112, 21, pp. 156, 17, Figs. 24, 148, respectively.
Barlach. The Avenger.
Barlach. Old Woman on Crutches.
Munch. The Shriek.
Heckel. The Man.
expressionless face, and its mutilated hand-stump angrily
thrust, jagged and bloody, out at the spectator. 15 Max
Beckmann's *The Night* depicts torture, rape and murder.16
Gentler symbols of oppression are found in the lyrical-
mystical paintings of Franz Marc, showing animals, most
frequently horses, caught in a trap or in a maze of force-
lines in forest-scenes. 17 The socialistic paintings of
the Activist group after World War I, are represented
in Myers' *The German Expressionists* by such works as
those of George Grosz, Figures 215, 216 and 217, *Germany,
A Winter's Tale*, *Engineer Heartfield*, and *The Cafe*, and
Otto Dix's *The Procuress*, 18 and by Dix's *German Sailor*,
on the following page.

Of Alban Berg's opera, Redlich says:

*Wozzeck* is the tragedy of the enslaved victims of
Metternich's *Vormärz*, the dreary epoch that went be-
fore the March revolution of 1848. The "Holy Alli-
ance" during this epoch deprived the generation of
Schubert and Grillparzer of freedom of thought and
political independence, and thus forced them to
withdraw from unpleasant reality into literary clubs
and romantic make-believe. *Wozzeck* is the spokes-
man of the "tiers etat," which, in belated succession
to the storming of the Bastille in 1789, was at
length in 1848 to succeed in abolishing at any rate
the worst features of that feudal tyranny. In
Büchner's drama, the sufferings of the humble and

15 Illustration in Myers, op. cit., Figs. 105 and 26.
16 Illustrated, Myers, op. cit., Fig. 59.
17 See *Fate of Animals*, Fig. 43, and *Unhappy Tyrol*,
Fig. 45 in Myers, op. cit.
18 Myers, op. cit., Fig. 222.
the almost dumb find painful articulation in elliptic, ejaculatory sentences and fragmentary exclamations: "Folk like us are always unfortunate... in this world and in any other world." "If we should arise to heaven we'd be employed there in helping to make the thunder..." "All our days are spent in endless toiling... sweating even in sleep... poor, wretched folk." The importance given in Berg's opera to these sudden, lightning-like illuminations of the darkness in Wozzeck's mind shows the measure of the influence exercised by Büchner's social and political ideas of 1836 on the young Austrian composer of 1914, whose subsequent war-time experiences must have made him particularly sensitive to the ordeals of Wozzeck at the hands of his ruthless superiors. The tragedy of the poor Prussian infantryman of Polish extraction, harassed to death in the stuffy atmosphere of a Prussian garrison-town, held special significance for the young Berg, called up for the Austro-Hungarian army, which consisted in good measure of enslaved soldiers of Wozzeck's Slavonic type. "The Bohemian-German Job of the Fourth Estate," as Arnold Zweig called him, became in the end the symbol of the Austrian Slav, gagged and silenced, in an army led by German-speaking officers.

Büchner's fragment was probably written between the Spring of 1836 and October of the same year. To set it to music between 1941 and 1929 was an act of supreme artistic awareness and political conscientiousness. Berg chose to treat this subject at the fateful moment when, to use again the terms of Schoenberg, the batman changed into the avenging angel of enslaved humanity.19,20

Wozzeck is a symbol of extreme oppression, and as a result he shows the mental unbalance and lack of moral sense of a psychotic. His story is one of decadence and

19Redlich, Alban Berg, pp. 79-80.

20Redlich's analysis of the socio-political sources of Büchner's Wozzeck, with their nineteenth-century roots, helps us to understand the sources of the themes of corruption, oppressions and suffering in all Expressionist art. It also places Expressionism in the line of nineteenth-century tradition.
horror. Poverty-stricken, he is so desperate for means of support of himself, his mistress and their child, that he volunteers his body for medical experimentation, and his semi-mad state is partly the result of the poisons he receives thereby. A much-ridiculed army underling, physically and mentally weak, he is forced to submit to all manner of abuse from the other soldiers concerning his prostitute-mistress, Marie. The character of Marie reminds one of the sympathetic approach to the problem of prostitution found in such works as Nolde's *Christ and the Woman Taken in Adultery* and in the writings of Dostoyevsky and Strindberg, which were widely-read in Germany of this period. Marie inspires sympathy in the scene by the cradle of her child, in which she reads about the Magdalene's repentance in the Bible. But Marie's character has been permanently set by society, and she indulges in a passing affair with another soldier. The story reaches its inevitable conclusion in disaster. Wozzeck, in a stupor, murders Marie, stumbles into the river perhaps intentionally, perhaps accidentally, and drowns - and only their child remains, unknowing and deserted.

Max Brand's *Machinist Hopkins* is another expressionist opera of social protest, with references to actual factory-working conditions. It is "symptomatic of this peculiar period in German opera, specializing in the depiction of restless, pathological states of suffering and
situations calling forth extravagantly bitter emotions."21

The representatives of social disorder in a less emotional sense, are the operas of Kurt Weill, the plays of the Marxist Bert Brecht, and the artists of the "New Objectivity," Otto Dix, George Grosz and Max Beckmann. As has been explained, Dix, Grosz and Beckmann, in an uncompromising, exaggeratedly-realistic style, depict the conditions of the day. Kurt Weill, in The Three Penny Opera, presents a light opera of social satire, none too profound in musical content but biting in its exposure in spite of the entertainment value of sprightly pickpockets and prostitutes. Like the drawings of Dix and Grosz, it is little more than a caricature with a deadly-serious political purpose. In comparison with Wozzeck it is entertainment with a challenge, rather than a serious work of art. Weill composed other works describing the "mood of life at a moment in Germany when economic disaster was preparing the way for the Hitler regime,"22 such as Aufstieg und Fall der Stadt (The Rise and Fall of the City of Mahogany, libretto by Brecht) and Die Bürgschaft (The Surety).

The politically-minded artists and musicians of the "New Objectivity" of the 1920's and 30's, are an exception to the main stream of emotionality in Expressionist art and

21Grout, A Short History of Opera, p. 516.
22Ibid., p. 515.
music, though the former as well as the latter, exaggerate reality in espousing a cause. Social disorder is most frequently linked with mental disorder, as it was in Wozzeck. Pierrot Lunaire, like Wozzeck, represents the victim, rather than the oppressor. Pierrot is a stupid, half-mad, defenseless figure. He is deformed and ugly, he hides his tragic soul behind the trappings of the theatre, occasionally he is vulgar and immoral. The character of the theatrical personage who must dance and sing, with an ineffable sadness underneath the bright make-believe, is not particular to German Expressionist art, but occurs in Paris as well. Picasso has painted countless Pierrots and Harlequins, all with staring empty eyes and bleak faces. On the next page, is one of Rouault's sad clowns, here, very significantly, in a self-portrait. The music-hall contains a tragedy. The most-famous musical uses of the theme of Pierrot are Stravinsky's Petrushka and Schönberg's Pierrot Lunaire. Pierrot is a symbol of the unreality of modern life, as unreal as the theatre. In Satie's Parade the enormous, abstract-Cubist "managers," designed by Picasso, and the din of noise-machines, dominate the doll-like, live ballerinas and the gentle music of Satie. We are reminded of certain films of the Swedish Ingmarr Bergmann, notably The Naked Night about a desolate and poverty-stricken circus troupe, and perhaps also of Leonconvallo's Pagliacci who must laugh when he would cry. Schönberg's Pierrot,
Rouault. The Clown.
in his humanity, is defenseless and trapped in a strange, half-mad, nightmare-world, more like the theatre than the theatre itself. This is his affinity with Wozzeck and "Wir arme Leut," with Machinist Hopkins and the characters painted and drawn by Heckel and Barlach. The insane unreality of modern life is expressed in countless "mask-pictures" by German Expressionist artists, such as Erich Heckel's Clown and Doll, engaged in a meaningless dance, Jawlensky's Mask tragic, Karl Hofer's Three Masqueraders, Nolde's jeering, yellow-faced Masks where the faces laugh at the victim, and the paintings by Rouault (see page 78) and Ensor (see page 80). In these "mask-pictures," social disorder is linked with mental disorder.

Mental disorder occurs, as a subject-in-itself, with fewer social implications, in Expressionist art also. Myers speaks of Kokoschka's portraits of 1910-1911 where:

... the earlier poetic quality gave way before a clinical analysis in which the artist studied an illness or neurosis. Pictures like Count Verona, 1910... or The Duchess of Rohan-Montesquieu, 1910 (Pl. 15), document the effect of tuberculosis on human beings. They are not concerned with symbolizing intellectual effort but rather the psychological decay resulting from a disease. In this connection, other analytical portrait experiments should be mentioned: a portrait of the mad Ritter von Janikowsky, 1909-1910... and Dr. Szeps, 1912.

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23 Illustrations in Myers, op. cit., Fig. 30, 56, 119 and 158 respectively.

24 Myers, op. cit., p. 60.
Myers says of Ernst Ludwig Kirchner:

His infrequent portraits are as much specimens of the Expressionist movement as anything he produced; their profound subjectivity and analytical probing are related to Munch and Van Gogh in the past and Nolde and Kokoschka as contemporaries. . . . One of the most penetrating psychological studies is the Sick Woman, 1912 (Fig. 134), which brings to mind other Brücke pictures and their common ancestors, the sick people of Kokoschka, 1909-1910. This delicate image of physical debility and emotional lassitude suggests Heckel's Woman Convalescing, 1913 (Fig. 150).25

One is reminded of Thomas Mann's study of the mental decay of tuberculosis victims, Magic Mountain. Der Blaue Reiter, the periodical published by Kandinsky and Marc, published drawings of the insane and pathological, as well as of children. The interest of der Blaue Reiter was in the images of the subconscious mind, free of the appearances of the natural world. They published drawings of the insane for the same reason that they published examples of primitive art - to reveal the "archetypal" images analyzed by Jung as being universal to mankind and symbolizing unrecognized fears and desires.

It cannot be overstressed that Germany-Austria-Switzerland is the center, the birth-place of modern psychoanalysis. Just as the greatest psychologists, Freud, Jung, Adler, Fromm, Köhler, have come from this

25 Ibid., p. 130.

26 Several of the Expressionists battled nervous breakdowns and temporary insanity, notably Dostoevsky, Strindberg, Kokoschka, Kirchner, Nolde and Munch.
Munch. The Sick Girl.
area, so have Expressionist artists, librettists and musicians. The introspective subjectivity, the scientific analysis and observation of the mind as though it were an object, the leaning toward mysticism and symbolism, as well as the tendency toward emotional extremes concerning love, life and death, and the fascination with human abnormality (and the grotesque) ... all features of the German mind ... find their very-effective outlet in modern Germanic psychology and psychological arts.

Psychological analysis of extreme fears and desires provides subject matter for opera-composers, particularly for Richard Strauss. The story of Elektra, based on the Greek myth utilized by Freud in explaining basic drives in women, is the story of the revenge and hatred of Elektra for her mother, who has murdered her father so as to take on a lover. The tendency of mother and daughter to conflict is here carried to the extreme of abnormalcy, in a desire for matricide. Just as extreme and disturbing is Strauss' Salome which interprets Salome's desire for the beheading of John the Baptist as a sexual perversion known as necrophilism.

Bartok's Duke Bluebeard's Castle, the whole action of which is involved with Bluebeard's seventh wife's discovery of his murder of his first six wives is described by Halsey Stevens as:

... a psychologico-symbolic piece not without strong impact upon the listener. In the well-remembered
beauties of dawn, midday, and dusk, and the crowning beauty of night, Balazs has drawn an allegory: Bluebeard is Everyman, whose happiness is contingent upon those he loves, but who is powerless to hold them except in memory; the fulfillment he seeks is ever denied him. In her desire to open his inner life to the light, Judith finally awakens the memory of Bluebeard's earlier loves, and is thereby condemned to join them in eternal night. The tragedy is not hers, but Bluebeard's.27

The above examples of psychological drama include only abnormal extremes, resulting, as did Berg's Wozzeck and the socialistic opera, in murder and violence. Another strain, inextricably related to the Expressionist interest in the problems of man and woman in their love for each other, and the Expressionist's sympathy for the prostitute as a social determinant, as well as the theories of Freud, is the prevalence of perversion and sexuality in Expressionist art. This fascination of Kokoschka and Kirchner, both mentally-unbalanced, is referred to by Myers but of course, not illustrated. Myers says:

In the initial period of Kirchner's development there already appeared that powerful erotic feeling which we associate with so many Expressionists: Kokoschka, Nolde, Pechstein, Mueller, Beckmann, and others. . .28

Myers refers to a drama by Kokoschka, his posters for which caused the play to be banned.

The first of these plays, "Murder Hope of Women," later set to music by Hindemith, is filled with

28 Myers, op. cit., p. 126.
elemental fury. It portrays in symbolic terms the eternal conflict between Man and Woman . . . Here the dramatist is . . . concerned . . . with a series of nonrational, even primordial urges and experiences. . . .

Shostakovich's *Lady Macbeth of Mzensk District* is a lurid story overloaded with violence of every kind. Grout says:

It is hard to say how much of this story is intended to satirize bourgeois society - the scene is nineteenth-century Russia under the Czarist regime - and how much is mere pornography (the love scenes) and perversion (the whipping scene).³⁰

Alban Berg's *Lulu*, based on a drama of Frank Wedekind, is the story of the self-destructive fascination of several men and one woman, for the irresistibly-sexual Lulu. One by one Lulu's admirers become her victims, but in the end Lulu is herself the victim of the society that produced her, and is murdered. The exact counterpart of Berg's *Lulu* is Munch's *Vampire*.

The counterpart of Munch's *Jealousy* (see page 86), is Schönberg's *Die Glückliche Hand*, where we have the unfortunate triangle symbolizing the successful and the unsuccessful lover, and the emotionally removed woman.

In Schönberg's *Erwartung*, there is some ambiguity whether the "She" jealously referred to by the single central character is another woman, or whether "She" is Death. The singer is filled with hysterical apprehension

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²⁹Myers, *op. cit.*, p. 60.

Munch. *Vampire.*
Munch. Jealousy.
as she seeks her lover in a midnight tryst in a ghastly, pitch-dark forest filled with weird sounds and implications. She finds only the dead body of her lover, over which she sings a long Liebestod. Love is associated in the German mind, with death, as being inescapable and all-consuming by character; in Tristan and Isolde, in Erwartung, in the theories of the subconscious mind propounded by Freud and Jung, and, (as symbolized by the long-flowing hair which surrounds and envelops the man) in Munch's Man and Woman.
Munch. Man and Woman.
In Chapter II, we criticized Scriabin's automatic relating of color-organ and musical performance, as being without scientific foundation, and aesthetically unsatisfying. It was said that most color-organs were set up with an automatic and arbitrary relationship between the musical pitches or keys, and colors. Although the music had been composed with consideration of form and content, the art was not independently created, but was simply dependent on the music in all respects. The music was composed first, without consideration of the resulting color-effects, and the color-art was added later. On the other hand, where the color-organ was used with no relation to music, as an independent art-form, by Thomas Wilfred, the result was aesthetically very satisfying.

Is it possible to physically and scientifically correlate color and tone? Both are vibrations: (1) the light vibrations which we perceive as color and (2) the sound vibrations which we perceive as musical tone. The following charts show that whereas there are analogies between the two, there are no exact correspondences. The charts are taken from Colour-Music, the Art of Light, by
# TABLE OF PRINCIPAL ANALOGIES

## PHYSICAL

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<th>Light</th>
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<td>Wavelength (Ten millionths millimetre)</td>
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<td>6900 A.U</td>
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<td>3680 A.U</td>
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<th>Ratios of Visible Rays (Scale as above)</th>
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<td>SOUND</td>
<td>LIGHT</td>
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<td>Wave-form ...... Purity, Saturation or Desaturation</td>
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<td>Wave-form (simple) .. Pure hue as</td>
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<td>Wave-form (complex) Grey tones.</td>
</tr>
<tr>
<td>tone as of an oboe</td>
<td>Dull/dilute colors</td>
</tr>
<tr>
<td>Wave amplitude (large) .. Loudness</td>
<td>Wave-amplitude (large) .. Bright,</td>
</tr>
<tr>
<td></td>
<td>luminous</td>
</tr>
<tr>
<td>Wave-amplitude (small) .. Softness</td>
<td>Wave-amplitude (small) .. Low</td>
</tr>
<tr>
<td></td>
<td>luminosity, faint, weak</td>
</tr>
<tr>
<td>Chord ......... Simultaneous production</td>
<td>Chord ......... Juxtaposition of</td>
</tr>
<tr>
<td>of more than two tones of different</td>
<td>more than two colors of different</td>
</tr>
<tr>
<td>pitch. Ex., C-E-G</td>
<td>dominant wave-length. Ex., red,</td>
</tr>
<tr>
<td></td>
<td>yellow-bluegreen</td>
</tr>
<tr>
<td>Interval ...... Ratio of frequencies of</td>
<td>Interval ...... Ratio of frequencies of</td>
</tr>
<tr>
<td>two tones of different pitch. Ex.,</td>
<td>two colors of different dominant</td>
</tr>
<tr>
<td>C to E is a third,</td>
<td>wave-length. Ex., red to yellow is a third,</td>
</tr>
<tr>
<td>Ratio 2-3 (256-320)</td>
<td>Ratio 2-3 (0.7360 - 0.5890)</td>
</tr>
<tr>
<td>PHYSIOLOGICAL</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td></td>
</tr>
<tr>
<td>SOUND</td>
<td>LIGHT</td>
</tr>
<tr>
<td>Auditory Sensation...Longitudinal waves in the air of frequencies varying from 16 to 40,000 per sec.</td>
<td>Visual Sensation...Transverse waves in the ether of frequencies varying from 395 billion vib. per second to 770 billion, or from a wavelength of 0.007 to 0.396</td>
</tr>
<tr>
<td>Physical Stimulus</td>
<td></td>
</tr>
<tr>
<td>Analyses..............The ear cannot not analyze most complex light into its constituent wavelengths. Ex., note of a drum</td>
<td>Analyses..............The eye cannot analyze a complex light into its constituent wave-lengths. Ex., the light of an iron arc</td>
</tr>
<tr>
<td>Evolution..............Probably an increasing power of perception of difference of pitch or timbre</td>
<td>Evolution..............From broad to subtle distinction</td>
</tr>
<tr>
<td>Aural Mechanism........Resonance theory most satisfactory</td>
<td>Visual Process........Photochemical. Something of the nature of resonance is probably included</td>
</tr>
<tr>
<td></td>
<td>Response differs according to the frequency</td>
</tr>
<tr>
<td><strong>SOUND</strong></td>
<td><strong>LIGHT</strong></td>
</tr>
<tr>
<td>-----------</td>
<td>-----------</td>
</tr>
<tr>
<td>Harmony... Depends upon mutual possession of &quot;partials.&quot; Simple ratios produce pleasant effect. Complex ratios unpleasant.</td>
<td>Harmony... May partly depend upon ratios of frequencies of juxtaposed tones. Measured relationships also give pleasant effect (see Ostwald and Munsell)</td>
</tr>
<tr>
<td>Scale..... Succession of tones in a regular order of frequencies.</td>
<td>Scale..... Succession of color tones in a regular order of Hues, Luminosities or Purities.</td>
</tr>
</tbody>
</table>
| Time (Rhythm). Duration of tone. Orchestration The distribution of timbres in a given combination of tones. | Time..... Duration of tone. The distribution of Hues, Luminosities and Purities in varying areas. According to some theorists the arrangement of purity in a given combination of tones is alone the "orchestral factor in color-music."
| No Stimulus.. Silence | No Stimulus.. Darkness |
| Melody..... Succession of tones of varying pitch. | Melody..... Succession of tones of varying hue. |
Klein, who has given an excellent, very thorough, and apparently completely scientific analysis of the problem. Field presents analogies between light vibrations and sound vibrations. There are no exact correspondences. There are, however, parallel scales of color and pitch.

Klein's scientific correspondences between color and sound reveal some especially interesting facts. For example, the primary colors from which all other colors can be mixed, are red, blue and yellow. Klein relates red to C#, blue to G#, and yellow to E. In musical terms, C# (red) may be considered a tonic and its octave, G# (blue) the fifth or dominant, and E (yellow) the minor third. Thus the primary colors of the spectrum roughly correspond to the first-heard partials of the overtone series, the same notes which are the basic intervals of tonal harmony. The sixth, A#, is violet; the fourth, F#, is green; the second, D#, is orange. Only the seventh, whether major or minor, has no independent color in the spectrum; it either corresponds to dark violet or it "leads" so closely to the spectrum's repetition, that it is invisible.

Pitch and hue are related. We can create chords of pitch-combinations and harmonies of color-combinations. We are reminded that classical periods prefer simple, primary chords of pure color, and simple triads in music. Romantic or baroque periods are more prone to chromaticism both in colors and in sounds. In-between shades, odd color-combina-
tions, and blending of one color into another so that they are indistinguishable, are characteristic of seventeenth- and nineteenth-century painting. Chromatic harmony, unresolved dissonances involving "between" shades of seconds, sevenths and ninths, are characteristic of seventeenth- and nineteenth-century music.

Aside from the contrast between simple and chromatic color and harmony of classical and baroque phases, let us look at what the centuries from ca. 1450 to 1875 had in common. The realistic painter from Renaissance to late-nineteenth century, was interested in representing three-dimensional volumes and space. He reserved the very close gradations of color for the purpose of modelling volume, mass, roundness of form, in light and shade. In the detail of the painting of Velasquez shown on the following page, the close shades of pink and red tones are blended into one another and overlaid so as to suggest three-dimensional form.

Klein's chart of the relationships between the well-tempered scale and the color spectrum, listed as barely visible red, C, red, C#, red-orange, D, orange, D#, yellow, E, yellow-green, F, green, F#, blue-green, G, blue, G#, blue-violet, A, violet, A#, dark violet, B, invisible, C. The change from one distinct color to another is equal to a whole-tone. The mediary colors are half-tones. In painting from the fifteenth to the late nineteenth century, illustrated
130. Diego Velázquez. Detail (original size) from Fig. 129.
by the Velasquez example on the preceding page, we saw that
the close relationships of color were reserved for modelling.
The gradations of light to bright red, or from red to red-
orange, established the three-dimensional volume of natural-
istically-described form.

Similarly, the semitone in tonal music is first and
foremost a leading tone. The function of the leading tone
is to model the space, that is, to make the central impor-
tance of the tonic notes extremely clear. In tonal music
the leading tone does not stand alone...it requires comple-
tion in the tonic to follow. Elsewhere, tonal music, espe-
cially in its classical phase, is preeminently diatonic.

Of course we also see semitones elsewhere in tonal
music but their placement is always between the diatonic
steps of the scale, just as red-orange is understood as
being between red and orange.

Even in the extremely chromatic music of Bach, where
all semitones are admitted, the diatonic, triadic structure
of the music is strong and holds the chromatic notes to a
subordinate position. In Bach's counterpoint, the chromatic
notes, like the discords of passing notes and suspensions,
occur only in strictly regulated positions. They give impetus
to the music causing a rush toward resolution. But the resolu-
tion, or diatonic notes and triadic consonances, is the direct
goal, and as a goal, it is always reached. Thus, Bach's chroma-
tic colors are still functional. They are not free. They do
not disturb the spatial organization of tonality.
Bach. *Toccata and Fugue in d minor.*
Because painters, from the fifteenth to nineteenth centuries, reserved the close shades for modelling, they habitually avoided using close shades anywhere else in the painting. In placing two figures close to one another, for example, clearly-separated hues (usually the three primary colors) were selected. Thus there was no confusion between the two figures, and each was distinctly placed in space. The painting of Fra Angelico, below, uses the three primary colors, red, yellow and blue, plus black and white, predominantly. The clear red and blue garments of Mary and Elizabeth bring them forward in front of the dull
contrasted wall behind them. The four arms of the two women, are each easily understood both spatially and in terms of mass and volume. The close gradations from light to dark red, and from light to dark blue, round out the forms. On the other hand, the strong contrast of red and blue keeps them separate from each other.

The clear contrasts of the three primary colors, red, yellow and blue, are similar to the three notes, separated by skips, of the common chord. Klein has related red to C# (tonic), yellow to E (minor third), and blue to G# (dominant). In painting of the preceding period devoted to spatial realism, the most frequently dominating color combination is that of red, yellow and blue. Many variants of these three colors may be favored by individual artists, for example, Raphael favors pink rather than red, and Rembrandt a rich, dark rust-red, and gold or melon rather than a pure yellow. But the strongest color-harmony, before the twentieth century, has been that of the three primary colors, equivalent to the common chord or triad of tonal music.

The "between" shades of green, orange and violet, asserted themselves most strongly in the mannerist style, contemporary with the chromatic harmonies of Gesualdo and Monteverdi, and in the mid-to-late nineteenth century, contemporary with the music of Liszt and Wagner.
I. CLOSE COLORS AND SEMI-TONES

The twentieth-century painter is less concerned than were his predecessors, with modelling three-dimensional form by subtle gradations of pink to red, or of blue to black. The twentieth-century composer has either broken away, or is in the process of breaking away from tonality. He is much less concerned, than were his predecessors, with the functional placement of semi-tones, as leading-tone, or as non-harmonic and passing tones between chords, which carefully resolve them into conventional triads.

Now that three-dimensional volume is no longer an aim, the closer colors are free for a different aesthetic use. Now that the painter is less concerned with whether one figure is in front of or behind another, stronger color contrasts are not necessary. The twentieth-century painter often takes pleasure in placing a color next to its nearest relative in the color scale, or spectrum. He does not blend one color into its neighbor. The colors are not graded. Rather he juxtaposes close colors. They exist in clearly-separated areas. The jarring excitement of this chromaticism is more akin to medieval than to seventeenth- or nineteenth-century effects. The reason is that the modern painting, like the medieval manuscript illumination, is mostly flat, without spatial suggestion.

The juxtaposition of two colors that are adjacent to each other in the spectrum, such as red and orange, or
red and violet, or green and blue, might be termed color dissonance. Without blending from one color to another, the clash is as violent as possible, especially when there is a "cluster" of such colors, for example, red, pink, orange, and violet in direct juxtaposition.

The inevitable concomitant of clusters of colors adjacent to each other in the spectrum is that, whenever contrast is desired, complementaries are brought into play. For example, if a cluster of red, yellow and orange requires contrast, the artist is likely to achieve balance with a complementary cluster of green, purple and blue. Although within the clusters, the close colors clash, the individual colors are frequently balanced by their complementaries.

Harmonies of red and green, or blue and orange, are more frequent in twentieth-century painting than in the past. In the past, the triad of primary colors, red, yellow and blue (without strong complementaries), was the dominating harmonic combination. The contrast of complementaries may not always be the result of contrasting clusters of close colors. It may occur alone. In addition to the complementaries within the color spectrum, there are also frequently strong black and white contrasts.

In music, a similar phenomenon has occurred. Without the organizing system of tonality, the semi-tones of leading tone and chromatic harmonies are freed from their
former functions. The direct juxtaposition of major and minor seconds, and their relatives, sevenths and ninths, is a striking and inescapably-conspicuous feature of twentieth-century music. These dissonances are not resolved as they were in the chromatic harmonies of the seventeenth and mid-nineteenth centuries, and in the Bach example previously quoted. They exist in chord clusters of added notes.

Applying Klein's list of colors and pitches, the chord clusters are strongly related to the clusters of close colors that are a feature of modern painting. Close colors are equivalent to major and minor seconds, for example, C# - D (red and red-orange), C - B (dark violet and red), F# - G# (green and blue).

The incidence of strong complementary relationships, such as red and green, or blue and orange, may be likened to the twentieth-century predilection for fourths and tritones, rather than thirds and fifths. Klein's listing related as follows, C# - F#, a perfect fourth, (C#, red - F#, green); D# - G#, a perfect fourth, (D#, orange - G#, blue); and E - A#, a tritone, (E, yellow - A#, violet).

The works of Mahler, Scriabin and early Schönberg abound with fourths, which are occasionally superimposed in the manner of triads. The tritone is a constant companion of the modern composer.

The tendency toward juxtaposition of colors adjacent to each other in the spectrum, such as red and orange,
and of notes close to each other in the musical scale, such as major and minor seconds, began in the late nineteenth century. Gauguin and Van Gogh directly influenced Les Fauves in France and die Brücke in Germany. The added note, or chord that combined an appoggiatura and its resolution, first appeared in the music of Debussy.

The next few pages illustrate these clusters of juxtaposed close colors and major and minor seconds.

The painting on page 108 moves by chromatic steps through the spectrum, and juxtaposed close colors, as well as complementaries, are the result. Red is a background for a light peach table. The pitcher nearby is also a light, warm tone. It is pinkish violet, which, with its admixture of red and blue, leads to blue. The next step is green (leaves), then aqua (pillow). On the table reflecting the warm red, peach and pinkish-violet tones are the ochre handle of the knife and the yellow lemons, which in their lightness lead to the white platter. Then the cycle turns back on itself, for the knife blade is light but dull, blue-grey, leading back to blue and the dark, cool tones. Thus the eye progresses step by step from one end of the spectrum to the other, and from extreme dark to extreme light. The steps chosen are the pure or primary colors of the spectrum, but off-shades and mixtures. Each color is clearly-separated from the other, in spite of their closeness in the spectrum. There are no
Van Gogh. The Postman's Son.
Gaugin. Nafea (When Will You Be Married).
Macke. **Tightrope Walker.**
Matisse. Still-Life With Oysters.
gradations of color, no blended areas, no modelling - the painting is flat. A harmony of close colors juxtaposed, is balanced by contrasts of dark and light and of comple­mentaries.

In the late nineteenth-century, the organizational factors of tonality began to break down. Chromatic notes, in chords and melodies, existed independently, without resolution. By the beginning of the twentieth century, composers felt no reticence whatsoever concerning chord-clusters, packed with semi-tone colors, and not moving anywhere in particular.

On page 111 are two quite different types of juxtaposition of close intervals, one harmonic, the other contrapuntal. The Honegger accompaniment is full of tone clusters. The excerpt from the slow movement of Bartok's Violin Con­certo is a canon, at the distance of a semitone, a crotchet apart.

II. USES OF COLOR-DISSONANCE

Color dissonance, such as has just been illustrated, occurs in several different ways in the twentieth century. Three of the most prominent shall be discussed.

(1) Color-dissonance for its own sake, a decorative function, occurs particularly in the first decade of the century. In the paintings of Les Fauves especially, color exists independently of the naturalistic intent of the
Debussy. Golliwogg's Cake-walk.
Honegger. Le Chasseur perdu en forêt. (above)
Bartók. Violin Concerto. (slow movement) (below)
picture. It is extremely vivid, pure color, inherited from the Impressionists, used in great quantity and variety. Color-dissonance for its own sake, occurs in much modern music. Examples will be given by Stravinsky and Strauss.

(2) **Expressionistic color-dissonance**, like Fauve color-dissonance for its own sake, exists in great quantity and variety, vivid and pure, and often used independently of form. The difference between expressionistic and decorative color-dissonance, is that the expressionists exploit the direct, emotional effect of color.

(3) **Color-dissonance leads to abstraction and atonality** in the paintings of Kandinsky and the music of Schönberg. Color variety, intensity, dissonance, and independence of naturalistic or tonal considerations, have been carried so far that a complete break with past traditions is brought about thereby.

The first use of color-dissonance to be discussed is **color-dissonance for its own sake**. In France, color of unprecedented intensity and variety, and used not to express the form, but rather as an interest in itself, reached its height in the paintings of Les Fauves. This group which included lesser painters such as Derain and Dufy, was headed by Matisse whose most sensational painting in this style was *The Woman With the Hat*. Not only are the hat and dress just an excuse for violent juxtapositions of color, but even this charming lady's face
Matisse. The Woman With the Hat.
is subjected to unnatural green and violent tints. Her neck is as bright a red-orange as is her hair, and all is set against an equally vivid and freely-splotched background. In this painting, the color is decorative. The decorative color is far more important than the representation of the woman, than the form, or its expression.

The two musical examples following both come from comical, operatic situations, - light, entertaining, and certainly not serious enough to be emotionally intense. Yet there are clusters of seconds and sevenths, although in the example by Strauss these are the result of inverting seventh chords rather than of added notes. In both examples, the dissonant harmony may be said to be decorative in purpose.

Stravinsky. The Rake's Progress.
Strauss. Der Rosenkavalier (Baron's Waltz).
Let us look now at expressionistic color-dissonance. In the first decade of this century, in Germany, we again find "Fauve" color of the hottest intensity and in this same rampant variety. Unlike the French examples, such as the Woman With the Hat, however, the color has psychological as well as decorative value. The early Fauve-Expressionists, as was seen in an earlier chapter, were very much interested in subject matter and spiritual expression. A very important means of this expression, at the expense of naturalistic description, is color. In the Portrait of Dr. Tietze and His Wife, painted by Oskar Kokoschka in 1909, the strong red, white, green, blue and black streaking of the nervous, attenuated, and thus accentuated hands serves to enhance their expressive character in a supra-naturalistic manner. The over-all rainbow coloring of the background in its iridescent richness expresses the psyche of the two persons portrayed. Color is the principal means of expressing emotion in this painting.
A sensitive observer will realize the alliance between the Kokoschka and the following examples by Schmidt-Rotluff, Nolde, Kirchner and Kandinsky, as opposed to that of Matisse. In all of them, color is an object in itself, and the raison d'être of the painting. However, Matisse has used decorative color. Matisse's painting is an entertainment. The German Expressionists, on the other hand, have used emotionalistic, expressionistic color. Even the semi-abstract examples by Kandinsky are highly-charged emotionally. The German Expressionist use of color-extremes and non-naturalistic placement is termed symbolic color. Its effect on the spectator is direct, irrational and inexplicable. It is a mystical and primitivistic use of color. In the majority of Expressionist painting it is associated with some naturalistic description, as in the examples here by Kokoschka, Kirchner, Nolde and Schmidt-Rotluff. This is its transitional phase, as in the paintings of Les Fauves, Derain, Dufy, Vlaminck, Matisse. The painters of this phase may continue in this style long into the twentieth century, but in doing so they cease to be leaders. Leadership is taken over by the Abstract-Expressionist, Wassily Kandinsky, whose painting is a natural outgrowth of this very transitional style. Let us first look at the examples of symbolic color by the German contemporaries of Matisse's Woman With the Hat.
Karl Schmidt-Rotluff. Village by the Lake.
Emil Nolde, *Masks*. 
Of the painting below, Will Grohmann says,

"The elegance of these fashionable women is almost timeless, yet they suggest the tense spiritual climate of the prewar years. Reality is put in question; the forms are anything but imitative....

The colors are just as unreal as the contours of the bodies and limbs, and the picture evokes the quintessence of Berlin itself."*

Ernst Ludwig Kirchner. Street Scene. 1913.

In the next three examples, color-dissonance occurs at moments in Expressionistic works, of almost painfully intense emotion. Literally, these works are Expressionistic, Duke Bluebeard's Castle, Elektra, Erwartung. They are full of horror, distortion and a nightmare quality. They are expressed in general, universal terms, as though significant for all humanity. In the scene from Duke Bluebeard's Castle, Judith demands that Bluebeard open the final door and in so doing reveal to her the ultimate truth of his past which he has carefully hidden. The listener expects the door's opening to reveal some unparalleled horror, since all the previous rooms had shown the blood of Bluebeard's murdered wives. The scene from Elektra is the one in which Elektra confronts Klytemnestra, her mother. Klytemnestra in a frenzy, asks her daughter for the means of relief from her alternate nightmares and sleeplessness. She is willing to shed the blood of any human or animal to relieve herself of this burden, not realizing that the burden of her crimes can only be relieved by her own death. At the moment illustrated she describes the nameless, shapeless "thing" which haunts her constantly... it is a symbol of her crimes and the irrevocable shadow of death which must be her punishment. In Erwartung a woman again fears death, the death of a loved one. Death is the nameless "She" which this woman jealously fears will take him. The setting is the forest, full of unnatural noises and shapes, symbolizing her emotion. She finds him dead.
Bartok. Duke Bluebeard's Castle.
Strauss. Elektra.
Schoenberg. Erwartung.
Color-dissonance leads to abstraction and atonality. In a portrait such as the painting Dr. Tietze and His Wife, by Kokoschka, the facial features must be clear enough to be recognizable. In Kandinsky's Arabian Cemetery, painted the same year, the faces have no features at all. The figures are blocks of color without details. In the next painting of 1910, by Kandinsky, two figures have only one arm apiece, and other figures are merely a suggestion, with neither hands nor feet. As in The Woman With the Hat, naturalistic description is of little value here. What is of value is the color; each color is at its most intense though overlapping in places and creating new mixtures. The overlapping of colors in these Kandinsky, Kokoschka and Matisse examples (and in the earlier example of the Fauve-Expressionist painter, August Macke) mark these paintings as typical of the early twentieth century. Later, as we shall see, colors are kept in separated areas and are used with more economy.

In the Kandinsky paintings in particular, color has been pushed to its utmost non-naturalistic extreme. Kandinsky has significantly given the second example the non-descriptive title of Study for Composition 2 as opposed to the preceding Arabian Cemetery. It is a short step from this to completely abstract painting. In Kandinsky's work, the preoccupation with the emotional and dynamic properties of color, coupled with the generalization of form due to
disinterest in naturalistic details, leads to abstract painting. This is just the opposite of the road taken by the Cubists to abstraction. The cubists ignore color and vary form to its breaking point.
In the paintings of Kandinsky, the variety, intensity, and dissonance of color have been carried so far that the painting is no longer convincing as a representation of objects of the world of natural appearances. It is abstract painting. Similarly, in the works of Schönberg in particular, the exploitation of chromaticism completely undermines tonality. Without going into the problem of the relation between realistic perspective-painting and tonal harmony, which we discuss in a later section, we still can note that in the following example from Schönberg's Second String Quartet, color-dissonance has gone beyond tonal limitations. The result of Schönberg's atonality (a stage already represented in the example from Erwartung) is twelve-tone or serial writing, where the purpose and technique of the composer is not only negatively anti-tonal, but positively directed toward a completely new system of organizing music.
Schönberg. Quartet Number II.
Klein's charts not only relate pitch and color. They also relate timbre and color. Timbre and purity (or saturation) of hue are related. The range is from a pure tone to that of a musical instrument; and from a pure hue (light) to a mixed, in-between and less intense shade. Loudness and brightness correspond. Softness and weakness of color correspond. Mr. Field does not attempt to thoroughly analyze and chart the relationships between color mixtures and musical instruments, as he had the relationships between specific colors and specific pitches. He does, however, make the following comments:

Red...bright, projecting, loud, vivid...hot, stimulating, glaring...... trumpets
trombones horns

Red-orange...loud, projecting, bright...... irritated, hot, stimulating................. trumpets

Blue...receding, quiet.....cool, restful, soothing, mentally stimulating................ flute
violin in high register

Blue-violet...quiet, receding, dark...cooling, tranquilizing.............. harp

Violet...dark, receding, distant...warm, subduing, funereal........... cello, bass

Vio
The foregoing chart is based on the association of certain qualities of a color, with the same qualities as associated with the sound of a musical instrument. Thus the psychological factor has determined those relationships, unlike the scientific basis given for the list of spectrum, and pitch scale. However, reference back to the charts given in Chapter V shows that it is the wave-form of sound that determines timbre, quality, or character of sound, and the wave-form of light that determines purity, saturation or desaturation of hue. Thus the correspondence between instrumental color and saturation of hue is scientifically established but not scientifically applied. We cannot here relate specific colors and specific instruments.

Sachs' The Commonwealth of Art relates linear, non-coloristic periods to "classical" or Ethos phases, when instrumentation is less important than at other times, and painterly, coloristic periods to "romantic" or Pathos phases, when instrumentation is very important.

I. TWENTIETH CENTURY USES OF INSTRUMENTATION AND COLOR

During the late nineteenth and early twentieth centuries, in the works of Wagner, Richard Strauss, Mahler, Rimsky-Korsakov and early Stravinsky, the orchestra was treated coloristically and somewhat separately from form. Interest in the individual sonorities of instruments, and
the dark richness of their blend, led to an art of orchestration almost independent of the art of writing music. The orchestra became larger and larger. Many instruments had no independent music to play, but simply doubled the music being played by other instruments. This heavy doubling gave a predominating coloration that was dark, fully blended, and ample in richness and depth.

In the early twentieth century, the nineteenth-century orchestra reached its peak in size and density, and then the trend turned toward the opposite direction, towards chamber orchestration.

Stravinsky's orchestration of The Rite of Spring called for 18 brass, and 18 woodwinds, besides an enormous body of strings and an unusually large group of percussion instruments. Schönberg's orchestration of the Gurre-Lieder was so complex and massive that it took him ten years longer to write the orchestration than to write the music. Comparable in size to Mahler's Eighth Symphony, the "Symphony of a Thousand," the orchestral apparatus included 5 solo voices, 3 four-part male choruses, eight-part mixed chorus, 4 piccolos, 4 flutes, 3 oboes, 2 English horns, 3 A and Bb clarinets, 2 Eb clarinets, 2 bass clarinets, 3 bassoons, 2 contra-bassoons, 10 horns, 6 trumpets, 1 bass trumpet, 1 alto trombone, 4 tenor trombones, 1 bass trombone, 1 contrabass trombone, 1 tuba, 6 tympani, bass drum, cymbals, triangle, glockenspiel, side-drum, tambour, xylophone,
tam-tam, 4 harps, celesta, and a proportionate number of strings in the usual quintet. Note the predominance of heavy, bass-range instruments. Along with early twentieth-century works of Richard Strauss, the Eighth Symphony of Mahler, The Rite of Spring and the Gurre-Lieder are the last examples of such massive orchestration in the twentieth century.

In late nineteenth-century German painting, contemporary with Wagner, the dark, almost black reds, purples and blues, form-obscuring in shadow and heavily varnished to a gleaming blend, in the works of Böcklin, Hans von Marees, and Max Klinger, are soon to give way. The late nineteenth century style is supplanted by the brighter, more vivid coloration of the twentieth century, under the influence of the Impressionists whose primary concern was, after all, color. The orchestra remains large in the early twentieth century, but uses more and more unconventional instruments and new colors. Unlike Wagner's uniform, blackish blend of weighty bass instruments, with exquisite spiritual highlights of high violins and woodwinds as a value contrast of dark and light; the orchestra of the Gurre-Lieder retains the quantity of usual instruments, but adds such tingling new sounds as glockenspiel, xylophone and celesta. The extravagant orchestra of Mahler's Eighth Symphony adds such strange new colors as church bells, harmonium and mandolines. The orchestras of The Rite of Spring and
The Firebird of Stravinsky, and Das Lied von der Erde of Mahler, include a quantity of new percussion sounds that add an oriental or primitivistic atmosphere.

We have seen a similar quantity and variety of color in the paintings of Les Fauves, such as Matisse's Woman With the Hat, and also in paintings of Fauve-Expressionists, such as Macke, Marc, Nolde, Schmidt-Rottluff and Kokoschka. As a matter of review, let us look at two new examples, on the following page, one of Marc and one of Kandinsky. As in the early twentieth century orchestras of Strauss, Mahler, Schönberg, and Stravinsky, we note several things: (1) the quantity of color, (2) the intensity of color, (3) the variety, and (4) the independence of color from form. The cramming of several colors into a single form, whether representational, as Matisse's Woman With the Hat, or non-representational, as in the Kandinsky example below, is significant for the beginning of the twentieth century only.
Kandinsky. Composition.
We have already compared this colorism to color dissonance in music. Thus we have the disconcerting situation of two musical comparisons to a single visual characteristic. There are relationships between color and instrumentation, as well as between color and pitch. There is an increase in the number of instruments, and in the variety, which frequently means the addition of new colors not exploited before. The instruments, like the colors, are used freely. Many colors, many instruments may express a single visual or musical shape.

In some instances, the orchestral exploitation may be described as color for its own sake, or decorative color. Let us set aside, for the moment, the Gurre-Lieder, and The Rite of Spring. Most assuredly, in these examples, the music was the composers' first concern, and the orchestration, albeit important and coloristic, nevertheless a secondary concern treated after the music had already been conceived. A better comparison to the decorative color for its own sake in the paintings of Les Fauves, such as Matisse and Derain, might be a work of Rimsky-Korsakov, such as Le Coq d'Or or Scheherazade. Although Stravinsky's orchestration technique was derived from that of his teacher, Rimsky-Korsakov, still Korsakov's music is thinner and somewhat uninteresting, whereas his orchestration is sensuous, beautiful and of primary importance. In Rimsky-Korsakov, the orchestra is more important than the music, and in
Matisse's *Woman With the Hat* the color is far more important than the representation of the woman.

The German Expressionists used **symbolic color** for purposes of expression. They used the same variety, intensity and combinations as the Fauves, but not color for its own sake. They used color for expression. Similarly, in the works of Mahler in particular, we have expressionistic use of instrumental sonorities. The following examples of Mahler's expressionistic orchestration are given as analyzed in Redlich's *Bruckner and Mahler*. Redlich mentions Mahler's expression of the metaphysical in terms of realistic sounds, as the distant tramping of feet in the first movement of *Symphony III* and the inexorable hammer-blows of destiny in the finale of *Symphony VI*. He says:

Mahler's expressionist art of scoring can perhaps best be studied in passages of almost violent expression, as in the final bars of No. 1 (*Das Trinklied von Jammer der Erde*), where the faint and yet piercing sound of the trumpet is set off against the plaintiff shriek of the flutes and clarinets, while the opaque thud of trombones, bassoons and harps adds to it a sense of hopeless finality, as if the door of life were shut for all eternity.

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Redlich refers to the following passage from *Das Lied von der Erde*.

Mahler. *Das Lied von der Erde*.

Redlich continues by discussing the introduction of new instrumental colors into the orchestra from multiple sources for the purpose of poetic characterization. From the military brilliance of imperial Austria, Mahler introduces the tenor horn (*Symphony VII*), the "biedermeierish" cornet (*Symphony III*), the bass drum with firmly attached cymbals and side-drum. He also adds to the symphonic orchestra such operatic effects as the hammer (*Finale, Symphony VI*), cowbells (*Symphony VI* and *VII*) where it symbolizes the last terrestrial sounds penetrating the remote solitude of Alpine mountain peaks, the mandoline (*Das Lied von der Erde*), distant orchestras in the wings, humming choruses without words, organ and piano.

Some of the most frequent expressionistic effects in Mahler are these banal, brash, blaring military marches,
deliberately parodistic and using the military instruments mentioned above. Many of them are funeral marches. Some of them remind one of the carnival or dance-hall, and in their banality express the vulgarity and meaninglessness of the everyday world, as opposed to the spiritual world. Allied to the parodistic marches in Mahler's music is his "grotesquerie" and love of the macabre. In the following example from Symphony VI, the scherzo is like a dance of death, or of lifeless puppets, reminding one of E.T.A. Hoffman, and of such Expressionist paintings as Heckel's Clown and Doll. This dance of unreality is a favorite topic of German Expressionism. In the example below Mahler achieves the effect instrumentally. Redlich likens the repeated xylophone figure to the metallic laughter of the devil himself.

Mahler. Symphony VI (scherzo)

Another example of grotesquerie in Mahler is the uncanny shuffling, slurring col legno passage below, as
the parodistic march of the third movement of *Symphony 3* literally dies out.

Mahler. *Symphony I* (movement 3)

Mahler also achieves a supernatural effect in his brass chorales, and his nocturnal nature-descriptions. Several times we see in his scores the marking "Wie ein Naturlaut," (like a sound of nature), as in this passage from *Symphony no. 3*. His bird-calls as in the example from *Um Mitternacht* express lineliness and remoteness and visionary dreams. As in the paintings of Kirchner, Kokoschka, and Nolde, color, instrumental as well as chromatic, is a principal means of expression. It does more than carry the form.
In the preceding chapter it was said that expressionistic use of color had a direct emotional effect that defied analysis. This is also true of expressionistic music. However, one feature of expressionism is marked; it is always the extremes of emotion, the abnormal, that is expressed, frequently in extreme or abnormal terms. Let us just look at the treatment of the human voice in a few expressionist works.

The human voice, in expressionist works, either proceeds chromatically, or it sings in frantic, wild skips upward and downward. These skips are so unnatural as to be almost unsingable, and invariably give the effect of hysteria. Note the extremely wide range expected of the singer, within just a few bars, without a vocal, scale-wise progression up or down. The constant octave-displacement of chromatic intervals, adds to their disturbance of tonality. These extraordinary vocal (and instrumental) leaps are characteristic of the early expressionism of Richard Strauss' Salome and Elektra, the atonal expressionist period of
Herzgewäschse, Erwartung, Die Glückliche Hand, and Pierrot Lunaire of Schönberg, and remain a feature of the atonal twelve-tone stylistic mixture of Berg's Wozzeck and Lulu, and of all the vocal, twelve-tone works of Schönberg and Webern.


Schönberg. Herzgewäschse (setting of Maeterlinck's Serres chaudes) for high soprano, harmonium, celesta and harp. The entire range of the voice is G# below middle C to F above high C.

Webern, Opus 23 #2.
Sprechstimme, marked in the score, is a combination of musical pitch and spoken tone-quality, and is far from the normal treatment of the human voice in music. In the following example, from Pierrot Lunaire, it is accompanied only by a wistfully-winding solo flute, giving a weird, mournful, nightmarish quality to the musical lines and poetic expression. Significantly, the title of the passage is "Der kranke Mond," "The sick moon." Schonberg. Pierrot Lunaire ("Der kranke Mond")

Berg uses the human voice in a multitude of different ways, depending on the passage and the emotion he attempts to express. In Lulu, we have the following four types: (a) Sprechstimme, speaking on pitch, (b) recitative, (c) parlando-singing and (d) bel canto. Redlich says:

Berg's imagination was undoubtedly stimulated by the fact that he conceived the part of Lulu for a coloratura soprano. The effects demanded range from a whispered shriek to the passionate whistling sound
of hysteria. This can best be studied in the scene of Lulu’s clash with the Countess Geschwitz (III/I). Lulu’s rage and frustration are reflected in the almost unproducible pitch of the following bars...³

Berg. Lulu (excerpt from III/I, scene of Lulu’s clash with Countess)

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Berg. Lulu (example of Sprechstimme)

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Berg. Lulu (example of recitative)

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Berg. Lulu (example of parlando singing)

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Schönberg's invention of speech-song, or Sprechstimme, may be interpreted in two ways: (1) as an expressionistic device, in which the voice is treated in an extreme and unnatural way to express intense emotion; and (2) as an abstraction of the human voice from natural circumstances, that at the same time allows the voice to carry a text in a musical manner. The second treatment of Sprechstimme is found in Schönberg's highly abstract, twelve-tone opera, Moses und Aron, where it is one of several ways in which the voices are handled. In this work, Sprechstimme is first used expressionistically in the part of Moses (who spoke the word of God, but who had a speech impediment), in contrast to the bel canto part of Aron (who misled men into mis-doing, but who had great fluency of speech). Moses und Aron simultaneously combines various vocal treatments, such as those found in Lulu: rhythmic chanting on a single tone, Sprechstimme, singing, high voices, low voices, in an overlapping configuration. The voices are kept distinct by their separate "instrumentations" or vocal treatments. There is no attempt in Moses und Aron to retain the realistic aspects of human speech. For example, the duets are not dialogues
or conversations, but overlapping monologues. Moses will perform Sprechstimme, and Aron sing, their contrasting points of view simultaneously:

Aron, "Du Sohn, meiner Vater schickt dich mir der grosse Gott?"
Moses, "Du Sohn, meines Vaters, Bruder des Geistes, aus dem der Einzige sprechen will..."

or they overlap at pivotal words such as "Gnade"...Aron's speech ending, "des Ewigen Gnade" and Moses' ensuing speech overlapping Aron's by beginning, "Gnade schenkt er dir aus Erkenntnis." Certain words in the opera are treated abstractly, as sounds, and occur and reoccur at significant moments in this highly symbolic music-drama. Another example of the abstractness of the vocal concept is the use of polytextuality, wherein one part sings different words from another. The unnatural and frequently highly emotional treatment of the human voice in these works seems to present a fitting comparison to the unnatural and frequently highly emotional treatment of color in expressionistic painting. 4

II. ECONOMY AND FORMAL USE OF INSTRUMENTATION AND COLOR

The examples discussed, the early twentieth-century works by Richard Strauss, Schönberg, Mahler, Stravinsky, Rimsky-Korsakov, show a tremendous extravagance in the use of color. The orchestral resources of these works are enormous in quantity and differentiation. Like Les Fauves and

the Fauve-Expressionists, there was no reserve employed in this exploitation of color. Many colors would spring from a single form, whether musical or visual.

Certain of the characteristics of the use of color we have just discussed will remain in the twentieth century. But the quantity and variety will be reduced. Also a single form will be allowed just one color, thus clarifying it. For example, there will be more use of solo instrumental melodies. The cramming of several colors into a single melodic or visual area will no longer occur.

The change in method of orchestration was anticipated by Mahler's *Das Lied von der Erde*. It is interesting to see the composer of the "Symphony of a Thousand" writing sparingly in vocal passages. Although the number of instruments used is still large and richly-colored, often even exotic, still fewer instruments are used at a time and there is less tutti than before. Even in the orchestral interludes some of the instruments are employed soloistically and individual lines can be more clearly-heard.

As in Mahler, the following example of Roualt, *Christ Mocked by the Soldiers*, uses strong (melodic) lines to emphasize the form and contain the quantity and variety of emotionally-charged color.
In turn-of-the-century France, Debussy's orchestral scoring allows a direct comparison with the Impressionistic palette of three (or seven) primary, unmixed colors. Debussy divides a somewhat smaller orchestra into three individual sonorities, strings, woodwinds, and brass, and seldom mixes them together. Monet and the Impressionists similarly divide their "instruments" using red and blue separately, for example, instead of purple, so as to retain the utmost purity and intensity of color. Like Debussy, Impressionist...
painters favor individual sonorities. Their preference is for the light and delicate, for pinks and yellows, for the combination of harp or celesta and flute or oboe.

In contrast to the music of Rameau, Debussy criticized late nineteenth-century orchestral writing, saying: "We have adopted a frenzied method of shaking up the orchestra as one mixes a salad." 5

Debussy even compared orchestral colors with those of a painter as follows:

Beethoven's orchestra...a formula in black and white, resulting in the whole exquisite gamut of greys; that of Wagner which is a species of polychromatic putty, spread almost uniformly, in which ...no longer distinguish the sound of a violin from that of a trombone. 6

Thus, Debussy anticipated a basic feature of twentieth-century music, in the return of individual unmixed sonorities of instrument. The Impressionists contemporary with Debussy, likewise lightened their palette, using only pure unmixed color. Pure color of high intensity is the color of Les Fauves and the Expressionists as well as of later artists. However, in the first decade of the century, these pure colors are used in such multiplicity as to obscure form. We still do not have the solo line.

A major feature of modern music and art is the limitation of a single instrument to a single part, without

6Ibid., p. 139.
doubling, and the limitation of a single color to an area. The economy of instrumentation and formal color is part of the equally important modern tendency toward clarity of line and contour. Certain of the Post-Impressionists in France, and the Expressionists of die Brücke, anticipate the return of color to form. The tendency toward chamber orchestration and melodic clarity, and toward formal color and clarity of contour, is not limited to any one nationality. Melody returns in the music of Ravel and Roussel, as well as in that of Mahler; line and contour return in the paintings of Degas and Gaugin, as well as in works of die Brücke.

In spite of the function of chamber orchestration and formal color, to enhance clarity of melody and line, color generally retains its importance in the twentieth century. However, before trends have been fully established, color is subservient in transitions of the most radical experimentation. During experimental phases of early twentieth century painting and music, not only is the number of instruments and colors reduced, but also their interest and variety.

When Bartok, Schönberg, Berg and Webern are experimenting with formal condensation, the return of counterpoint often very dissonant in its free part-writing, and the advent of atonality, in a general breaking away from all past traditions, they write small piano pieces, songs and string
quartets. In these experimental sketches, the number and variety of instruments is reduced.

During experimental phases of twentieth-century painting, the number and variety of colors is likewise frequently reduced. Two years after The Woman With the Hat, in 1907, Matisse's sketch Music uses a simple flesh tone for the figures, with all-black hair, flat green grass and flat blue sky. The violent mixing of many colors of the earlier example is completely missing here. When Picasso and Braque are experimenting with their point of departure from realistic spatial representation, Analytical Cubism, there is a preponderance of dull greys and beiges, almost monochrome, as in the example on the next page. We see that instruments and color are used for a single purpose in this phase, to delineate and clarify lines, planes, melodies and their resultant harmonies.

The example, par excellence, of the attention to line and economy, is the orchestration of Schönberg's Kammersymphonie, composed while the orchestration of the Gurre-Lieder was still unfinished. The Kammersymphonie is scored for fifteen solo instruments; flute, oboe, English horn, two clarinets, Bass clarinet, bassoon, contrabassoon, 2 horns, string quartet and double bass. Characteristically, the Kammersymphonie is also briefer. It is in just one movement, and lasts barely 30 minutes.
Below is an almost monochromatic work by Braque, contemporary with the Kammersymphonie by Schönberg. Braque. *Man With a Guitar.*

When the formal results of the experiments leading to a break with past tonal and realistic traditions have fully arrived, then color will return. Color returns in Schönberg's *Variations for Orchestra* and *Five Orchestral Pieces*, in Berg's *Wozzeck* and *Violin Concerto*, and in Bartók's *Music for Strings, Percussion and Celesta* and *Concerto for Orchestra*. We see vivid color, now united with form in Klee's *Double* and in Picasso's *Three Musicians.*
Klee. Double. 1940.
Because of the wealth of experimental innovations in twentieth-century art, there is likewise a quantity of monochrome sketches and miniature pieces. These appear, as in the case of Braque's Analytical Cubist painting and the Kammersymphonie of Schönberg, whenever experimentation is in progress. Whenever the results of experimentation have been achieved, we see longer, larger works with more colors and more instruments. There is a vacillation between compositions with color and compositions without. However, the unity between color and form, and between instrument and melodic line remains throughout. The use of orchestral and colored masses for their own sake never returns.

Not conflicting with the new emphasis on structural, musical innovations and economy, are the innovations in the use of color and instrumentation. New sonorities of individual (as opposed to mixed) instruments, in unusual combinations, are exploited. This is the happy outcome of the change to fewer instruments, each one of which can be clearly heard.

In Pierrot Lunaire, 1912, each of the 21 poems uses a different combination of the same instruments, with the successive entries of instruments clearly noticeable. In no. 1, Mondestrunken, the scoring is for flute, violin, and piano with cello; entering later; No. 2, Columbine, violin and piano, with flute and A clarinet entering later; No. 3, Der Dandy, piccolo, A clarinet and piano; No. 4, Eine blasse
Wascherin, flute, A clarinet, and violin; No. 5, Valse de Chopin, flute, A clarinet changing to bass clarinet, and piano; No. 6, Madonna, flute, bass clarinet, cello, and piano entering later; No. 7, Der Kranke Mond, solo flute, and so on. Nine instruments are actually used as though they were only six, and these become even fewer in the individual numbers. The total scoring of *Pierrot Lunaire* calls for Sprechstimme (a totally new musical color, used for the first time here), piano, flute (including piccolo), clarinet (including bass clarinet), violin (including viola) and violoncello.

An equally unique combination of instrumental colors in a chamber ensemble is seen in Stravinsky's *L'Histoire du Soldat*. The score calls for a virtuoso, solo performer on a high and low instrument in each category of instrument, plus a large body of percussion to be played by a single and double bass, and percussion. Again, the instrumental colors are used in a variety of smaller combinations, differing with each number, rather than in tutti. The Three Dances are almost entirely scored for violin and percussion alone. The four-part chorale is divided among the four wind instruments. The cornet and trombone are prominent in the Soldier's March (with violin) and the Royal March. The music ends with solo percussion as though the Devil had made off with the Soldier's soul, in the form of his violin, and left only a bare skeleton behind.
Soloistic color treatment is also prominent in modern art. In *The Moroccans* by Matisse, there are only six colors used: blue, off-white, green, violet-pink, black and ochre. Each color area is self-contained and does not overlap or blend with the others. Values and complementaries are opposed: green vs. violet-pink, black vs. white, blue vs. ochre, in a manner reminiscent of Stravinsky's oppositions of high and low (light and dark) instruments drawn from three "colors" or choirs, string, woodwind, brass. The strong color contrasts are as important as the lines in separating the objects one from another, in this painting, illustrated on the next page.

In Piano Lesson, the second example by Matisse on the preceding page, the complementary colors are not only opposed, but are related to a similar formal contrast. As in Stravinsky's L'Histoire du Soldat, the colors characterize the forms and figures. The green triangle (suggesting a garden through an open window) opposes the pink rectangle of the piano coverlet. The brown (wood) statue of a woman, three-dimensional and curvilinear in character, and nude, is exactly opposite the white painting of a woman, flat and angular and clothed. This characterizing use of color, green for garden, etc., reminds one of Stravinsky's choice of percussion accompaniment to solo violin in the jazzy Ragtime, and the use of brass instruments for the Royal March. In the Piano Lesson, the arabesques of the window grill and the music rack are both black (wrought iron?) and are thus related by their forms, by their proximity to each other in the painting, and by color. The orange strip that divides the painting from the window is directly opposed to its complementary, the pale blue of the window casement parallel to it. This light blue continues in a right angle in the music book, unifying the separate parts in the same manner as the black arabesques continue into each other, almost in a right angle.

The desirability of the unity between a section of a painting and its color, or a musical part and its instrumentation, is expressed by Schönberg himself:
Now, to speak of orchestration. My concept of color is not the usual one. Color, like light and shadow in the physical world, expresses and limits the forms and sizes of objects. Sometimes these elements serve as a camouflage. A musician likewise might wish to hide something. For instance, like a good tailor, he might wish to hide the seams where sections are sewn together. In general, however, lucidity is the first purpose of color in music, the aim of the orchestration of every true artist.

III. KLÄNGFARBENMELODIEN AND VARIATION OF FORM

BY MEANS OF COLOR

This brings us to Schönberg's concept of "Klangfarbenmelodien." Leibowitz explains as follows:

In the final pages of his Theory of Harmony, Schoenberg, after having recalled that a tone is generally conceded to have three properties: pitch, color (or timbre) and intensity, remarks how little attention has been given, up till now, to the second of these properties. Some very judicious observations lead him to believe that some day melodies will be composed which are not measured by varying pitch-levels alone, but also (even principally) by various timbres; they will be "tone-color melodies," or, to use Schoenberg's German term, Klangfarbenmelodien.

At first glance, this explanation of "Klangfarbenmelodien" would seem to coincide exactly with the examples, Pierrot Lunaire and L'Histoire du Soldat. It would seem to mean that the line, the form, the melody would be conceived in terms of the color instrument expected to carry it. Put into practice by Schönberg and Webern, however, "Klangfarben-

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melodien" indicates the varying of the form by means of the color. That is, the color has effect on the composition within the melodic line. The same melodic-line is not doubled by more than one instrumental color at once. Nevertheless the color has an independent existence within the melodic line. Schönberg says:

The figure in the bassoon part in Variations for Orchestra continues for some time, while the instrumentation of the harmonies in eighth notes changes rapidly and continuously.9

In Webern's Quartet, op. 22, for violin, clarinet, tenor saxophone and piano,

The theme is varied, not only in its registration, but also in its instrumentation. Instead of being played by a single instrument... it is played by three alternating instruments, and so in constantly changing in color.... The theme, which has but a single color (saxophone) in the exposition, now has a variable color; the canon, which had a variable color in the exposition, now has a single color (piano).10

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9 Schönberg, op.cit., p. 138.

10 Leibowitz, op.cit., p. 220.
The following example, by Mondrian, illustrates the variation of line-like strips by means of color.

Mondrian. Boogie Woogie.
The variation of line by color, thus reducing the line to a series of spots, is, however, relatively rare in modern painting. More frequently we find that the color of a line is changed or altered only when it crosses a line or area of a different color. For example, a beam of red light changes to purple at the point where it is crossed by a beam of blue light. Wilfred shows us one color blending into another in his lumia compositions, but the form is also undergoing a metamorphosis at the same time. In the instances cited by Schönberg and Webern, the form remains constant and only the instrumental color changes. In the painting illustrated below, by Kandinsky, we see linear strips and semicircular forms changing color as they cross each other. It is an interesting digression at this point to note that this painting by Kandinsky belongs to his geometric, neo-classic period, just as Schönberg's Variations for Orchestra is a work in constructive, twelve-tone writing. Preceding this stylistic phase in the work of both men are the abstract Expressionist Compositions and Improvisations of Kandinsky, and the atonal Expressionist works of Schönberg (Erwartung, Die Glückliche Hand, Pierrot Lunaire) where we see no instances of "Klangfarbenmelodien" or its correlative in the visual art of Kandinsky.
Kandinsky. Lyrisches Oval.
"Klangfarbenmelodien" is a very brief phase in the history of music. Webern has entirely different purpose than that of line-variation, in his constant changes of instrumental color. A full explanation of Webern's use of isolating points of color within a line, usually isolated not only by instrumentation but also by register, change of dynamics, surrounded by rests and sounding alone, must wait until our discussion on related techniques in music and painting of the twentieth century. Webern, like so many modern painters, sees the spatial properties of color. One color will come forward; a bright loud sound, for example, will seem to stand out and hence be in front of a softer, more mellow tone. Webern's spatial uses of color are the most subtle imaginable in their gradations and variety, though each is distinct to the sensitive ear. Observe the following example, requoted from Leibowitz's book, of Webern's opus 10, the first piece.\textsuperscript{11} In this piece the 12-tone series on which the entire music is based does not stand out as a line at all. What stands out are the subtly isolated notes of various registers and instrumentation, related seemingly mysteriously.

\textsuperscript{11}Leibowitz, \textit{op. cit.}, pp. 199-200.
Webern, opus 10, no. 1.
The spatial differentiation and balance by means of color is more common to painting, a spatial art, than it is to music, which exists in time rather than space. Color was one of the most important ways by which the realistic painter achieved the illusion of distance. In what is called "aerial perspective," the objects supposedly in the background of the picture, were not only represented as being smaller, but also as being paler, more vague in color, and tending toward the most recessional color, a cool greyish-blue. This is actually what our eye does to the natural appearance of objects in the distance, letting them fade as they get farther and farther away. The modern painter no longer imitates nature with aerial perspective, but many modern painters nevertheless counteract the actual surface-flatness of a painting by using the forward-backward properties of color in an aesthetic balance.

Kandinsky, in his epoch-making publication of 1910, Concerning the Spiritual in Art, makes a thorough analysis of the spatial properties of color in terms of motion forward or away from the spectator. Along with these spatial properties, he includes the psychological values of color as well, sometimes due to the spatial movement toward or away from the spectator, and sometimes due to the associations human beings make, such as the association of red with warmth since fire is red. Psychological associations based on common human experiences are less prominent and analyzable in the
instrumental colors, because we only hear instruments when we hear music - we do not hear them in our daily life. Consequently, Kandinsky's psychological analysis of colors is of particular interest to the musician - as he frequently identifies a color with a corresponding instrument. The comparison can never be absolute of course, because we have exactly six colors in the spectrum and an unlimited number of instruments. It is nevertheless an interesting cause for speculation, however, because musicians in general agree that certain instruments are bright and strident or delicate, warm or sombre, rich or thin, piercing or subtle, spiritual or earthy, a matter not only of tone quality but also of highness and lowness, loudness and softness.

Let us look at Kandinsky's theories of the spatial, psychological and instrumental properties of color. The following is a rather lengthy quotation from Kandinsky's Concerning the Spiritual in Art, included because it is directly pertinent to Webern's use of instrumentation. Red underlines have been added by the author to point out the direct musical references.

Two great divisions of color immediately occur to the mind: warm and cool; and light and dark. Thus it becomes evident that each color may have four principal notes: either (1) warm, and therefore either light or dark; or (2) cold, and either light or dark.

Generally speaking, warmth or coolness in a color means an approach to yellow or to blue. This distinction occurs on one level, so to speak: i.e., the color preserves its basic quality, but this quality is, now more, now less, earthy. It represents a horizontal movement, the warm colors approaching the spectator, the cool ones retreating from him.

The colors that cause in another color a horizontal movement while they are themselves affected by it have another movement of their own, which acts with a violent, separative force. This is therefore the first great antithesis in internal value, and the inclination of the color to cool or warm is of tremendous importance.

The second great antithesis is between white and black; i.e., the inclination to light or dark caused by the two tones. These tones have, too, a peculiar movement to and from the spectator, but in a more rigid form...

Yellow and blue have another movement which affects the first antithesis - an eccentric and concentric movement. If two circles are drawn and painted respectively yellow and blue, a brief contemplation will reveal in the yellow a spreading movement out from the center, and a noticeable approach to the spectator. The blue, on the other hand, moves into itself, like a snail retreating into its shell, and draws away from the spectator. The eye feels stung by the first circle while it is absorbed into the second.

In the case of light and dark colors movement is emphasized. That of the yellow increases with an admixture of white, i.e., as it becomes lighter. That of the blue increases with an admixture of white, i.e. as it becomes lighter. That of the blue increases with an admixture of black, i.e., as it becomes darker. This fact has a greater importance if we note that yellow inclines to the light (white) to such an extent that there can be no very dark yellow. The relationship between white and yellow is as close as between black and blue, for blue can be so dark as to border on black. Besides this physical relation, there is also a spiritual one (between yellow and white on one side, and blue and black on the other), which marks a strong separation between the two pairs.

An attempt to make yellow colder produces a greenish tint and checks both the horizontal and eccentric movement. The color becomes sickly and unreal, like an energetic man who has been checked in the use of his energy by external circumstances. The blue by its contrary movement acts as a brake on the yellow and is hindered in its own movement, and, if more blue is added, the contrary movements cancel each other and complete immobility ensues. The result is green. Similarly white,
when mixed with black, loses permanence, and the result is gray, which is spiritually similar to green.

But while yellow and blue are potentially active in green, though temporarily paralyzed, in gray there is no possibility of movement because gray consists of colors that have no motive power, one representing static resistance, the other non-resistant immobility (like an endless wall or a bottomless pit).

Because the component colors of green are active and have a movement of their own, it is possible, even theoretically, on the basis of this movement, to determine (or anticipate) their spiritual effect.

We reach the same results by proceeding experimentally in having colors act upon us. The first movement of yellow, that of straining toward the spectator (which can be increased by intensifying the yellow), and the second movement, that of overrunning the boundaries, having a material parallel in that human energy which attacks every obstacle blindly and goes forth aimlessly in all directions.

If steadily gazed at in any geometrical form, yellow has a disturbing influence; it pricks, upsets people, and reveals its true character, which is brash and importunate. The intensification of yellow increases the painful shrillness of its note, like that of a shrill bugle.

Yellow is the typical earthly color. It never acquires much depth. When cooled by blue, it assumes, as I have said before, a sickly tone. If we were to compare it with human states of mind, it might be said to represent not the depressive, but the manic aspect of madness. The madman attacks people and disperses his force in all directions, aimlessly, until it is completely gone. To use another metaphor, we are reminded of the last prodigal expansion of summer in the glaring autumn foliage, whose calming blue component rises to the sky.

Depth is found in blue, first in its physical movements (1) of retreat from the spectator, (2) of turning in upon its own center. It affects us likewise mentally in any geometrical form. The deeper its tone, the more intense and characteristic the effect. We feel a call to the infinite, a desire for purity and transcendence.

Blue is the typical heavenly color: the ultimate feeling it creates is one of rest. When it sinks almost to black, it echoes a grief that is hardly human. It becomes an infinite engrossment in solemn moods. As it grows lighter it becomes more indifferent and affects us in a remote and neutral fashion, like a high, cerulean sky. The lighter it grows, the more it loses resonance, until it reaches complete quiescence, in other words, white. In music a light blue is like a flute, a darker blue a 'cello; a still darker the marvelous double bass; and the darkest blue of all - an organ.
Yellow easily becomes acute and is incapable of great
depth. Conversely, blue resists pointing up and heightening.
A well-balanced mixture of blue and yellow produces
green; the horizontal movements cancel each other, and
so do movements from and towards the center. Calm ensues.
This is a fact recognized not only by oculists, but by
the world. Absolute green is the most restful color,
lacking any undertone of joy, grief or passion. On
exhausted men this restfulness has a beneficial effect,
but after a time it becomes tedious. Pictures painted
in shades of green bear this out. As a picture painted
in yellow always radiates spiritual warmth, or as one in
blue has apparently a cooling effect, so green is only
boring. Yellow and blue have an active effect correspond­
ing to man's participation in continuous and perhaps etern­
al cosmic motion, whereas green represents the passive
principle. This contrasts with the active warmth of yellow
or the active coolness of blue. In the hierarchy of colors
green represents the social middle class, self-satisfied,
narrow. It is the color of summer, when nature
is quiescent after the perturbations of spring.

Any preponderance in the absolute green of yellow or
blue introduces a corresponding activity and changes the
inner appeal. The green keeps its characteristic equanimity
and restfulness, the former increasing with the inclination
to lightness, the latter with the inclination to depth.
In music, absolute green is represented by the placid,
middle notes of a violin.

Black and white have already been discussed in general
terms. Speaking more particularly, white, although often
considered as no color (a theory due largely to the impres­sionists, who saw no white in nature), is a symbol of a
world from which all colors as material attributes have
disappeared. This world is too far above us for its
structure to touch our souls. There comes a great silence
which materially represented is like a cold, indestructible
wall going on into the infinite. White, therefore, acts
upon our psyche as a great, absolute silence, like the
pauses in music that temporarily break the melody. It
is not a dead silence, but one pregnant with possibilities.
White has the appeal of the nothingness that is before
birth, of the world in the ice age.

On the other hand, the ground-note of black is a
silence with no possibilities. In music it is represented
by one of those profound and final pauses, after which
any continuation of the melody seems the dawn of another
world; the circle is closed. Black is something burnt
out, like the ashes of a funeral pyre, something motion­
less like a corpse. The silence of black is the silence
of death. Outwardly black is the most toneless color of
all, a kind of neutral background against which the minutest
shades of other colors stand forth clearly. It also differs
in this from white, in conjunction with which nearly every color becomes blurred, dissolves and leaves only a faint resonance.

White is not without reason taken to symbolize joy and spotless purity, and black, grief and death. A blend of black and white produces gray, which, as has been said, is silent and motionless, being composed of two inactive colors, its restfulness having none of the potential activity of green. The immobility of gray is desolate. The darker the gray the more preponderant becomes this feeling of desolation and strangulation. When it is made lighter, the color seems to breathe again, as if invested with new hope. A similar gray is produced by an optical mixture of green and red, a spiritual blend of passivity and glowing warmth.

The unbounded warmth of red has not the irresponsible appeal of yellow, but rings inwardly with a determined and powerful intensity. It glows in itself, maturely, and does not distribute its vigor aimlessly.

The varied powers of red are very striking. By a skilful use of it in its different shades, its fundamental tone may be made warm or cool.

Light warm red has a certain similarity to medium yellow, alike in texture and appeal, and gives a feeling of strength, vigor, determination, triumph. In music, it is a sound of trumpets, strong, harsh and ringing.

Vermilion is a red with a feeling of sharpness, like flowing steel which can be cooled by water. Vermilion is quenched by blue, for it can bear no mixture with a cold color: more accurately speaking, such a mixture produces what is called a muddy color, scorned by the painters of today. But mud as a material object has its own internal appeal, and therefore to avoid it in painting is as unjust and narrow as was yesterday's cry for pure color. At the call of internal necessity that which is outwardly foul may be inwardly pure and vice versa.

These two shades of red are similar to yellow, except that they reach out less toward the spectator. The glow of red is within itself. For this reason it is a color more beloved than yellow, being frequently used in primitive and traditional decoration and also in peasant costumes, because in the open air the harmony of red and green is very charming. Taken by itself this red is material and, like yellow, has no very deep appeal. It is dangerous to seek to deepen red by an admixture of black, for black quenches the glow or at least reduces it.

A further point of great importance must not be forgotten. There are other ways of using the concrete plane as a space of three dimensions in order to create an ideal plane: the thinness or thickness of a line, the
placing of the form on the surface, the crossing of one form by another may be mentioned as examples of the extension of picture space in depth through drawing. Similar possibilities are offered by color, which, when rightly used, can advance or retreat, and can make of the picture suspended, non-material form. The combination of both means of extension - in-depth in harmony or counterpoint is one of the richest and most powerful elements in pictorial structure.

N.B. The following color charts are Kandinsky's as well as all the preceding single-spaced material. The red underlines are not, but have been added by the author to point out the direct musical references.
Figure I

First pair of antitheses a and b (internal structure acting on the spirit)

<table>
<thead>
<tr>
<th></th>
<th>warm</th>
<th>cold</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>yellow</td>
<td>blue</td>
</tr>
</tbody>
</table>

Two movements:
(1) horizontal

Towards the spectator (bodily) ← → Away from the spectator (spiritual)

(2) eccentric and concentric

b. light dark
white black

Second antithesis

Two movements:
(1) movement of resistance

Eternal resistance, yet Complete non-resistance, potentiality (birth) devoid of potentiality (death)

White Black

(2) eccentric and concentric, as in the case of yellow and blue, but more rigid
Figure II

Second pair of antithesis  c and d  (physical appeal of complementary colors)

c. Red          Green

-Third antithesis (of the spiritually extinguished first antithesis)

Two movements:

Movement within itself - Potentiality of motion - Immovability

Red

Eccentric and concentric movements are entirely absent.

Optical blend - Gray

Mechanical blend of white and black - Gray

d. Orange       Violet  -Fourth antithesis

Arise out of the first antithesis from:

1. Active element of the yellow in red - Orange

2. Passive element of the blue in red - Violet

(end of quotations from Kandinsky, Concerning the Spiritual in Art, pp. 54-57.)
In the painting below, Summer No. 2, painted by August Herbin in 1952, the properties of color (and shape) as movement toward the spectator (warm colors - red, yellow; light colors - strong admixture of white) and away from the spectator (cool colors, giving depth - blue, green, violet; dark colors - strong admixture of black), as well as movement within the color (the tendency of white and yellow to expand beyond their boundaries, of blue and black to draw inward within their boundaries, of red to express vitality and movement within the boundaries without tending either to expand or contract) are the whole raison d'être of this painting. In the Herbin painting, red, by its brightness and inner-vitality comes forward, held back slightly by its dull (neutralized by some grey) green ground. Blue by its blackness and division with black and violet (admixture of forward properties of red), in strongest possible contrast to its white ground which comes forward and counteracts the retreating character of blue and black. Thus the dynamic red-green sections are held in check, and balanced by the blue-black-violet-white sections, although there is tension between them. Color accomplishes the principle aesthetic quality and structure. An otherwise flat and two-dimensional picture is activated to spatial properties more easily achieved by sculpture.
Herbin, *Summer No. 2*, 1952.
Herbin's use of color in *Summer No. 2*, in spite of its flat surface, ironically gives the illusion of more physical space than this unfortunately flattening photograph of a mobile sculpture by Alexander Calder, which actually takes place in physical space. The reader must call upon his memory of actual mobile sculpture. In actuality, the Calder mobile consists of several flat pieces of metal hanging from a single ceiling fixture in such a way that some of the pieces of metal are in front of and some behind the others. The whole mobile sways slightly, altering the spatial relationships between the pieces of metal, yet keeping them in an aesthetic equilibrium.
Alexander Calder. Lobster Trap and Fish Tail, mobile, steel wire and sheet aluminum, 1939.
Calder has made space his subject rather than volume and mass (the subject of traditional sculpture). The pieces of metal articulate the distances between them - otherwise they are of little interest. Similarly, in the two-dimensional *Summer No. 2* of Herbin, the dynamic moving distances between the red-green sections and the blue-black-white sections is his main interest, a spatial one. In Herbin, the space is an illusion, achieved by color. In Calder, the space is an actuality.

If Herbin can achieve the illusion of space purely by means of color (without perspective), cannot Webern likewise achieve an illusion of space by means of instrumental color? More recent analyses of the works of Webern emphasize this tension between points of varying distances, almost to the exclusion of 12-tone series analysis. Webern has many followers in this spatial art, the forerunner of "pointillism," the style of several electronic composers and certain non-electronic, 12-tone composers such as Luigi Nono in Italy. Webern has achieved his spatial differentiations with such keen, delicate sensitivity and subtlety as to make his art nearly inimitable by lesser composers. One of his means of achieving spatial differentiation is by separating the chromatic notes of his twelve-tone series, by register jumps - a second will be a ninth, etc. His

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music constantly leaps from one register to another, never however, repeating a note but always returning to a register with a note that is a little higher or a little lower than the one we remember. Look at the vocal line illustrated below. The only way to memorize this music is to memorize the distances between notes. The intervals, or distances between notes, are more important than the notes themselves. 

Webern, opus 25, no. 1

A principle means of achieving spatial differentiation in the music of Webern is by constantly changing instrumental color, and by the manipulation of the quality of instrumental color in such textural distinctions as flutter-tonguing, pizzicato vs. arco, etc. and by frequent changes of dynamics. This is Webern's use of "Klangfarbenmelodien."

Let us return momentarily to the color theories of Kandinsky, for a reminder of his associations between the colors of paint and the colors of instruments. After explaining the movement toward the spectator, achieved by yellow partly by its position as a warm color in the spectrum, and partly by its tendency toward whiteness, he
compares a brilliant yellow to the sound of a shrill bugle. A bugle sound (and all instrumental timbres akin to it), hence has, by virtue of its brilliance or even shrillness, the spatial property of coming forward, or moving toward the spectator.

The difference between white and black, Kandinsky has likened to two opposed kinds of silence. White, in its relation to light, the carrier of all-colors in even balance, is related to a pregnant silence, "like the pauses in music that temporarily break the melody. It is not a dead silence, but one pregnant with possibilities." Black on the other hand, in its scientific definition of absence of light, and therefore of color, is a "silence with no possibilities. In music it is represented by one of those profound and final pauses, after which any continuation of the melody seems the dawn of another world: the circle is closed." "The silence of black is the silence of death."

Thus we have two kinds of silence in music. One is the silence that indicates only that music is absent, that it has not begun or that it has just been ended, the silence of black. The other is the silence achieved by rests in music, rhythmic pauses in music that are as important to the music as are the notes, the silence of white.

Perhaps no composer before Webern has made such subtle use of the loudness and softness (the tendency toward
sound or silence) and the absolute, dynamic, positive silence of rhythmic pauses in the music, of rests. In comparing Webern's use of silence to modern sculpture, we are reminded of the modern sculptor's activation of space. No longer is space merely an excuse or a background for volume - i.e. a blackspace. It is, rather, a positive space. In many cases, not only in the case of the Calder mobile previously illustrated, volumes are thin, flattened, reduced, and used only to articulate the space in which they take place. Calder's art is an aerial art, to the extent that we think of his mobiles not as space-penetrated volumes but as volume-penetrated spaces. The use of free-moving active and tranquil space in modern art is particularly conspicuous in modern architecture. The framework of the building is not a mass but a freely-penetrated skeleton, holding glass which separates the in-dweller from the coldness or warmth of the outdoors but not from his free vision of the outdoors. One feels as if one could walk through these buildings into the air outside. The air moves through the building, however - it is never static. Similarly, in the example of Naum Gabo's sculpture, seen at the end of this chapter as an illustration of the prominence of pure light and whiteness in modern art, and comparable to the pure tone art of electronic music - the light or space is active because the plastic is transparent, though it controls the movement of light through and around it.
In the music of Webern, the frequent rests and pauses almost dominate the whole. Pieces are very brief to begin with and contain as few notes as possible. Webern's music reminds one of the active space and light in Calder's mobiles, Gabo's constructions, and modern buildings.

Webern's silences are "white" silences rather than black. Kandinsky has said, "Outwardly black is the most toneless color, a kind of neutral background against which the minutest shades of other colors stand forth clearly. It also differs in this from white, in conjunction with which nearly every color becomes blurred, dissolves and leaves only a faint resonance."

As we have seen, not only pauses and silences achieve this effect of space in Webern's music, but also the distribution of the notes in strongly-contrasted high and low registers. If the single note in Webern is comparable to a spot of color, then the interval between one note and another must be considered to represent the space between two notes. For Webern, the twelve-note series is not a theme as it is for Schönberg - it is never used as a single line by a single instrument. Webern uses the notes and intervals of the basic series individually, composing by means of the space between these notes rather than connecting the notes into a line. Herbert Eimert says on page 32 of volume 2 of Die Reihe:
He is the only one who in his music organized **more** than the stratum of pitch-levels; the only one who was conscious of the structures, spatial dimension where the antithesis of vertical and horizontal no longer exists. His fundamental structural element is not the note but the interval - the interval between two notes, conceived melodically as a unit of measure.

On page 34, Eimert says:

It is crystal clear how Webern achieves spatial tension by, so to speak, knocking in his acoustic objects right at the edge of the octave-gaps, thus creating for himself a complete system of barbed hooks, an autonomous, tightly-braced, freely-floating system from which the last trace of tonality has been erased.

(In the next section of this paper, tonality will be compared to description of volume and mass.) On page 35, Eimert says again that the basic unit is the interval proportion; and,

To this process of measuring there are subordinate: the interval; the manifold reflections of the interval motif ('the same, yet always different'), and their mid-axial grouping which opens up the time-continuum as 'space'; symmetric organization of harmony, which marks the entry of real 'sound composition'; the variable profile given the notes according to their intensity, dynamics, and differentiated accentuation; in works for larger resources, the grouping of timbres (here the motivic-instrumental alterations of the sound are a fragmented legacy from 'Klangfarbenmelodie'); and finally the motivic use of rests which in the de-thematised structural system no longer relieve tension but must be regarded as architectonic rests - as it were, silent notes... In music, measurement is an operation on pre-arranged material: at the same time it is more than that; with the advent of 'proportioning' it is transformed directly into structure. The thinner, the leaner Webern's music becomes, through its compulsion to extreme refinement, the more structure is manifest in it. Thus, at the last, the ideal of structure becomes the composer's inspiration - this is one of the points closely preceding the practice of pointillist and electronic music... In Webern 'sound-composition'; which has become so significant in the electronic sphere, is present in rudimentary form.
This was perhaps not the place for a discussion of Webern's spatial art, so closely related to Calder's, Gabo's, Mondrian's, and architecture's aeriated, colorless compositions. It was included because, as has been seen, the spatial effect has been achieved partly by dynamics, partly by rests, duration of rests, effective duration, and interval of entry, partly by register jumps, and partly by differences in color or instrumental timbre. It was juxtaposed to Kandinsky's concepts of spatial properties of color, illustrated by the painting by Herbin. However, the structure of the painting by Herbin is not aeriated - rather the color exists in masses and volumes spatially active. Silence, whiteness, activated space, play no part in the painting by Herbin. For an example of aeriated structure in painting, achieving space by color, we must turn to a painting by Maria Helene Vieira da Silva. Before we do however, let us look at an example of Webern's structure where the register changes place the notes (normally chromatic) in what Henri Pousseur calls different "harmonic fields." Compare the structure of Pousseur's diagram of the first three measures of the first of Webern's Six Bagatelles for String Quartet to the aeriated mobile by Clader, or the structure of the paintings by Mondrian and da Silva on the following pages.
Webern, *Six Bagatelles for String Quartet*, no. 1, first three measures, charted as below, by Henri Pousseur in article on "harmonic fields" in *Die Reihe*, 2.14

\[ \text{\textsuperscript{14}Ibid.} \]
Mondrian, Composition. Note the active importance of white space in this painting, held in place by the black lines and color areas.
Maria Helene Vieira da Silva, *Composition.*

About this painting by Maria Helene Vieira da Silva,

Frederick Gore says:

She has painted many pictures where thin rectangular facets of harlequin color extending along fine diagonal lines gives an illusion of immense aerial space: sometimes there is a rotary movement as if we were flying down into the picture space. Certainly there is a sensation of flying over and through new cities - she spent seven years in Rio de Janeiro. She has spoken of the 'musical mathematics of a fugue,' and there is also the sensation that we move in an intricate and absolutely consistent world of pure composition, part music, part architecture. This painting, which is loose in handling and has not the same mathematical depth as much of her work, might well be the free
abstract interpretation of a city lit at night. Paintings of this looser kind are of recent date, and we can see that her conception of space is changing in tune with a decade which is seeking a visionary space, amorphous and psychological rather than physical and defined. 15

The aerial effect of this painting recalls Kandinsky's definitions. Neutral gray is the background or space in which the painting takes place, and there are a few black streaks that seem to be behind the grayness. The red and yellow streaks are the farthest forward. The blues are farther forward than the greys and blacks, but nevertheless are behind the reds and yellows.

Maria Vieira da Silva has achieved a hanging, aerial, geometric structure in space largely by means of color-relationships. Calder has shown us the same aeriated structure, without color. Webern presents a similar aeriated, spatial art both by means of note-placement and by means of differentiations of instrumental timbres. We have seen examples of this style of Webern on pages and To refresh our memories as to the spatial differentiation of notes by means of color, let us conclude with an examination of a work by one of Webern's followers in this style, Karlheinz Stockhausen.

Up to this point, all our discussion has involved the presence and use of visual and aural color. Our final comparison involves the absence of visual and aural color. As has been said, colors are the result of the human being's psychological perception of varying wave-lengths of light, which in itself is colorless. Timbres are the result of the human being's psychological perception of the presence of a varying number of partials or overtones. The modern era is an age of science, of objectivity, and it tends to leave the average human faculties of perception far behind. The "pure tone" exists only as the sinus tone of a fundamental without overtones, issued by an electronic generator, and has not, until the twentieth century been used musically. Similarly, the painter has used colored pigments until the twentieth century but he now begins to explore the possibilities of an art of pure, white light (white being the equivalent to the presence of all the colors of the spectrum in equal quantity). The importance of light in the constructivist sculptures of Naum Gabo, using transparent celluloids and plastics, bears an interesting comparison to the "pure tone" electronic compositions of Stockhausen and Boulez.
Naum Gabo. Linear Construction, Variation, 1942-3, plastic.
CHAPTER VI

MELODY AND LINE: CONTOUR AND COUNTERPOINT

There seems little need for explaining a basis for the comparison of line in the visual arts, with melody in the musical arts. It is customary for composers to speak of a melody as being a "melodic line", and of counterpoint as being "linear" or the simultaneous combination of two or more melodies.

A line has been variously defined as (1) a succession of objects or points in any particular direction, (2) as having been generated by the movement of a point, and (3) as the edges of a solid (the boundaries of a solid being a plane, the corners a point, and the edges a line. Also, a section of a solid may be the surface, a section of the surface a line, and the section of a line the point).¹ In drawing and painting, the edges of a formal area, if clear, may constitute a line or contour (outline). If the edges are unclear, and blended with another formal area of similar hue or value, or obscured in shadow, then these edges cannot be read as lines. Thus, we have two possibilities in drawing and painting, (1) the line which

exists independently as such, and which has been drawn by a fine-pointed instrument by the artist, and which has length without width, and which can be broken down into a succession or continuum of points having direction (extension), and (2) the outline or contour of a formal area, which may or may not represent an object, but the edges of which are clearly-defined as in a silhouette. This second kind of line does not exist independently of the formal area to which it is a boundary. However, like the independent line, it can be broken down into a succession or continuum of points having direction (extension).

Now, a melody is also a succession or continuum of points having direction. A melody is a succession or series of pitches having time-value (that is, notes), which sound one after the other rather than simultaneously. The direction is up or down or on a level (repeated notes). Unlike the line in drawing and painting, the points (pitches, notes) of a melody are perceptible one from the other, because when we hear a melody we hear the line in the process or action of being drawn, so that one point clearly succeeds the other. The linear aspect of a melody is most readily apparent when we look at it as notated on music-paper, and can see all parts (points, pitches, notes) of the line at once, as we do when we look at the already-drawn lines in drawing and painting.

There are four principal categories of melodies
of which we shall speak. **First**, a melody may sound independently of any other musical sounds, as in the medieval monodies of troubadours and minnesingers, in the Gregorian Chant, and in some styles of primitive and oriental music.

**Second**, several melodies may be sounded simultaneously without losing their independence and directional impulse. This we call "counterpoint". In contrapuntal music, the distinctness and independence of the melodic lines, one from the other, is frequently enhanced by (1) differences of register (high vs. medium vs. low); (2) differences of dynamics (loud vs. soft); (3) rhythmic individuality, that is, one part will have long-held notes and another moderately-moving notes, and the third fast notes, etc., or there will be a regular rhythm in one part, opposed to a syncopated rhythm in another, etc.; (4) instrumentation, that is, strong contrasts in instrumental color will divide one melodic line from the other, for example, a flute, a violin, and bass continuo may be used in three-part counterpoint rather than three violins.

In some cases, one of these means of distinguishing the contrapuntal lines may be used at the expense of others. For example, rhythmic counterpoint may feature rhythmic individuality in each part, thus keeping the parts distinctly separate from each other. It is possible to have rhythmic counterpoint without melody, as in pieces for percussion instruments only. In rhythmic counterpoint, the melodies
may not move up or down, and one might question their description as melodies. Yet the notes of each (melodic) part would cohere as a succession or continuum of notes due to the repetition of rhythmic pattern.

Also, a clear difference between parts may be accomplished primarily by instrumental sonorities, that is, by color differences.

In the ensuing discussion, we will distinguish between counterpoint that is principally melodic and linear, and counterpoint that is not particularly linear.

Third, there is single melody accompanied by chords. (Chords are the simultaneous sounding of notes, as opposed to melody which is the succession of notes one after the other. The chords fuse the notes of which they are made into a solid, homogenous mass or block of sound. The notes of a chord have little individuality but rather are interdependent on each other. The chord itself is the unit.) When a melody is accompanied by chords, it usually outlines the notes of the chord, that is, the harmony.

Melody that outlines harmony may be understood as a chordal contour. Unlike independent melody or melodies (counterpoint), it is dependent on chordal structure. This melody usually exists above the chords (occasionally below), but seldom in the middle, as there it could not be heard. Thus, accompanied melody is the contour or
outer edge of harmony. It corresponds to the second kind of line described on page

The basis of tonal harmony is the triad. Where the melody outlines triads, especially emphasizing the basic triads of tonic and dominant, with passing tones occurring mostly on unaccented beats and always "resolved", then the melody alone, without accompaniment, will suggest harmony. Such melody corresponds to line-drawing which can, in "classical" periods, suggest three-dimensional volume and mass, without modelling. The melody suggests harmonies, chordal blocks, with or without its natural accompaniment. Such melody is the extreme of clarity of contour. It does not qualify as independent melody, however, because of its harmonic suggestiveness.

The opposite extreme of unclearness of contour, occurs in chromatic harmony where the addition of sevenths, ninths, elevenths, thirteenth, appoggiaturas, unresolved dissonances, over-ornamentation, added notes, all tend to obscure the basic triadic structure. The chromatic additions to the triadic structure result in blurred and indistinct edges or contours. Chordal contours may also be blurred by massive orchestration wherein the melodic lines, or perhaps we should say, harmonic and melodic parts, are extensively doubled at the octave, and the sonorous unity dominates instrumental (and consequently melodic) individuality.
It is interesting to note that the periods of extreme chromaticism, over-ornamentation and massive orchestration of basically tonal music have coincided with those periods in art (parts of the baroque and romantic periods) when the dominant tendency has likewise been toward blurred, indistinct edges and contours, with some forms obscured in shadow, and a less clear distinction between foreground and background forms. Baroque and romantic painting are commonly called "painterly" as opposed to "linear" or "sculptural".

The clear contour line is a "sculptural" line, expressing or representing three-dimensional mass and volume within its boundaries. It corresponds to the predominantly triadic melody, which expresses the chords it outlines.

The relatively clear or unclear contour line described above refers only to that period in western art history which devoted itself to the representation of the world of man and nature as man perceived it, that it approximately the 16th to the end of the 19th centuries. This is the period which evolved the tonal system, in music, with its consonances of third and fifth, its triadic chords, its emphasis on tonic and dominant, etc. During this period, melody never existed independently of (tonal) harmony, that is, chord structures. Even in the highly contrapuntal arts of sixteenth century and the late baroque music of Bach, which were strikingly linear and melodic
in character, the relationship between these melodies was controlled by the usual "tonal" consonances at accent-points and cadences.

I. "FREE" SHAPES AND CONTOURS OF NON-TOTAL HARMONIES

In contrast to the humanistic period intervening between the middle ages and the twentieth century, medieval and contemporary melodies seem strikingly independent of chordal suggestions. The counterpoint of Machaut in the fourteenth century and Schönberg in the twentieth is made up of melodies which pursue their own directions so avidly as to ignore completely the resulting dissonances between parts. Contemporary melodies rarely suggest the triadic structures of tonality. They are not contours of tonal harmonies, but are free in form. As such, they correspond to the free form designs of contemporary artists. These new shapes of modern art may be flat, or they may outline three-dimensional volumes, but they represent nothing ever seen before in the world of nature as man's unaided eyes perceive that world. Occasionally these free shapes have connotations of biomorphic form in a state of growth or movement, or as seen through a telescope, or of geometric form as seen in the abstract world of mathematics. But they bear little relationship to the things and figures represented in the last four centuries, such as human beings, architecture, landscape and still life. To us they
seem to have descended from an imaginary, newly invented or scientific world, abstract and inhuman.

On the next page is a reproduction of a work by Hans Arp, who was one of the first, contemporary with Kandinsky's experiments between 1910-1920, to people the contemporary art world with these free forms. The linear contour is clear; yet it suggests nothing habitually seen. It is typical of so much non-representational painting and sculpture which has followed it.

The following example by Schönberg, being composed in twelve-tone technique, uses the same series of twelve notes for the accompaniment as for the melody. In this sense, the harmony and the melody are again identical. There are chords, which again constitute blocks or masses of sound, which are outlined by the melodic line. In the melody, the twelve-tone row occurs as a succession of notes having direction (extension). In the accompaniment, the same twelve notes sound in groups, simultaneously. The difference between the contemporary method of melody and accompaniment and the tonal method is that the contemporary melodic contour of the chordal structure is "free" in form, that is, it is not based on the overtone series' first few partials. We leave to a later chapter the contemporary coincidence of "free" lines and contours, and of "non-tonal" (atonal or twelve tone) melodies and chordal outlines. The practice of contouring a melody by means of a chord that
Arp. Relief in Wood
Schönberg. Quartet Number IV
is not triadic is not limited to twelve-tone compositions. Scriabin's "mystic chord", freely-invented by himself, made up of superimposed tritones, served as the basis of both melody and harmony in his Prometheus, and many modern composers have worked from chords made up of superimposed fourths.

II. MOTIVIC AND RHYTHMIC COUNTERPOINT.

The fourth category, melodic fragmentation, is up for discussion because twentieth century counterpoint is not necessarily the combination of long melodic lines distinguished from each other by register, dynamics, contrary motion, rhythmic features and instrumental color, as well as by their own inner coherence and independence as melodies. Some one of these several features may be strong enough to compensate for the lack of others, and cause each part to have melodic unity within itself, and melodic independence from the other parts. This music must, then, still be called contrapuntal, even when the parts are united by rhythmic pattern, instrumental color, or twelve-tone organization rather than by linear succession. Curiously enough, the frequent melodic fragmentation in the music of Bartok (in instances of rhythmic counterpoint), Stravinsky (short-breathed, motivistic melodies united by instrumental color or by rhythm, frequently ostinatos) and Webern (notes connected as lines by participation in twelve-tone construction and sometimes also by instrumental color,
but "pointillist", that is, each note individualized by register, dynamics, and frequently also by instrumental color); curiously enough, this counterpoint composed of melodic fragments occurs side-by-side with the extreme of melodic linearism in the counterpoint of Honegger, Hindemith and Schönberg, to name a few.

Let us look first at rhythmic counterpoint, made up primarily of repeating patterns or ostinatos. In this type of counterpoint, which requires only a percussion instrument for articulation, there is no sense of line, per se, but only individualization of an area or part. Sometimes one finds a single ostinato, opposed to lines or chordal blocks. Sometimes there is more than one ostinato, which repeats intact, or which is varied slightly, and these ostinatos are set in dynamic opposition to each other. The twentieth century ostinato can be first seen in the music of Debussy where it made a mild appearance. It has become a basic stylistic feature of much of the music of Stravinsky, Messiaen, Milhaud, and Bartok. Stravinsky's Rite of Spring was an outrage of ostinatos, many combined and set in conflict against each other. The ostinato with its "obstinate" repetition reminds one of Oriental, particularly Indian, music.

The ostinato, like the all-over pattern of a printed fabric, involves the constant repetition of a configuration of motives. In French twentieth-century art, we find ex-
ample after example of these dynamic all-over patterns, which remind one of Oriental patterns, in their flat configurations. Seldom is there just one of these all-over fabric designs. Two or more may be superimposed in a dynamic and conflicting relationship. Matisse's art is especially full of these juxtaposed patterns, but here we have examples extending from post-impressionist artists to Cubists.
Debussy. Preludes ("La Puerto del Vino") (above)

Ravel. Bolero. (below)
Stravinsky. Le Sacre du Printemps.
Stravinsky. Les Noces.
Milhaud. Les Euménides. (Act II, Orestes' aria)
Messiaen. Apparition de l'Eglise Éternelle.
Bartok. Quartet Number IV (second movement)
Cézanne. Portrait of Madame Cézanne.
Vuillard. Missia and Thadée Natanson.
The example on the following page, by Matisse, *The Purple Robe*, juxtaposes eleven different patterns. The profusion of all-over patterns in counterpoint to each other, in Matisse's work, is comparable in quantity and dynamic variety to the ostinatos in Stravinsky's *Le Sacre du Printemps* and *Les Noces*, where they are a special feature of Stravinsky's style. In Matisse's *The Purple Robe* there is hardly a single form but what is defined by one of these repeating figure patterns: (1) the red and yellow striped wallpaper, (2) the blue and white striped wallpaper, (3) the black and green checked tile, (4) the black and blue striped carpet, (5) the blue-spotted red cushion, (6) the white striped red cushion, (7) the grill-work of the table, (8) the arabesque pattern of the sitting stool, (9) the purple and white striped robe, (10) the grey and white patterned overblouse, and (11) the arabesque design of the flower vase.
Matisse. *The Purple Robe.*
Bonnard. The Breakfast Room.
Picasso. **Pierrot and Harlequin.**
Braque. Woman With a Mandolin.
One wonders, on considering the previous examples of ostinatos and all-over patterns in radical juxtapositions, can this conflict of patterns rather than lines be called counterpoint? Although the rhythmic figures are too short to be called melodies, still they constitute a "succession of points" (notes) albeit without "direction (extension)". Let us consider "motivic counterpoint".

One finds in twentieth century counterpoint of rhythmic ostinatos and motifs, that even though the figures are short, their outlines are clearly discernable. There is no blurring of contour. One finds, in twentieth century painting, side by side with designs combining long flowing lines and large solid areas, usually flat with clear contours, that there are also many instances of painting surfaces completely covered with very small, flat, spotty areas of color, with definite edges and equally clear contours. If the long lines and contours can be compared with melodic lengths, then surely the small motif can be compared with the "motivic" style of Miro and other artists. On the next page is an illustration of what the author calls "motivic" painting. Notice that the lines or contours surrounding even the smallest areas are sharp and clear. Actual lines connect the small motifs with their clear contours.

The extreme of the "motivic" painting (not illustrated here) would be the "pointillist" painting. Compar-
able to the "pointillism" of Webern and his followers, the "pointillist" painting would be made up of even smaller, flat, clear-edged areas of color -- so small as to be mere dots or points rather than motifs.
Miro. *Large Figure and Blue Moon.*
Klee. *The Vase.*
The example below, from the fifth movement of the same quartet is more linear, but still predominantly motivic in character. There is strong contrary motion, and definite directional movement. However, the same short figures are repeated in the second violin and cello parts (the cello part being an approximate inversion of the second violin), with rhythmic contrast as well, that is, one part moves while the other is held. The first violin and viola alternate the short triplet motif with its auxiliary note of a descending whole step and its initial trill, and its occurrence after an eighth note rest (or hold).

Bartok. *Quartet No. IV* (fifth movement).
In the following color reproduction of Gustave Singier's *The Magician*, we see the contours of the flat motifs, no matter how small or fine-lined, because of the sharp contrasts of hue and value. This is also true of the Miro and Klee examples on pages 170 and 171. The yellow shows strongly against the black (and vice versa), as do the black and blue areas against the vermillion. Thus we see how important color is in defining contour lines. Without these strong color-differences there would be no contours.

Singier. *The Magician*. 

![Image of The Magician by Gustave Singier]
Color enhances the distinction between the various motifs in the paintings by Singier and Miro in several ways. Not the least important is the fact that there are fewer colors, in the case of the Singier Magician only four; vermillion, yellow, blue and black, and a very occasional gray. The vermillion and black are flat and un-modelled. There are two gradations of the yellow, a light, pure yellow, and a medium-valued yellow-orange. There are two gradations of blue, light and medium, but these are never placed against each other — only against the stronger-contrasting vermillion. None of the colors moves from one to the other, but each remains in clearly separated areas.

The colors are usually placed in strong contrast of value as well as hue. Black is very dark, yellow very light, red and blue are medium value. This is comparable to the use of very high (light), very low (dark) and middle register instruments in music.

In modern music that is motivic, the result is frequently contrapuntal largely because of the selection of instrumental coloring. The fact that there are few instruments in Stravinsky's Octet for Wind Instruments brings clarity to each motif, no matter how fragmentary.

In Stravinsky's L'Histoire du Soldat,\(^2\) there are strong contrasts of high and low (light and dark) and of

\(^2\)See description on p. 92.
color (string vs. brass vs. woodwind vs. percussion) and a small number of instruments; -- all of these are contributing factors in the clarity of the individual parts.
Stravinsky. **Octet for Winds** (Theme and Variations).
III. CONTOUR-DEFINING USES OF COLOR

Prominent melodic lines are the inevitable result of reduced and contrasting instrumentation. There is no need to reiterate the discussion of the preceding chapter on Instrumentation and Color. Accompanying the change, in the early part of the century, away from the massive orchestrations of Mahler's *Eighth Symphony*, Strauss' *Elektra*, Schönberg's *Gurre-Lieder*, and Stravinsky's *Rite of Spring* toward chamber orchestration in the ensuing works of these same composers and their contemporaries, is a change away from over-doubling of parts, which obscured melodic lines, and musical conceptions based on harmony rather than melody as in the styles of Debussy and the post-Wagnerians, toward stronger melodic lines and counterpoint.

The same examples that illustrate the economical use of color, and the return of color to form, in the preceding chapter, also serve to illustrate the increase in clarity of contour of forms. In the beginning of the century, the works that correspond to those listed above as examples of massive orchestration, showed a riotous variety and form-confusing use of color, in works of Les Fauves, particularly Matisse, and the early Expressionists as Kokoschka and Kandinsky. The tendency begins to reverse itself about 1910, but is not fully established until the 1920's.
In the chapter, Instrumentation and Color, there are examples of modern art in which the limitation of a single, ungraded (flat) color to each formal area results in a linearism made up of the contours of these areas (examples, page no. 1 and 2).

On the next pages are two examples of works composed for a quantity and variety of musical instruments. Yet in both cases, the composer has limited himself to just a few instruments at a time. Mahler's Das Lied von der Erde may be said to mark a turning point in this respect. In spite of the size of the score, note how transparent the texture. As a result, the vocal line dominates the whole, in a complete reversal of the Wagnerian manner. Honegger's Symphony No. 5 is likewise a truly contrapuntal work, seldom employing more than chamber orchestration of few instrumental colors, even though the score calls for a good many instrumental colors on hand. In the case of both Mahler and Honegger, the composer has found linear, contrapuntal writing most natural, and has limited the orchestral dimensions to enable melodic lines to stand out.
Mahler. Das Lied von der Erde ("Das Trinklied von Jammer der Erde").
Honegger. Symphony Number V (first movement).
The close connection between chamber orchestration (strongly-differentiated orchestral colors) and clarity of individual lines brings an increase in the number of chamber works. The example following, by Hindemith, is somewhat short-breathed and motivic. Because of the transparent texture, however, the lines are clearly separate one from the other. As in the paintings of Miro and Singier, color-difference has clarified the smallest motif, each one of which has strong linear contour.
Hindemith. Kammersymphonie Number III (opus 36, no. 2; first movement).
We have discussed melody and line in the following ways.

(1) We discussed melody as being the contour of chords; and line as being the outline of three-dimensional (modelled or relief) volumes. In modern music there may be chords without relation to tonal harmony (Schönberg), and in modern art there may be representation of three-dimensional volumes without reference to the natural world as man perceives it (Arp). The line that contours such shapes, and the melody that outlines such harmonies is "free" in form. It is not an independent melody or line, because of its function as a contour.

(2) We discussed the short melody, or motif; and the short line or small spot, which we also called motif. We pointed out that there could be clear linear contours, even surrounding the smallest shapes, because of the use of color. We spoke of rhythmic counterpoint, and superimposed ostinatos, as being the opposition of independent parts, made up of small motifs. There can be a counterpoint of motifs, that is, short melodic fragments that remain separate from each other largely because of the use of chamber orchestration. (Miro, Klee, Singier, Stravinsky, Bartok.)

(3) We emphasized the fact that, in the twentieth century, two tendencies have gone hand in hand. The limitation of color, and chamber orchestration, have been close friends with the new linearism in painting and music. We referred
to the illustrations used in the preceding chapter, *In-
strumentation and Color*, and offered a few new ones
(Mahler, Honegger, Hindemith, Stravinsky).

IV. INDEPENDENT LINES AND DISSONANT COUNTERPOINT

Now it is time to discuss linearism in its extreme
cases. The examples of this are many in the twentieth cen-
tury and occasionally remind the observer more of medieval
art and music than of the productions of any period since.
Since designs made up of lines, whether in painting, draw-
ing or sculpture, need little explanation, we will let the
illustrations speak for themselves. The comparison between
music and art here rests on the similarity between lines
that are independent rather than functioning as contours
of colored areas; and extremely contrapuntal music. In
twentieth-century counterpoint, the relationship between
the melodies is frequently completely independent of the
rules of tonality. Dissonances occur at will, with no at-
tempt at resolution. The independence of much twentieth-
century counterpoint, from the laws of tonal harmony, or
even of much chordal organization, forbids comparison with
any paintings except those that are made up of nearly-flat
lines.\(^3\)

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\(^3\)The comparison of nearly-flat lines with melodies
that do not outline harmonies and which clash with each
other, sometimes even crossing each other, will be better
understood after the explanation given in the next chapter,*
Tonality and Spatial Realism*. Chords in a consonance-
dissonance relationship are allotted the same function as
modelling of volumes in painting. Melodies that cross or
compete, without chordal coordination, are "flat" and two-
dimensional, just as lines in painting.
Stuart Davis. Cliché.
Picasso.  **Figure** (above).
Klee.  **The Sentry** (below).
Schneider. Peinture.
Jean Bazaine. La Messe de l'Homme Armé.
Giacometti. *The Palace at 4 A.M.* (above)
Ben Shahn. *Silent Music.* (below)
The following are some outstanding examples of twentieth-century counterpoint. The examples by Mahler, Honegger and Bartok still evidence a remote connection with tonality. They are comparable to nearly-flat lines that have some connotation, still, of the three-dimensional world of man's perception. The examples by Schönberg and Webern are totally removed from tonality. They are the equivalent of flat lines in an abstract pattern. Note the number of main features of counterpoint present in these examples.... There are canons, melodies combined with their inversions, contrary motion, rhythmic as well as melodic counterpoint, and distinctions of instrumental color. Note the extreme independence of the melodic lines. This counterpoint bears no resemblance to that of the Renaissance or Baroque composers. It is closer to the counterpoint of the thirteenth and fourteenth centuries, with independent linearism and resultant "dissonances." The Gothic art of France was also inclined toward "flatness," spatial distortions and linearism.
Mahler. Symphony Number VIII.
Mahler. Das Lied von der Erde ("Von der Schönheit").
Honegger. *Psaume CXXXVIII* (above)
Honegger. *Une Cantate de Noël* (below)
Bartok. Quartet Number V (finale).
Bartok. Quartet Number IV (fourth movement).
Webern. I Kantate, opus 29.
V. CHORDAL MELODIES AND LINEAR STRIPS

Now there is just one more type of linearism in twentieth century art and music that we will mention. Frequently, we see linear strips, the outer contours of which are parallel or nearly parallel lines, and the inner content of which is flat and filled-in, on a plane with the picture's surface. In modern music we have many instances of melodic parallelism or near-parallelism. Debussy was the first to duplicate melodic lines at the octave, fifth, seventh, ninth, etc. Many modern composers (Honegger, Stravinsky, Bartok, etc.,) likewise write melodic blocks. Sometimes the melody, instead of being made up of single notes, or notes doubled at the octave or some other interval, is made up of whole chords. Because the notes within the chords all move in a single line and direction, the series of chords reads as a melody in the same sense as do a series of notes (or points). The doubled melodies and chordal melodies remind the listener of the medieval practice of organum, which occurred before polyphony and harmony had been thought of. The cases in which the lines are not exactly parallel throughout, and where there is just a small amount of contrary motion, are comparable to cases in painting where the outer edges of the flat, clear-contoured strips are not exactly parallel either. The flatness of these linear strips, in painting, is an important feature -- since (as we shall see in the next chap-
ter), flatness is characteristic of those periods in art which occur simultaneously with music that is either undeveloped or else declining in respect to tonality.

The first three examples that follow, of French art at the turn of the century, we have parallel strips to indicate architecture or furniture; in the Mary Cassatt, the desk; in the Vuillard, the frame of the mirror; in the Matisse, the window frame. These architectural or furniture elements are given such flat treatment that all indication of placement in space depends on the superposition of objects in front (or behind), and in the Cassatt on linear perspective, rather than on modelling. These elements have no solidity but remind us that the painting's surface is flat, and all spatial indications are a mere illusion. In the Vuillard, roundness and three-dimensionality of the figures, particularly those dressed in black, depends entirely on the curving outer contours, rather than on modelling. The areas are filled in (black hair, black blouse) with flat paint, which allows the whole design to have an abstract character. The painting has a distinctly contrapuntal character. It is a counterpoint made up of chordal lines, exactly parallel in the mirror frame, approximately parallel in the sewing girl's arms, and motivic or rhythmic in the patterns of black and white in the standing woman's dress, and pink and green in the wallpaper pattern. The painting by Mary Cassatt also shows this combination
of two kinds of counterpoint; of linear strips or chordal lines in the desk, and of rhythmic motifs or ostinati in the all-over patterns of dress and wallpaper.
Mary Cassatt. The Letter.
Vuillard. "Il vestito rabescato".
Matisse. The Music Lesson.
Léger. Composition.
Magnelli. Je l'imagine.
Soulages. Painting.
Ubac. Forest.
Malevich. **Suprematist Composition.**
Like the painting illustrations we have just seen, the majority of musical examples of melodic parallelism or chordal melodies come from composers working in France. Bartok is the major exception. There is also an example here from Hindemith. Stravinsky, of course, worked in France but is not French by nationality.

The first three examples show examples of melodic parallelism, in Impressionist and Post-Impressionist music. Debussy and Ravel superimposed these melodic blocks on what was predominantly a non-melodic texture made up of broken chords, and hazed, atmospheric, coloristic effects. Reminiscences of impressionist texture were also evident in our second example of linear strips, that of Vuillard, in the treatment of the wall particularly.

Ostinatos, the basis of the rhythmic counterpoint of Stravinsky and Bartok, were likewise first seen in the music of Debussy. (See chapter, *Texture as a Means of Organization; Ostinati and All-over Patterns.*) The second three examples, two from Stravinsky's *Rite of Spring* and one from Bartok's *Quartet Number Three*, show a combination of chordal melodies and rhythmic counterpoint made up of ostinatos, and we recall this same combination in the examples on pages 201 and 202, in works of Cassatt and Stravinsky. Although the Matisse example on page is devoid of these all-over patterns, comparable to ostinati, we find many instances of these in his work also.
The last three examples, by Honegger, Hindemith and Milhaud, are miscellaneous illustrations of chordal melodies. The effect of the opening of Honegger's Symphony No. 5 is particularly medieval in effect, with suggestions of organum. The example from Milhaud's Cinq Symphonies, Number 4, is polytonal. Chordal melodies are frequently used to keep two juxtaposed tonalities separate from each other. (See chapter, Polytonality and Spatial Dualism.)
Debussy. Nocturnes (Nuages) (above)
Ravel. Ma Mère l'Oye (Tom Thumb) (below)
Stravinsky. *Petrouchka* (above)
Stravinsky. *Le Sacre du Printemps* (below)
Bartok. *Quartet Number III* (second movement)
Hindemith. Das Marienleben (eighth song) (above)
Honegger. Symphony Number V (first movement) (below)
Milhaud. *Cinq Symphonies: Number IV* (first movement)
Now, let us summarize our observations on melody and line, contour and counterpoint.

First, we considered melody as the contour of harmony, and line as the contour of three-dimensional volume. We sidestepped the tremendous number of examples, prior to the twentieth century, of tonal melodies, outlining traditional chords and contours of carefully modelled, representational figures in painting. Instead, we used examples of "free" shapes and atonal chords, illustrated by a relief sculpture of Arp and a twelve-tone composition of Schöenberg, in which the chords and the melody contain the same note-series, thus the melody "outlines" the chords.

Second, we considered rhythmic and motivic counterpoint. We found that there could be a clear opposition of parts and shapes, even when these were made of melodic fragments and very short lines, bits and spots.

Third, we discussed the importance of color-oppositions in clarifying contours. Colors might be contrasting in high and low (light and dark), in instrumentation (hue), or their contrast might be slight but distinct because of the small number of colors or instruments used.

Fourth, we discussed the incidence of long, independent, flat lines in painting, and dissonant counterpoint in music.

Last, we talked about linear strips, with a flat, filled-in area between parallel or almost parallel contours,
and melodic parallelism of chordal melodies, wherein a whole chord might move up and down as a melody.

VI. VACILLATION SINCE 1945

The dominant trend in modern art and music, toward linearism and formal color, arose before 1920 and culminated in the 1920's and 1930's. There are exceptions to every rule, however, and examples can be found in the 1920's and 1930's of the exact opposite of linearism and formal color. The majority of these exceptional examples, however, are the works of the same artists who had engaged in the extravagant style of painting and composing in the first decades of the century and never changed away from it, particularly the Expressionist painters such as Kokoschka and Nolde. The leaders of the movements in the extravagant, coloristic style, Matisse of Les Fauves and Kandinsky of Expressionism; Stravinsky in France and Schönberg in Austria, turned away from it. Art in the 1920's and 1930's was notably linear and economical in the use of color, in spite of those artists who clung to an earlier style.

Since the Second World War, however, there has been a resurgence of formal freedom and extravagant color, side by side with linearism and economical color. Both groups are forward-looking and progressive. The artists in both groups are abstract and/or non-figurative. The composers in both camps are atonal or twelve-tonal. Art and music since 1945 shows a vacillation between the two trends.
At one extreme, there is an intellectual, totally non-figurative style, frequently geometric, descendant of the paintings of Kandinsky of the 'twenties and 'thirties, of the Cubists and of Mondrian, which has a smooth surface, is clear-contoured and linear, and economical even where it is dynamic in the use of color. One might add the caption "classical" to this category.

At the other extreme, there is a growing group of abstractionists which, curiously enough, seems to have returned to the Kandinsky paintings from before 1920, which were abstract Expressionist (a process comparable to composers returning to Schönberg's atonal, Expressionist idiom before he developed twelve-tone technique.) The painting in this group is also related to the techniques of Impressionism, in their rich, heavy textures and painterly quality; and to Les Fauves in their vivid, free colorism (as in the following example by Bissière). This more directly subjective, emotionalistic extreme of painting has many aspects,

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4 Examples of this style may be found in Art Since 1945, edited by Brion, Hunter, Argan, Ponente, Apollonio, Bihalij-Merin, Grohmann, Read, Jaffe, and Hodin (New York: Harry N. Abrams Inc., 1959). Illustrations in this style include works by Herbin, Magnelli, Deyrolle, Vasarely and Mortensen in Paris; Meistermann and Geiger in Germany; Bill and Glarner in Switzerland; Mikl in Austria; Soldati, Reggiani and some works of Prampolini and Capogrossi in Italy; Nicholson and Pasmore in England; Motherwell and Rothko in the United States.
just a few of them being "Action Painting" (New York), "Tachism" (France), Abstract Expressionism and Abstract Surrealism. These painters are too much in love with sheer resonance of paint, color and surface texture, and formal freedom, to be limited within orderly-outlines contours. One might add the caption "romantic" to this group.5

Innumerable painters belong to neither of these two extremes of linear constructivism and abstract colorism. The painters who do not follow extremes, maintain emotional and lyrical expression, and often a sensuous texture and dynamic color as well, within the confines of formal containment and clear, linear contours. This group, which fuses the two extremes, is possibly the majority.

5Illustrations may be found in Art Since 1945 (see reference on preceding page). Painters whose work falls in this category include Bryen, Riopelle, Fautrier and Zao-Wou-ki in Paris; Schultze, Schumacher, Gaul and Hohme in Germany; Acht and Rollier in Switzerland; Prachensky in Austria; Birolli, Morlotti, Santomaso, Morenà and Corpora in Italy; Cohen in England; and Hoffman, Guston, Tworkov and Besnick in the United States.
Bissière, Composition. 1954.
Much more information is available concerning painting since 1945 than concerning music since that date. A very few scores and even fewer performances are available, and the theoretical periodical of the electronic composers, a development of the 1950's, called Die Reihe, is the only major source of information about music since 1945. While generalizations can be made concerning the electronic composers (usually sparing in color and pointillist or motivic in texture), few conclusions can be arrived at as to the musical scene as a whole, in the last fifteen years, the same years in which have appeared these strongly contrasting tendencies in painting toward free brushwork and colorism as opposed to a more structural and linear style.

Reporting on the 34th annual world festival of 1960, of the International Society for Contemporary Music, at Cologne, Germany (host, West German Radio, sponsors of electronic experimentations of Stockhausen and Eimert, and of the periodical, Die Reihe), Alexander Fried has the following to say:

Whether because the juries had certain predilections or because they saw clearly the major fresh trends of the times, the festival repertory chose to omit entirely the physical, dynamic neoclassic idiom of earlier Stravinsky and Hindemith. There was little or no place in the programs for music that had a clear, uncomplicated language of tonality or a frank charm (in the character of Benjamin Britten, let's say) of romanticism.

The actual repertory fitted mainly into four types:
1. Most striking and promising of all was a frequent type of work that one might call post-electronic. Its composers, using many different orchestral groupings, created orchestral sound in abstractly aural and visionary sequences, in a manner that might be compared to abstract expressionist painting.

Such works contained nothing of tangible melodic and rhythmic sequence. Instead, in a great diversity of personal palette, they twittered and murmured and bonged and hissed and rasped and shrieked and clashed according to their composers' completely original fancy. Yet obviously the fantasy of tonal effects (and serious expressive purpose) had learned a great deal from the sound of electronic music. Further back in history, it owed much to the tonal sensitivity of Webern and the pioneer Edgar Varèse of 35 years ago.

Remarkable and sometimes deeply meaningful post-electronic works included those by György Ligeti (Hungary), Nicolo Castiglioni and Luciano Berio (Italy); Gunther Schuller (U.S.A.) and Ingvar Lidhold and Bengt Hambraeus (Sweden).

2. Electronic music took less place in the schedule than one might have expected in a view of the fact that Cologne is a center of electronic experiment. An electronic work by Herbert Eimert... etc.

3. A decisive majority of the music adopted the serial or tone-row system. While some of the 12-tone pieces were appallingly crabby and sterile, the more welcome examples included a string quartet (with an elusive Oriental flavor) by Isang Yun of Korea. And Stravinsky's new piano-orchestral "Movements" was uniquely beautiful in the delicate imagination with which it blended 12-tone concept and a subtle motor complexity of rhythm.

4. In the general context of the festival, such neoromantic scores as Milhaud's "Rhône" Symphony, Karl Amadeus Hartmann's vigorous, tightly knit Seventh Symphony and even Roger Sessions' intensely expressionist new Fourth Symphony revealed an almost old-fashioned aspect, as they built up their large moods, their fluid start-to-finish impact, and their gestures of rhetorical emotion and drama.

In the preceding quotation, it is the first group described by Mr. Fried that immediately commands our attention. Such features as the preponderance of 12-tone compositions and the presence of electronic music, on the contemporary scene are commonly known. Composers using these techniques have habitually worked in an idiom that was clear-contoured, whether linear, motivic or pointillist, with formal, economical use of instrumental (or electronic) color. But the first group described by Mr. Fried presents an entirely new trend in the contemporary picture. The fact that "Such works contained nothing of tangible melodic and rhythmic sequence" precludes them from linearity. And Mr. Fried's description of the sound effects in this "great diversity of personal palette" wherein "they twittered and murmured and bonged and hissed and rasped and shrieked and clashed according to their composers' completely original fantasy" is an extremely vivid description of uses of instrumental color that are anything but economical or formal.

So the creative picture since the Second World War is an extremely mixed one. Older trends have continued to develop along new lines, but at the same time a completely new trend seems to have developed. Art and music since 1945 have been predominantly abstract (non-figurative) and non-tonal (12-tone). On the one hand, there continues linearity and formal color. On the other (with some painters and composers occupying a middle ground), there has sprung up a new
tendency toward formal freedom, softened and sometimes obscured contour, and extravagant, emotional colorism.

The following example by Varese, like the painting by Bissiere, is in the flamboyant, luscious, coloristic style that has recently developed in contrast to the dominant twentieth-century trend toward economy and linearism.
Varèse. Intégrales.
CHAPTER VII

TONALITY AND SPATIAL REALISM

Tonality and perspective are the theoretical foundations of music and painting of the four hundred years preceding the province of this study, which is the twentieth century. Many twentieth century practices can be only understood as aberrations from, distortions of and exclusions of these traditional techniques. Consequently, it is necessary to compare tonality and perspective with each other before proceeding to a discussion of the ways in which the twentieth century is individual and distinct from the traditions of the past.

Now, tonality and perspective are really only the raw material of the music and art of preceding centuries. While the creator's choice of technique, and materials cannot be divorced from the ensuing creation, still it cannot be overemphasized that the way each artist and composer utilizes these techniques and materials is what distinguishes him as a creator. An aesthetic evaluation of a creator would concentrate on the aspects of his creation which make it different from all others. These differences constitute an artist's or composer's personal style. To some extent the creative output of certain times and places and personalities can be grouped according to
similarities that, again, mark the group out as being different from the production of other groups.

In this light, the stereotyping of all production of the last four hundred years as obeying rules of tonality and perspective is a violent distortion of the actual case. The laws of tonality and perspective exist only in theory. No creator of merit has merely followed these rules. The differences amongst the various stylistic applications of the rules vary from time to time, from place to place, and from personality to personality. The basic rules themselves exist only in the minds of analysts. Tonal harmony is extraordinarily different in the eighteenth and nineteenth centuries, etc., etc.

Nevertheless, in distinguishing the work of the humanistic period extending from the Renaissance through Post-Romanticism, from that of the Orient, the Middle Ages, and the Twentieth Century, one has to recognize that the presence of tonality and perspective in that four hundred years, marks out this period as different from the others mentioned. Elsewhere, tonal harmony and perspective¹ (including linear, atmospheric and three-dimensional modelling) do not exist at all! Consequently it seems both necessary and valid to discuss these two

¹The term "spatial realism" is perhaps more accurate than "perspective" though the latter is more readily understood.
phenomena on a theoretical basis.

The picture before 1600 is extraordinarily complex. When we discuss tonality and spatial realism as characterizing the Renaissance as well as Baroque and later periods, let us keep in mind the fact that features of these two systems exist but are still in a state of evolution from 1450 to 1600. By 1600 the laws of perspective and spatial realism in the sense of the total visual effect, had been adopted by northern as well as southern masters. By 1600, major-minor scales, tonal harmony, the emphasis on chords and modulation, and supported melody, were adopted throughout Europe. Before 1600, the picture is confused and complicated by national tendencies; though the seeds and sometimes the accomplishment of the total visual effect of spatial realism and tonal harmony were to be found in western art and music.

Let us repeat then, before we proceed, that within the confines of perspective and tonality there are a multitude of differences of time, nation and individual artist. We discuss the most important basic constituent of style (that continues throughout these differences), in its absolute theoretical form rather than with stylistic mutations, when we compare tonality and perspective as being typical of the music and art of Renaissance through nineteenth century.
I. THE TONIC NOTE AND THE VANISHING POINT

Essential to both harmony and perspective is a center of attraction to which all other parts are related, thus cohering to make an organic whole.

In music, the center of attraction has been the tonic note, i. e. the starting point for the scale, key or mode in which the music occurs. Habitually, music in a certain key or mode has begun and ended on the tonic note. The tonic note can be understood melodically, first and foremost, and this is its connection with modal as well as tonal harmony. As soon as music combines melodies, or combines melodies and chords, it becomes necessary for the tonic note to be the strongest sound at beginning and end, and to occur frequently enough during the music to establish its primary importance.

In the visual arts, the center of attraction has been the vanishing point of linear perspective. The illusion of the eye is that two sides of a straight road will converge at a single point in the distance, at the horizon line. If the viewpoint changes, then the vanishing point will change; but if the observer's gaze remains fixed he sees a single point of convergence. Artists of the Italian Renaissance first observed this phenomenon of human perception and represented nature in accordance with its appearance to the human eye.
Naturally, they could not represent multiple points of view, so they began by representing the spatial scene with the observer in a fixed position, with just one vanishing point on the horizon. The vanishing point in Leonardo's *Last Supper* is on the central axis, behind the head of Christ.

Later artists tried to represent a world wherein several points of view were possible. In such cases, the vanishing point was usually suggested as being out of the picture, and rarely was it on the central axis as in the Last Supper. Perspective became principally a matter of the diminishing size and clarity of objects in the distance, and the illusion of their position as being closer together.

Similarly, musicians in later ages developed the art of modulating from one key to another within the course of a piece, thus presenting several tonics, all subordinate to the main key of the piece. As music in the baroque period became more harmonically than melodically determined, the attraction of a tonal center remained but will less obvious clarity. Music might be based on several scales (keys or modes) after 1600 - before 1600 a single mode would allow music only a single, stationary tonic (or vanishing point). The art of modulation and circle of primary key-relationships enlarged the viewpoint of tonal harmony.
II. MODULATION AND SPATIAL PLANES

Leonardo's Last Supper consists almost entirely of a single spatial plane, in the foreground, parallel to the picture frame, that is, the table around which the thirteen are seated. Whereas the architectural panels of wall and ceiling clearly lead to a background plane, the background space is not important in the picture. The space in The Last Supper is shallow and contained, comparable to a niche or a stage set. The attraction of the vanishing point behind Christ's head and emphasized by the architectural elements is made all the more logical by this extremely-contained space.

Artists such as Domenichino and Raphael enlarged the picture space to include more planes. These were laid out in layers, parallel to the picture plane as in the case of Leonardo. The diminished size and clarity of figures and objects on progressively distant planes, allowed the foreground plane to dominate the others.

Baroque artists such as Velasquez and Rubens were interested in deeper space, with a stronger effect of recession. Their pictures were still organized in planes. However, the parallelism with the picture frame was not emphasized. Instead, strong diagonals leading in zig-zag from plane to plane, cut a clear path from foreground to far-distant background. The progression from plane to
plane was more strongly emphasized than were the planes themselves. Also, there was a great increase in the number of planes included. Occasionally, a repoussoir effect was used, that is, an exaggeratedly large, dark, prominent object or figure, such as the tree root in Rubens' Chateau at Steen, was placed on the foreground plane, thus increasing the effect of great distance between foreground and the small, pale, almost imperceptible objects in the background.

The neo-classic paintings of David and Ingres again emphasized planes more strongly than recession. The romantic paintings of Delacroix returned to the representation of recession.

Classical musical structures, such as basic sonata form, are based on clear contrasts between a few keys, such as tonic and dominant and major and minor. Musical sections will be in one or another of these keys with the tonic key clearly in the foreground. The relationships of dominant and minor keys to the tonic key are close in the circle of keys. While change of key invariably gives the impression of traveling away from one key to another, the distance from tonic to dominant, or from major to minor is not great. In classical musical structures, the transition from one key to another is not emphasized. The change of key is sharp and clear.
Classical music is comparable to the painting composed of a few planes (keys), each precisely distinct in its definition from the other, without emphasis on the transition (modulation) from plane to plane, and which achieve an effect of distance from foreground to background that is important to the general aesthetic but which is not an extreme distance.

Baroque and Romantic music emphasize modulation, that is, the transition from one key to another key. Many changes of key may occur within a single piece. The establishment of each new key is not nearly as important as the transitions between keys (for example, Monteverdi or Liszt). Music modulates to keys that are farther and farther away from the tonic key in the circle of keys and often stand only in chromatic relationship to it.

Baroque and Romantic music are comparable to paintings by Rubens and Delacroix wherein the distance from foreground to background, and the transitions between a quantity of planes, are emphasized more than the planes (keys) themselves.
III. CADENCE AND THE PICTURE-FRAME

The comparison between the cadence and the picture-frame is almost inseparable from the preceding discussion. In tonal music and perspective painting, the conclusion or outer edge of the work exerts its influence within the work itself. The cadence is the point where the music ends. There are small subordinate cadences and one dominating final cadence. Musical sections, and music as a whole have been "framed" by the tonal cadence. The cadence asserts the tonic chord of the key in which the music or musical section has occurred, and the other chords are thus held in abeyance by the cadence. The cadence is in the "foreground" of the music, to which all parts of the music are related.

In The Last Supper by Leonardo, the entire action on the foreground plane was parallel to the picture frame, both horizontal and vertical. In Renaissance and Baroque painting, architecture is frequently used to assert the verticals and horizontals of the picture frame.

The Last Supper is an extreme case. Classical paintings habitually assert the parallel of foreground plane and picture frame, however. Baroque paintings are less likely to place an object, such as the table in The Last Supper, parallel to the frame. The baroque interest in deeper space led artists to use the frame...
in an open-window effect, with strong diagonals (modulations, transitions from spatial plane to plane) drawing the eye back into the picture space very quickly. The "open window" effect, like the piece of music with sudden modulation away from the tonic and modulations lasting almost until the final moment when the last cadence reasserts the tonic (or enframement), still depends, for the effect of distance, upon the enframement.

In both classical and baroque styles, the picture has its own space which is delimited and made meaningful by the picture frame. The picture is a world in itself, a scene that is being acted out before us. We are separated from that world by the picture frame. Thus, the spatial illusion within the picture is intact, unified and organic. So also, the musical sections in the era of tonality cohere in relationship to one another, giving the piece unity. We do not feel that tonal music continues on indefinitely. The cadence ends it, cuts it off from us.

The functions of cadence and picture-frame should not be taken for granted as being typical of all art and music. Modern art resists the frame, which seems illogical and arbitrary to forms which want to continue on indefinitely. The modern artist is more concerned with the flux of forms, their occasional coherence and their inevitable change and metamorphosis, which is an endless process. The world is not static and measurable in modern art. In modern music,
It is sometimes difficult to tell where the music ends. It stops, that is all, and the effect is seldom conclusive. We feel, again, that the constant metamorphosis and "perpetual variation" of twelve-tone technique, for example, is an endless process, capable of countless mutations.

IV. CHORDS AND VOLUMES

A chord is an aggregate of notes, sounding simultaneously, so that the individual pitches are fused into a unit. As opposed to melody (line), and note (point), a chord is mass, block, volume, three-dimensionality. Chords could not be said to have existed before the mid-sixteenth century and the advent, by the Camerata, of the continuo bass or chordal accompaniment to melody. Earlier in the Renaissance, the consonances of counterpoint, where melodies came together on thirds and fifths (especially at cadences), might be called the antecedents of chords. In late Gothic polyphony, the additive method of composition, whereby each part was composed to coincide with the tenor but not to coordinate with other parts, cancelled out the sound of consonances as chords. When the parts were all added together there were very few consonances, and only at strong points.

A chord, in its traditional definition, is a triad. It is made up of two superimposed thirds, the second making a fifth with the bottom note. Triads may be inverted so as
to include other, alien intervals in their vertical structure. History has added more notes to the triad, which, in inversions, destroy the triadic impression. The modern chord can include any combination of notes arbitrarily, and has no relation to the triad with its structure-determining bass note, that we consider a basic participant in tonal harmony.

In Chapter VI, Melody and Line, Contour and Counterpoint, we made a distinction between "independent" melody and melody that outlines chords. Melody that outlines chords, and which is usually dependent on accompanying chords, we likened to the contour of mass or volume.

Hand in hand with the development of perspective in the visual arts, has been an interest in representing the solidity and roundness of volumes. Again, artists have duplicated the optical illusion, which interprets flat vision in terms of the third dimension. Light and shade and the curving, now-taut, now-loose surrounding contour have been used to suggest the roundness and solidity of volumes. These volumes have, in turn, interacted with linear and aerial perspective, superposition, and organization into planes, to achieve the illusion of space as seen by the human eye. Local color has helped to set off objects from each other, and to contain the volume within its contour.
It is interesting to note that the art of other eras has not been concerned with representing the volumes of objects in terms of paint on a flat surface. The art of other eras, Oriental and medieval most notably, has for the most part allowed the picture surface to remain flat, without three-dimensional illusions. Even in Roman painting which was illusionistic in terms of perspective, there was not much attempt at the representation of volume.

Thus, in the organizational schemes of tonality and spatial realism, the chord and the volume seem to take the same position. Both chords and volumes are manipulated, and the relationships between them are of the first importance. Curt Sachs' opinion in this respect is quoted below.

Faced with the unwonted dualism of plane and corporeal on the one hand, and with the familiar contrast of an unaccompanied oriental melody and a harmonized melody of the West on the other hand, they would not hesitate to call the first plane and the second, corporeal. Again, of two contrapuntal or harmonic settings, one in the earlier medieval style without thirds or sixths and the other with triads, they would readily call the latter by far more corporeal. And of two harmonic settings, one in simple, sober triads and the other in triads mingled with seventh and ninth chords, this second one would doubtless appear to be a good deal more corporeal, fleshy, all-round.²

Harmony, then, appears to be the depth, the third dimension in music. Harmony is 'functional:' its chords are organically, lawfully linked from the first to the last without an arbitrary shift or jump. True, the chords follow the melody. But just for this reason, each individual note of the melody finds itself not only in a linear way tied to those which precede and follow but also the march of harmony, which complicates its function and gives it stronger intensity.

And this is exactly what perspective does: it relates the parts of a painting not only with its neighbors but also with a space that, enveloping all of them, gives them a new intensity, significance and unity.

How close the art of harmony is to the art of space illusion appears from the central law of voice leading: neither counterpoint nor harmony are in favor of 'similar' motion, where the voice parts move in the same direction; and they do not tolerate parallel fifths and octaves. Instead they prescribe 'contrary' motion, where the voice parts move in opposite directions...The actual reason for the (often transgressed) interdiction is the motus contrarius is nothing but the musical version of contrapposto and as such counterbalances any movement by its opposite, to secure convincing all-roundness and third dimension.3

3Ibid., p. 273.
V. NON-HARMONIC TONES, THE LEADING TONE AND MODELLING

In Chapter IV, Color and Tone, we illustrated the way in which close colors in the spectrum had played a part in modelling three-dimensional form. Gradations from pink to red, from dark to light, were used to differentiate the subtlest spatial distinctions. The light, or vivid areas seemed to come forward, leaving darker or less vivid areas slightly behind. This is a manipulation on a smaller scale of the principle of aerial perspective whereby distant objects are paler and less distinct because of the intervening air. Light highlights protuberances and shadows inclines. The artist expressing volume by means of modelling does so by means of the slightest differences in tones (tones close together in value scales or on the spectrum) - and the result is roundness and solidity.

The charts in Chapter IV showed a scientific relation between color scales and musical scales. On looking at music of the period of tonality, we find that the notes close to each other in the scale, round out the harmony. Notes in the harmony generally skip by thirds. Between chordal notes, however, melody generally fills in with passing tones, auxiliaries, etc. A visual glance at a score, with treblepart moving up and then down, and bass moving down and then up in contrary motion,
and the inside parts as harmonic fillers, and passing tones clarifying the contour, will show how the passing tones, or gradations between chords, complete the volume-containing contour.

The most important semi-tone in tonal music is the leading tone which demands movement to the tonic (or foreground).

Besides melodies, chords may also contain notes adjacent to each other on the tonal scale. This may be due to inversion, or addition of seventh or ninth, or appoggiaturas, etc. Such chords demand resolution to simple, triadic chords, and of course all is resolved at cadence points. In these cases also, the chords containing adjacent whole or half tones recede in importance and are superseded by chords of resolution, which stand out in the listener's mind. Chords also "model" space, by alternating "dissonant" chords which contain adjacent tones, with "consonant" chords which do not.
VI. CONSONANCE-DISSONANCE AND FOREGROUND-BACKGROUND

This brings us to the question of consonance and dissonance and the function of each. While consonances definitely dominate the scene in tonal music, they only achieve their importance in relation to dissonance. The definition of dissonance might be "requiring motion to a point of rest" as opposed to consonance which is the "point of rest." In tonal music, there is a constant back and forth motion from dissonances to consonances. Before the twentieth century, listeners were so accustomed to feeling dissonances as requiring resolution, that a dissonance was considered unpleasant and ugly in itself. Actually, dissonance is relative to context. In baroque and romantic music, dissonances are far more extreme, that is, they contain many more adjacent (chromatic and whole steps) tones, and are also more frequent than in classical music. Chords which were considered dissonant in Mozart's time are considered consonant in the music of Wagner, disproving their classification as "ugly." A dissonance is a point of tension. This tension, in tonal musical aesthetic, called for relaxation.

Rhythm helps to achieve the forward-backward effect of consonance-dissonance. Coincident with the development of tonality, there developed measures and bar-lines, with strong rhythmic accentuation on the first beat of each bar.
We expect to hear consonances on the accented beats, and dissonances on the weak beats, with the exception of the suspension. Also, long-held chords are more likely to be consonant than dissonant.

The distinction between consonance and dissonance is inextricably bound up with other important aspects of tonality; the cadence (tonic chord), the home key, the circle of keys to which to modulate. Objects (or parts of objects) closer to us might be compared to consonances, and objects farther away to dissonances. There are consonances and dissonances relative to each key, that is, on each spatial plane. The main consonance, the tonic chord, or cadence of the home key of the music, puts all the other chords in the background. Both consonances and dissonances in the home key of the music, may be said to take place in the foreground plane. Modulation to another key takes us back from the home key to another spatial plane, wherein consonances and dissonances relative to the secondary key achieve a sense of volume and spatial differentiation on that plane only. Modulation to a third key takes us even farther back from the tonic key, and so forth. Thus tonality may be compared to spatial realism, with its roundness of volumes (chord progressions alternating consonances and dissonances), and its foreground domination (home key, tonic cadence or final consonance).
CHAPTER VIII

THE DECLINE OF TONALITY AND SPATIAL REALISM

The distortions of tonal and perspective organizations began in the late nineteenth century. Intense dissonances were not resolved into consonances. Increased chromaticism detracted from the leading-tone — indeed, the leading tone was sometimes even ignored and replaced by modal cadences. Illogical, sudden, frequent modulations to far-distant keys disturbed the orderly relationships of tonic-dominant and major-minor, and disturbed the importance of the home key. Rhythms were irregular, changed metre, or dissolved the accentuations of the barline. Parallel fifths and octaves completely ignored the modelling function of contrary motion. In the visual arts, painting tended to become flat, with spatial ambiguity, and both the painterly impressionists and the linear post-impressionists such as Gaugin and Lautrec, ignored modelling almost entirely.

Realistic painting and tonal music are not without following in the twentieth century. But their following is so small and the results of works produced in those idioms so insignificant in the twentieth century, that it seems just as well to ignore them altogether. The great
contributions in the twentieth century have involved either the distortion or the exclusion of these two traditional means of organization. The handwriting is on the wall, even for those who maintain tonality and realistic representation only in a distorted manner. The trend is away from these two techniques, towards entirely changed and revolutionary styles of art and music. The return to more conservative styles of work in the art of Picasso and Stravinsky, after their great ice-breakers of Cubism and Primitivism, seemed to imply that the traditional techniques were not dead, in the 1920's and 1930's. But the works of Stravinsky and Picasso before 1920 have been far more influential than those after, and the leadership taken over by the Austro-German schools of Abstract Expressionism (Kandinsky) and Atonality (Schönberg). The work of Kandinsky and Schönberg in the 1920's, in a more rationalistic abstract style of painting, and in the twelve-tone technique of composing music, have let loose the dominating trends of the quarter-century since that time. Since 1945, painting has been almost exclusively abstract (the strongest exception being Picasso, who is now over 70 years old). Since 1945, the majority of important music composed has been in twelve-tone technique, and this includes all nationalities, Italy, France, Germany, etc., and even includes its strongest dissenter, Stravinsky. For these reasons, we shall now concentrate on the techniques used for distorting tonality and spatial realism.
I. POLYTONALITY AND SPATIAL MULTIPICITY

One of the most frequently used techniques of deviating from the tonal system while still retaining certain of its elements is polytonality. Polytonality is the simultaneous combination of parts, one or more of which is in a different key from the home key. Sharp key contrasts are favored in polytonality, so that the result is not confused with a dissonant texture in a single key. Usually adjacent keys are chosen, for example C and C#. The parts in separate keys are often also separated in register and in instrumental color. It is very unusual for music to continue throughout its entire length (the single instance of this is perhaps the music of Milhaud) in polytonality. Usually it is employed for a few measures, to give a special effect. Another characteristic of polytonality is that examples of it are more frequent in French music than in that of any other country, the principal exceptions being Bartok (who was one of the first to develop polytonality and one of its greatest users) and a few Americans, notably Roy Harris and Ives. The music of Stravinsky, in the first two decades of the century is especially full of polytonality, as is that of Milhaud. We find that two other features of Stravinsky's, Milhaud's and Bartok's music are occasionally associated with polytonality, (1) the ostinato and (2) chordal melodies. Otherwise the music of these three composers is
so radically different from the others that these few similarities of technique are quite astonishing.
Stravinsky. Symphonie de Psaumes (III).
Stravinsky. Le Sacre du Printemps.
Bartok. Zwanzig Ungarisch Volkslieder ("Szekely "Lassu" ")
Polyrhythm (the simultaneous combination of two or more metres) is closely associated with polytonality. In our discussion of tonality and spatial realism, we noted that regular accents and metre clarify chordal progressions in the tonal system. In the example below, we find two metres, 2/4 and 3/8, superimposed.

Bartok. *Quartet Number III* (second movement).
The most amazing experiments in polytonality are made in the music of Darius Milhaud. Milhaud frequently uses so many keys simultaneously that the ear is too dazzled to distinguish one from another, and the iridescent effect resembles what Schönberg called "fluctuating tonality". It is easier to hear just two keys, especially when they are only a semitone apart, and are further divided by means of instrumentation and distant registers. According to Searle, however, the finale of the fourth of Milhaud's Cinq Symphonies (1921) is musically effective in spite of its very complicated key scheme. Searle charts the movement, written for ten solo strings, as follows, and says:

It is a strict canon in ten parts on two subjects; each subject is exposed successively in five different keys, the second subject entering in the same key as the final entry of the first subject and reversing the order of keys in its exposition. This process is carried out twice, once starting from the bottom of the orchestra, and once from the top with closer entries; then a coda of two bars rounds off the movement.¹

¹Searle, Twentyith Century Counterpoint, pp. 34-35.
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Milhaud describes his discovery of polytonality in his autobiography, *Notes Without Music* (pp. 65-66). Of his applications of the principle of polytonality, he says:

In the *Choephores* I had used chords superimposed in masses; the nature of the musical thought in *Les Eumenides* led me to adopt the same device....

and in speaking of *L'Enfant Prodigue*,

What I wanted was to eliminate all nonessential links and to provide each instrument with an independent melodic line or tonality. In this case, polytonality is no longer a matter of chords, but of the encounter of lines. 2

Milhaud distinguished lines, usually, by instrumentation as well as tonality, and in some cases by rhythm:

Already I could visualize several independent groups: on the third tier, to one side a vocal quartet, and on the other, oboe, trumpet, harp and double-bass. On the second tier, on either side, the percussion. On one side of the first tier, the piccolo, the flute; the clarinet, and the bass clarinet; on the other, a string quartet. I wanted to preserve absolute independence, melodic, tonal, and rhythmic, for each of these groups. I realized my desire, and in order to facilitate the execution of my score, written for some instruments in common time, for others in triple time, and for others in six-eight, and so on, I inserted an arbitrary bar-line every four beats, adding accents to preserve the authentic rhythm. 3

In *Cinq Etudes* for piano and orchestra, Milhaud carried polytonality to the utmost, in writing four simultaneous fugues in the third *Etude*. 4

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3 Ibid., p. 82. 4 Ibid., p. 108.
In Chapter VII, *Tonality and Spatial Realism*, we likened keys to planes in painting. Just as one had to modulate from one key to another, so there was a transition necessary between planes. The movement between keys, and between planes, was necessary in order to maintain the position of first importance of home key and foreground plane, and to achieve the impression, when changing key or plane, of moving back into space away from the home key or foreground plane.

We have seen, in modern music, examples of polytonality, the simultaneous combination of keys, without (obviously) modulation. In polytonal situations, no single key dominates the others.

In the following examples by Matisse, Braque and Klee, two planes are asserted, yet neither dominates. What should be a background plane leaps forward and participates with the objects close to the picture's surface. Since all four examples are still lifes, we expect clear spatial differentiations between the objects on the table, the table, and the room behind the table. Instead all three planes, objects, table and room are tilted up against the picture surface, and superimposed flat against it. Paradoxically, the objects, the table, and the background retain as something of their original three-dimensionality, whether by superposition or by slight indications of modelling as in the pitcher in the first example by Matisse. This reminisc-
cene of roundness is compatible with the use of chords on the different tonal planes in the examples given of Stravinsky, Bartok and Milhaud. In other words the objects, the table and certain background elements may retain their three-dimensionality, but the relation between the planes in which they would normally exist is destroyed by the flat superposition of planes. The planes are suddenly compressed onto each other. This is certainly very similar to polytonality, or the simultaneous combination of more than one key (spatial plane) in music.
Matisse. **Gourds (above)**

Matisse. **Goldfish and Sculpture (below)**
Klee. Still Life.
Braque. Still-Life With Mandolin.
II. FLUCTUATING TONALITY, CONSTANTLY-CHANGING RHYTHM AND CUBISM

There is no single movement in modern music with the concentration to a small area and a few people comparable to Cubism in modern painting. The concepts we compare here to Cubism are more amorphous and less organized than the concepts of Cubism, which had an analytical, self-conscious approach. Fluctuating tonality and constantly-changing rhythm, which we compare to Cubism, were spread out over the work of composers of widely variant nationalities and styles. "Fluctuating tonality" is not a style, in the same sense that Cubism is a style. However, we will find several similarities between the two, which have strong historical foundations in the past. Let us also remember that although Cubism was the accomplishment of Picasso and Braque, with later French adherents such as Metzinger and Juan Gris, it was an influential style. The influence of Cubism was not limited to France. Franz Marc, Kirchner and Feininger (not to mention Mondrian, who carried Cubism beyond its construction to an entirely new style), each worked out an entirely individual style strongly influenced by Cubism.

The source out of which Cubism sprang was the work of Cezanne. This French master of the late nineteenth century wished to restore solidity and spatial differentiations
to the work of the Impressionists. Using the prominent brush-stroke of the Impressionists in multi-shaded layers, he built up his surfaces architecturally. Instead of ordering the picture space in terms of a few parallel planes, Cézanne considered the multi-planar construction of each object in space; two sides and front of a nose, eyelids, sides and front of brow, several planes in cheek and chin. Instead of modelling forms in terms of subtle gradations, he grouped surface areas in a sort of jerking, stop and start, manner. The planes were a stereotyping of viewpoints, rather than a natural phenomenon (the subtle gradations of modelling are closer to the natural effect). By this means, Cézanne was able to create spatial realism without modelling, and without sacrificing the advantages of the Impressionist's brush technique and pure color.

Cézanne's technique was the point of departure for Cubism. Works of Picasso and Braque, on the brink of the beginning of Cubism, resemble those of the late Cézanne very closely.

Picasso and Braque intensified the angularity and rigidity of Cézanne's planes. Each plane was in itself flat with a sharp edge. A spatial impression was created by the shape, slant and superposition of these planes, which were far more conspicuous and less blended into each other than they had been in Cézanne's style.

Then Cubism began as an analysis and recreation in
different terms of natural space. Like many other ways of
distortion, in the early twentieth century, it progressed
farther and farther away from realistic representation;
planes became separated from objects, until the object was
merely a point of departure for a semi-abstract design.
Eventually, in Synthetic Cubism, the object was lost en­
tirely and the planes had become thoroughly independent.

In the examples that follow we see an example by
Cézanne, where the planes in terms of brush strokes add up
to a reconstruction of spatial reality. The Picasso Still
Life of 1908 and Woman With Pears of 1909 still represent
solid objects, though now in terms of highly artificial
flat planes and cubes. Picasso's Bottle and Glass of 1911-12
is the logical result of the preceeding tendency. The planes
of a still life subject have been only a point of departure
for an abstract design.
Cézanne. *Pines and Rocks.*
Picasso. Still Life.
Picasso. Woman With Pears.
Picasso. *Bottle and Glass.*
In Chapter VII, *Tonality and Spatial Realism*, we related changes of key by means of modulation away from the home key to the painter's organization into spatial planes, each of which is progressively distant from the more prominent, foreground plane.

In Cézanne and the Cubists, the number of planes and transitions to planes has been greatly multiplied. Painting in which there were many planes and constant change from one to another would seem to be comparable to music in which there were many keys, and constant modulation from one to another. Certain works of the late nineteenth and early twentieth century show an enormous increase in the number of modulations and key-changes. In the examples given, by Faure and Wolf, modulation is the most important expressive element, and occurs almost from phrase to phrase. (In classical music, modulation had only occurred at sections.) These frequent modulations, particularly the enharmonic modulations in the songs of Wolf, accomplish an almost constant turning in space.

In the early twentieth century (1905-1910), the constant turning in space becomes so rapid, and the length of time spent in one key (plane) so short, that the result has very little connection with tonality (spatial realism). This constant turning in space was given the name "fluctuating tonality" by Schönberg. Following the examples by Faure and Wolf, are examples by Bartok, Schönberg and Webern of "fluc-
tuating tonality." In the final examples by Messiaen and Webern, constantly-changing rhythm adds to the sense of location and dislocation that is characteristic of "fluctuating tonality" and Cubism.

Just as Cubism paved the way for abstract art in the work of Mondrian if not in that of Picasso and Braque who retreated from the inevitable outcome of their Cubist invention, so "fluctuating tonality" and rapid rhythmic dislocations of accents paved the way for atonal music, in the work of Schönberg and Webern though not in that of Bartok or any of the French composers.
Fauré. Green.

Voici des fleurs, des feuilles et des

franches... et puis mon cœur qui ne bat pas pour vous... Ne les chiez pas avec vos deux ailes...
Wolf. Spanisches Liederbuch (Book I, Song IX)

Ach, wo soll die Liederlein, weid sie Griesben.

da gediehn? "Ja, und wisse! Träuzelein.

gar verschiedene, flieht man dir euem. O, nein.
Bartok. *First Elegy of Piano*. (1908)
Schönberg. Quartet Number I (1905)
Webern. Five Movements for String Quartet, Opus 5 (1909)
Messiaen. Mode de Valeurs et d'Intensités.
III. ATONALITY, RHYTHMIC FREEDOM AND ABSTRACT ART

Cubism was a systematic means, first of analyzing and representing space, and second of distorting space. Like other means of spatial distortion, the ultimate conclusion was abstract art. Kandinsky, in Germany, also carried spatial distortion to its ultimate conclusion. His means were more emotional and subjective than that of the Cubists and not at all systematic. Unlike the Cubists, who abandoned that road once they arrived at the brink of abstraction, Kandinsky carried it through. Kandinsky was the first to paint abstractions, beginning in 1910. The forms in Kandinsky's paintings between 1910 and 1920 are completely spontaneous, wayward and free. They give the effect of violence, of an emotional and physical explosion. Their content is incapable of systematization, and is far from the ordered, placid even when dynamic, formalism of the Cubists and Mondrian and of the work of Kandinsky himself after 1920.

In Austria, Schönberg carried "fluctuating tonality" and rhythmic displacement to its ultimate extreme. We call the works of Schönberg between 1910 and 1920 "atonal," which merely means that they are not in the tonal system of musical organization. While all works not in the tonal idiom are thus "not tonal" or "atonal," music that is not tonal may be organized along different lines. "Atonality"
need not be merely a negative phenomenon. In the 1920's Schönberg, feeling the need for a new means of organizing music that was not tonal, evolved the "method of composing with twelve tones related only to one another." Twelve-tone method is a means of organizing music, that is fully as systematic as was tonality. But before the twelve-tone method was devised, and after the break with tonality, there is a space in Schönberg's "oeuvre" which lacks any single systematic means of organization. The organization of Schönberg atonal works is completely spontaneous and free. Like the abstract expressionist works of Kandinsky, it is characterized by violence of an emotional and physical variety. Schönberg's atonal works include Erwartung and Pierrot Lunaire. Illustrated on the next page is Schönberg's first atonal composition, the three piano pieces, opus 11. Also illustrated is an abstract expressionist work of Kandinsky, Composition, done in 1914.
Schönberg. Three Piano Pieces, Opus 11 (first piece)
Kandinsky. Composition.
Music seems to require some means of organization, with its own set of rules. Unadulterated "atonality" did not live long in Schönberg's work. Out of it he evolved the "method of composing with twelve tones related only to one another." The twelve-tone method forbade the presence of any tonal center by requiring that all twelve chromatic tones within an octave be sounded before any one of them was repeated. This held true for both melody and harmony (though later users of twelve-tone technique have sometimes divided the twelve-tone series into groups of three and four which have been used individually). The chromaticism inherent in twelve-tone technique automatically discouraged organization of chords in triads. It was possible to use the twelve-tone series in many ways, in its original order, in inverted order, in reverse or retrograde order, and in reverse (backwards, last note first) and inverted (upside down, intervals take their complementary intervals up instead of down and down instead of up) order called retrograde inversion. The twelve tone series in any of its four shapes could be transposed to any note of the scale, provided its organization remained intact. Components of the series and its mirrors could also be grouped into chordal blocks in several ways.

Kandinsky, after the First World War, likewise abandoned his former formalistic freedoms. His paintings after 1920 are composed with repeating and varied basic
shapes, many of them geometric in character.

In Chapter X, Modern Means of Organization, we will compare repeating and varied basic shapes in twelve-tone music with a similar phenomenon in the visual arts.

Kandinsky, like Schönberg, never returned to the formalistic freedom of his work before 1920. Works of lesser composers and artists have carried on in abstract expressionist and atonal styles of composition since that time. Everyone does not reach the same stage at once in artistic history. It seems fairly certain that some version of twelve-tone technique is the means of organizing music in the future, and that atonality is a less lasting phenomenon. The rigidity of twelve-tone rules may be softened, however, and new possibilities discovered. Composers working in twelve-tone technique since it was developed by Schönberg have shown an astonishing range and individuality of style. The differences between the works of Schönberg, Berg, Webern, Boulez, Stockhausen, Nono and Stravinsky are enormous! Yet they all employ twelve-tone technique. The situation is comparable to the situation of tonality in the era that has just past. One would consider the differences between the music of Beethoven, Schubert and Berlioz to be far more significant than their similarities, yet they are all tonal composers. To relate this musical situation with that of art, the number of painters who indulge in a wild and violent spontaneity comparable to that of Kandinsky
before 1920 seems remarkably few (De Kooning, Karel Appel, who else?). The term "abstract expressionism" has come to mean any style of non-figurative painting that is emotional as opposed to the placid, concrete formalism of Mondrian and his followers. One could hardly equate the abstract expressionism of Pollock or Gorky with that of Kandinsky; by contrast the later works seem ordered in a much more uniform texture, or in a complex of related shapes.

IV. THE FUSION OF TWELVE-TONE TECHNIQUE AND TONALITY AND THE FUSION OF ABSTRACTION AND REALISTIC REPRESENTATION

Originally Schönberg conceived the twelve-tone system as a means of avoiding tonality and ensuring atonality. One of his rules was that, in creating the twelve-tone series for a piece of music, one should carefully avoid any intervals, such as thirds and fifths, which might suggest tonal chord structure.

However, after fully establishing his own mature style of twelve-tone writing in major works such as the Violin Concerto of 1936, and the Fourth String Quartet, Schönberg occasionally reverted to tonality. The Ode to Napoleon, for reciter, quartet and piano, of the 1940's combines tonal and 12-tone techniques. This seems a strange turn-about, yet it is no stranger than Picasso's vacillation between semi-abstract, Synthetic Cubist paintings and real-
istic drawings, such as his portraits or sketches of artist and model.

Whereas the examples above express a dualistic attitude on the part of composer and artist, we find a few cases in the twentieth century wherein this dualism is very beautifully resolved. Certain twelve-tone compositions by Alban Berg, in particular the Violin Concerto, are a remarkable fusion between this technique and tonality. In the Violin Concerto, Berg's basis is a twelve-tone series, which obeys all the rules of that technique. No notes are repeated before the twelve notes of the chromatic scale have, in Berg's unique order of them, been sounded. Thus there is no tonic, and no tonality. However, the construction of the series is such that chordal structures are implied. It is made up of interlocking fifths and completed with whole tones (see illustration). The fifths remotely suggest the tonic-dominant relationship of tonality, yet they are inextricably woven in a twelve-tone, chromatic texture. A Bach chorale and a folk melody (both tonal) are sufficiently suggested by this series to allow their incorporation into certain movements of the concerto.

Berg. Violin Concerto.
Paul Klee, like Alban Berg, has on certain occasions created a fusion between abstraction (atonality or twelve-tone) and representation (tonality). The abstract construction of some of Klee's designs is too seldom appreciated. Klee does not begin from the outside in, in his deviations from exact realistic representation. He works the other way, beginning with a purely abstract design that contains, almost by coincidence, references to the real world as man perceives it, in terms of ideographs or cartoons. His descriptive titles are often the main reason we can intellectualize the basically abstract lines and shapes into naturalistic references. When we look at a painting like the one below, we enjoy it but it makes no intellectual sense. When we read the title, which is Twittering Machine, the little design becomes enormously funny, even true, and very specific as a representation. We feel that Klee has created a profound yet pleasant satire on the machine age, and the musician's first reaction is, "Is this a satire on the electronic composer?"
Some of Klee's paintings, notably the "Magic Square" series, are totally abstract and contain no representational references. These paintings, with their repeating yet varied shapes (and possibly also their geometric character) are the correlatives of twelve-tone music, as we shall see in Chapter X, Modern Means of Organization.

Klee will paint a totally abstract painting, made up of his "magic squares" and in the middle slant two of the squares and near the top place two triangles with divided squares beneath them and behold! the abstract painting now represents architecture! The triangles read as rooftops, and the divided squares beneath the triangles, like the two slanted squares in the middle, read as the two sides of a building in perspective. The fact that so many of the squares in the top row are purple or dark blue converts this into a night scene, whereupon the yellow squares begin to look like lighted windows. On the next pages are illustrations of an abstract painting by Klee, Antique Harmonies, and the painting, Architecture.

Is not this process exactly like that used by Berg in his Violin Concerto? First begin with an abstract design (twelve-tone) and then, as an inseparable element in that design, incorporate into the design references to the world of nature (tonality).
Klee. Antique Harmonies (left)
Klee. Architecture (right)
CHAPTER IX:

WESTERN MAN'S CHANGING VIEW OF THE WORLD

The driving force behind tonality and spatial realism in the music and art of the four preceding centuries has been humanism. The perspective painting is an expression of a man-centered world wherein all things are measurable and accurately perceived by the human eye. As we shall see, the laws of tonality are also inextricably bound up with man's perception of sound, with its partials of the overtone series strikingly resembling the thirds and fifths and octaves of tonal harmony.

I. PRE-TWENTIETH CENTURY AESTHETICS BASED ON HUMAN PERCEPTION; THE OVERTONE SERIES AND PERSPECTIVES

Prior to the twentieth century the artist's pre-occupation with the world of man, and his method of organizing the picture surface in terms analogous to man's perception of the world, were inseparable. Civilizations less interested in the natural world and mankind per se have not attempted to recreate this illusion of space. We see the world according to perspective-lines, but the world is not as we see it. The objects on the horizon are not actually any smaller or paler than those near us.
It is a distortion of the human eye that it sees objects in the distance as small and blurred and that it can see only one side of an object at one time. The Oriental artist ignores this distortion of the eye and portrays the distant object in a different distortion, as being behind and partly obscured by nearer objects and air, but as being above them - the distant mountain is merely higher on the page. The Egyptian paints what he considers the most characteristic view of each aspect of an object - a man's eye will be full-front while his face is in profile. The Egyptian portrays a garden as though from an airplane view - he sees no logic in hiding half the garden behind the part of it that is nearest the observer. The medieval artist portrays consecutive events side by side in the same place as though they had happened simultaneously. It is only the western artist, 1500-1900 (and Roman), whose painting presents nature distorted by perspective, as it appears to the human eye.

Since organization of the painting by means of perspective was historically contemporary with musical organization by means of tonality, one wonders if there is as close a relationship between man's perceptual limitations and tonality, as there is between man's perceptual limitations and perspective. At first glance, one thinks, "Certainly not; music is an abstract rather than an imitative and representational art." Whereas
the painter of 1700 would emphasize the relationship between nature and painting, the composer of 1700 would deny any such relationship existed between nature and his music. Music is imitative and representational only when it is programmatic or expressive of a text. But the human view of nature is not just the subject matter of some painting; it is the means, i.e. perspective. Consequently, there would have to be a relationship between the human perception of nature and tonality (aside from subject matter represented by painting, text or programme) to correspond to the relationship between perspective and our perception of nature.

Such a relation can perhaps be found in our perception of a fundamental tone as containing overtones, the first intervals of which form the basis of tonality. The relationship between overtones and tonality was, however, never as consciously exploited as was man's perception of nature in terms of perspective. The musician of 1600-1900 must have been aware of its existence, all the same, due to the necessity of composing for brass and woodwind instruments which, without valves, could only play partials on a fundamental tone.

Below is the overtone series, or partials on the fundamental tone, C. Omitting the intervals which repeat (thus emphasizing) themselves, and considering each new interval in terms of the C below it, one finds the octave
(reassertion of tonic, boundary limitation of scale or key), the fifth (dominant), the third (filling in the triad).

The relationship between the overtone series and tonal harmony is an obvious one. But what is the relationship between the overtone series and the world of nature as man perceives it. All sounds of the natural world, including the human voice and musical instruments, are made up of different combinations of partials of the overtone series. The partials peculiar to each individual sound give it "timbre" or sound-color. The phenomenon is very similar to the splitting up of light into rays and reflections, which are perceived by the human eye as colors. A "pure" sound, which does not exist in nature, is comparable to "pure" light which does.

Not only have composers of the twentieth century breaking with the past achieved a method which is atonal
and has no relation to the intervals of the overtone series and of tonality, but they have also attempted to work with instruments producing "pure" sound. The sinus tone of the electronic generator is the only pure sound in nature - it is without "partials" or color. Electronic composers have found, however, that colorless sound is, by itself, unsatisfactory, and are now experimenting with artificially colored sounds in which the partials are controlled and do not conform to the order of the overtone series on a fundamental tone.

II. SCIENTIFIC DISCOVERIES INVALIDATE HUMAN SENSE PERCEPTION

The most striking discovery of the twentieth century is that nature is not as it appears. Science, from 1450 to 1900, had based most of its precepts on observation of natural processes by means of the senses of sight, hearing, smell, touch, etc. Science had been fundamentally materialistic, assuming that space and time were absolutes, that matter was solid, and that objects existed as entities, as we perceive them. As such, science was a triumph of common sense. It had got rid of medieval phantasies and of Cartesian vortices....It grounded itself upon what every plain man could see with his own eyes, or with a microscope of moderate power. It measured the obvious things to be measured, and it generalised the obvious things to be generalised. For example, it generalised the ordinary notions of weight and massiveness. The eighteenth century opened with the quiet confidence that at last nonsense had
been got rid of. Today we are at the opposite pole of thought. Heaven knows what seeming nonsense may not tomorrow be demonstrated truth.¹

The commonsense, materialistic world of nature was also the world of painting and music as we have seen. Painting imitated the apparent separateness, solidity and weight of objects and living beings by means of contour line, local color, modelling, and light-and-shade. The painter's acceptance of human sense perception and his unification of the picture space as a single event in a single location are singularly compatible with the scientific exploration with which they were contemporary. Like painting, tonal harmony showed more interest in depth (harmony, polyphony) than surface (melody, which, like line, is the principal means of almost all other styles of music and painting). There is no need to recapitulate here the information of Chapter VI, Tonality and Spatial Realism. There is no question but that the world of man's perceptions was the preoccupation not only of art and music, but also of science of the time.

What happened to the world of nature in the twentieth century? With the invention of subtler scientific instruments, man's senses became inadequate as a means of measurement and observation. Natural processes were

stated in increasingly abstract and symbolic terms, incomprehensible to the uninitiated observers, and constituting an entirely new "language" or hieroglyphics, those of science. Solid objects were no longer thought of as solid, but as a collection of active molecules; matter was equated with energy. The atom, thought to be the irreducible constituent of the natural world, was split to release this energy. Space and time were no longer thought of as absolutes but as being relative and influencing each other. An object came to be defined in terms of time as well as space; an object equalled an event. Separate space-time systems, in which the velocity (in terms of speed and distance) of light has different meaning for each system, were discovered. The world of nature was conceived, not in terms of now-moving, now-static, definable volumes, but rather as constantly-moving, constantly-changing molecules and forces. The world of natural appearances, as perceived by the senses, is an illusion.2

Two great philosophers of the twentieth century, trained in science before they became philosophers, Alfred North Whitehead in mathematics and physics, and Henri Bergson in biology, carried the scientists' rejection of the

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2 For a more thorough explanation of recent scientific revelations such as relativity and the quantum theory in terms the layman can understand, see Whitehead's Science and the Modern World and Bertrand Russell's The ABC of Relativity.
materialistic view of the world into their philosophies.
Their revolutionary thinking forms a link between the
changes in scientific thought and the changes in the arts
in this century.

Morton White speaks of Whitehead's rejection of

The view that nature is composed of permanent things,
bits of matter moving about, as he says, in a space
otherwise empty, each one having its shape, its mass,
its motion, its color, its smell. It is the view of
the great thinkers of the sixteenth and seventeenth
centuries, the view of the ordinary man today, and
according to Whitehead it has never been successfully
extruded from the minds of scientists even though
science has thoroughly discredited it.\(^3\),\(^4\)

...the twentieth century scientist...not only drives
the last nail into the coffin of common sense but
also launches Whitehead into his activist philosophy
of process. The doctrine of empty space has been
eliminated by modern physics, Whitehead says, and
replaced by the idea of a field of force, a field
of incessant activity. Moreover 'matter has been
identified with energy, and energy is sheer activity.'
Since any local agitation shakes the whole universe
there is no point in treating anything as a local,
detached existence. The environment enters into the
very nature of each thing. The common-sense and
older scientific view of self-contained particles of
matter is an abstraction, and a useless one when we
are plumbing the depths of the universe. It may
suffice for lawyers and ignorant philosophers, Whitehead
says, but it prevents us from seeing that the basic
fact of modern physics is activity. However, this
figure of activity that the modern physicist places
at the center of his picture of the universe is what

\(^3\)White. The Age of Analysis. (New York: Mentor

\(^4\)Whitehead's mention of the continuing of materialism
in some branches of scientific research reminds the reader
of the continuance of realism and tonality of sorts, in some
aspects of twentieth century art and music. In other words,
the new point of view is still evolving from the old.
Whitehead calls 'bare activity,' and it remains for the philosopher to veil it decently with the answers to the very large questions: 'Activity for what, producing what, activity involving what?'

Later Whitehead answers this question by saying, "The key notion from which such construction should start is that the energetic activity considered in physics is the emotional intensity entertained in life."

This last conclusion of Whitehead is strikingly similar to the Hindu-Buddhist conception of the world of natural appearances as Maya, or illusion, and the real unity of all material and spiritual being as Brahma. The Oriental concept of the immaterial nature of reality, like that of the medieval, resulted in an immaterial, semi-abstracted art of painting, and a non-tonal, primarily melodic art of music. In the Oriental and medieval arts, the cause was religious. In the twentieth century western arts, the cause is scientific and philosophic. Yet the results in each case have certain traits in common which unite them in strong contrast to the spatial realism and tonal harmony of western music from 1500 (1600) to 1900.

5White, op. cit., p. 86.
6Ibid., p. 100.
III. ENERGIZED SILENCE AND ACTIVIZED SPACE

"The doctrine of empty space has been eliminated by modern physics, Whitehead says, and replaced by the idea of a field of force, a field in incessant activity."

In Chapter V, Instrumentation and Color, we mentioned the importance of active space in Calder mobiles, Viera da Silva's paintings and Webern's music. In Webern's music, silence replaces the "empty" space of the visual arts. Webern's isolated notes of music are separated by "spaces" or rests, which are as important as the actual notes in the music's rhythmic pulsation. This is very different from the silences or rests of classical music, which occur as pauses after cadences, thus serving as separating-spaces between periodic phrases and musical sections, to define the beginning and end of the music, rather than to participate in the music. In the music of Webern and his followers, rests, like the note-by-note changes of instrumental color, pitch-level or register, and dynamics, serve a spatial function. How different these "points" of single notes, so seldom sounding side by side in a line of melody played by one instrument, are - from the solid chordal blocks of tonal harmony, the static consonances, the infrequent rests, the orchestral masses, and the melodic continuity of classical music! In the music of Luigi Nono, the distances between the notes, especially the range-distances
from almost-intolerably high to very low, create an exorutiating tension. It is a tension of active space, to which we react emotionally. See the musical example by Webern quoted below.

In the mobiles by Calder, as in the isolated notes of "pointillist" music, the slight, almost weightless, thin bits of metal are "points" suspended by wire at related locations in space. It is almost impossible to photograph these mobiles so as to successfully show their spatial organization because the photograph inevitably has a flattening effect. In the example below, Translucent Variation on Spheric Theme, a plastic construction by Naum Gabo, the curves of the form help us see that space and light are as important a part of the form as is the form itself.
Gabo. Translucent Variation on Spheric Theme.
Closer to pointillist music than the Gabo sculpture is the sculptural construction below by Richard Lippold, *Moon*. Again, the reproduction prevents the reader's appreciation of the importance of space... the sculpture takes up a whole darkened room, across which are stretched thin wires lit up by a hidden spotlight. The wires connect points in space in a geometric manner. Without these connecting lines of metal, which suggest the light rays of the moon, the isolated points would appear as stars in the sky, as a constellation. Compare this example to the painting by Viera da Silva, illustrated in Chapter V, which achieves the same spatiality by means of the forward and recessional properties of color. Lippold. *Moon*. 
Space activated by means of light (note the importance of light in the last two examples of Gabo and Lippold) is the essence of modern architecture. Like these constructivist sculptures of plastic and metal, the importance of space in modern architecture with its glass walls on steel framework, is made possible by modern feats of engineering, such as the cantilever construction and the strength and malleability of the new materials. The symbol of these feats of engineering is the first of them that was built, in the nineteenth century, the Eiffel Tower. In Edward Stone's Museum of Modern Art's beautiful staircase, space and light swirl as gracefully around the penetrating and curving form as they do in Gabo's Translucent Variation on a Spheric Theme.
Abstraction in painting begins with the equalization of foreground and background, and a flat picture surface. Atonality in music begins with the equalization of consonance and dissonance in chords that require no resolution. These two phenomena are related to the scientific discovery that the object is inseparable from its environment.

The new twentieth century attitude toward the picture surface was historically declaimed by Maurice Denis in 1920. "One must remember that a painting - before being a battle horse, a nude woman, or any anecdote - is essentially a flat surface covered with colors assembled in a certain order."7

The bringing of the background forward to a flat picture surface is a similar situation to the emancipation of the dissonance and the activization of space and silence just discussed. No discussion of activated space and silence would be complete without mention of the Russian Suprematists, Malevich and Lissitzky, and the Dutch "de Stijl" movement of Theo van Doesburg, Oud and Mondrian.

Whitehead's discussion of nature as a field of force in which "any local agitation shakes the whole universe... there is no point in treating anything as a local, detached existence. The environment enters into the very nature of each thing," reminds us of the evolution of Mondrian's style.

Mondrian felt that the continual struggle of forces in nature, wind against sea, for example, was "tragic." He looked for a dynamic balance of forces in nature but was always upset by lack of equilibrium. In his early painting, The Red Tree, the deep blue field of night dominates the twisting leafless branches of the tree and almost swallows them up into the background. There is consequently a sense of the tree's oppression by its background, which inadvertently gives the observer a feeling of sadness. This is what Mondrian means by the "tragic" in nature.
'Unequivalence,' the tyranny of one factor over others; the simple tyranny for example of a movement—vertical or horizontal—that is too strong. 'I saw the tragic in a wide horizon or a high cathedral,' he wrote. Thus in the case of this series, had the roles been reversed and had the tree been too powerful for the blue, spreading rhythmically to the edges of the canvas or drawing with strong black curvilinear movements, the result would have been 'unequivalence' once again and once again 'tragic.'

As Mondrian painted the apple tree again and again, he worked for a balance of forces until we no longer recognize the subject matter but simply the aesthetic principle. In *Apple Tree in Blossom*, painted in 1911, a year after *The Red Tree*,

The trunk and branches have now become simply linear movements extending to (and beyond) the borders of the canvas. These movements enclose spaces between them; and we find that Mondrian's use of space has undergone a significant change. The spaces between the branches have become clear forms - volumes. And they are quite as distinct, structural and important in the composition as the branches. The branches describe movement: and the (spaces) volumes between them are the branches' 'oppositions' - static, and bracing themselves against the expanding movement. We can see that the painter has built up these volumes, brushstroke by brushstroke, with a view to their precise intensity of opposition...\(^9\)

The interaction of form and background symbolizes Whitehead's statement that the environment enters into the nature of the thing. From this stage it did not take Mondrian long to evolve a completely abstract style of force-lines, and color-forces in his sophisticated studies of "dynamic equilibrium" not to be confused with static balance. Space is represented by white, black, grey, which are as much a part of form as the primary colors he uses, red, yellow and blue with their movement relationships, (described by Kandinsky, see Chapter V,) fully utilized. Mondrian says, "The action of plastic art is

not space-expression but complete space-determination. Through equivalent oppositions of form and space, it manifests reality as pure vitality.  

In the example below, the white space is as active as the colored spaces, and holds them in abeyance. Mondrian carefully stressed the difference between dynamic equilibrium and static balance. He said that plastic art expresses action in a real plastic way. It creates action by the tension of the forms, lines, and the intensity of the colors - and in this is its force. In art, we distinguish oppositions of position and dimension. The principal, the most exact, and the only constant opposition of position is the right angle, in which two straight lines are opposed. In all art, the function of rhythm is to prevent static expression through dynamic action.

Mondrian strongly felt that the dynamic tensions of his art were expressive of the modern life of the cities and of their most typical music, jazz. He did a series entitled New York and another entitled Boogie-Woogie. He felt there was a beauty to the complex, syncopated, counter-rhythms of modern city life that would soon be more inspiring to the artist than the more static beauty of nature.

10 Theo van Doesburg, editor, articles by Mondrian, Doesburg, Kok, Oud, de Stijl, Catalogue 81 (Amsterdam: Stedelijk Museum, 6/7/51 to 25/9/51).

11 Ibid.

Mondrian. Composition.
The study of the tension-properties of lines, colors and their combinations is far more concentrated in the twentieth century than in any other. A look at the Preliminary Course at the Bauhaus school, the model for all succeeding avant-garde art schools to follow, fully explored these. The study of the abstract tension-creating properties of non-representational forms seems to be prerequisite to an art without subject matter; how else is a reaction to be inspired in the observer? Along with comprehensive studies of engineering principles and the possibilities of materials (Bauhaus students must make three-dimensional sculptures of paper, for example, and reliefs with pieces of cloth) these studies replace the academic painters' studies of anatomy, modelling and perspective. Rhythm, motion, time, activity, are not specifically the province of painting as they are, more naturally, of music, yet they have become of principal interest to the twentieth century painter, who, like the scientist, feels that the modern world is all activity and complex, rapid change. Prampolini's *Cosmic Contacts*, illustrated below, makes use of the forward property of the blue in comparison to the taupe field, and the two blue areas are thus attracted to each other, near the observer. The slight distortion of a sphere into an ellipse sends it rolling off the canvas to the right, but this motion is counteracted by the force of the white line
beneath which drives into an angle against blue and white lines pitted against it. As Frederick Gore says, the white line on the left is "not static but like the path of a bullet." The whole of the painting of so-called "cosmic contacts" is in motion, and the activity of the lines and the blue shape would shoot right off the page, thus resulting in disunity, if they were not held in equilibrium by the dark brown areas in the corners.

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Prampolini. Cosmic Contacts.
Our discussion of Mondrian's evolution to an abstract style of activated-space dynamics by means of the activation of the background and its interaction with the foreground began with a quotation of Whitehead's philosophy. "Since any local agitation shakes the whole universe there is no point in treating anything as a local, detached existence. The environment enters into the very nature of each thing." The importance of one's contemporaries, whether nations or individuals, is also stressed in modern psychology, which emphasizes the determinism of one's experience as being possibly more important in the formation of individual character than heredity. In social and political life, as well as in psychology, the individual is dominated by the environmental group in which all individuals are treated as equal, whether in the form of democracy and free enterprise, or in the doctrine of communism expressed by the totalitarian state. The word "collective" has a different meaning in, yet can certainly be applied to, both democratic and totalitarian situations.

Mondrian felt, when he created his dynamic equilibriums, that he was expressing the most satisfactory relationship of an individual and his environment. He considered his solution to modern tensions in painting, to be an example soon to be translated by mankind into their ways of life. The social idealism that motivated all the members of de Stijl of which Mondrian was the greatest artist, were expressed by
its spokesman Theo van Doesburg, in their periodical, de Stijl.

The plastic idea precedes the appearance and because the former now appears by itself, the nature of the new culture is disclosed. In plastic arts the new cultural idea has reached the appearance. All other functions of human cognition will only be able to develop when directed towards the new plastic arts.\(^{14}\)

The development of modern art towards the abstract and universal idea, i.e. away from outwardness and individuality, has - by joint efforts and common insight - made it possible to realize a collective style, which - beyond person and nation - expresses plastically the highest and deepest and most general desires of beauty of all nations.\(^{15}\)

Thus, the aim of the Neo-plasticist of "de Stijl" was the perfect and dynamic equilibrium of social forces, of the individual and society, of the thing and its environment. How curious that the supra-national and classless tendencies of modern society, in direct contrast to the hierarchy of aristocracy, bourgeoisie and proletariat of the preceding era, should bear a comparison to Einstein's revelation that matter equals energy and that consequently the objects considered by materialists to be solid and self-contained are neither of these, but are inter-related with all being!

Similarly, the modern artist no longer allows the illusion of nearer object to dominate supposedly receding

\(^{14}\)Theo van Doesburg, \textit{op. cit.}\n
\(^{15}\)Ibid.
objects in a spatial hierarchy, but allows the flatness of the canvas to assert itself, and brings the background into equal status with the foreground. And the modern composer of whatever style, uses an increasing amount of dissonances...he asserts an equality of consonance and dissonance, rather than keeping consonance in the foreground as "featured players" and dissonance as the background field. In the example below, Modigliani gives as much interest to the "background" area between the two heads as he does to the portraits themselves. Viewed abstractly, as though these were not shapes resembling human figures in a room, we find as interesting a geometric interplay of lines and rectangles (and spheres) as we did in the paintings of Mondrian.
Modigliani. *Bride and Groom.*
The all-over intense blue background is so active in the following example by Matisse that some of the objects, the table, the trees, the bushes, the green vase, are fused with it, and the white cloud and lighted window, supposedly in the distance as seen through the window, come almost as far forward as the ochre sculpture on the table and the red flower.

Matisse. *The Blue Window.*
The fusing of environment with object and background with foreground is universal in twentieth century painting, and leads to the development of abstract painting in the works of painters completely isolated and out of communication with each other; Picasso, Mondrian, Kandinsky, Arp, Delaunay, Kupka, Malevich, to name a few. Since the preceding examples by Modigliani and Matisse were of the French school, I include a German example as well, the following painting by Franz Marc of der Blaue Reiter. The important difference between the French and the German bringing-forward of the background, is that the French aim is decorative (the preceding example by Matisse is an entertainment and a pleasantry) whereas the German is concerned with emotional expression and color symbolism. In the paintings of the German expressionist, the dominant space, often in vivid colors, crowds in on the individuals and expresses their sense of oppression. In the following painting by Marc the dynamic background which dominates the picture space is a spiritual field for the horses. In later paintings by Marc, this spiritual field becomes increasingly disturbed and complex, trapping the animals in their mesh in such paintings as The Fate of Animals, and presaging the oncoming World War I.

In Erich Heckel's Glassy Day, and in Kirchner's The Street the background exerts both an emotional and a physical pressure on the foreground, of great tension.
Marc. The Fate of Animals (turn sideways).
Heckel. The Glassy Day.
Kirchner. The Street.
Modern art rejects the Renaissance hierarchy of object and space, and foreground and background. As in modern science, the spatial environment enters into the nature of the thing. Modern music rejects the tonal hierarchy of sound and silence, of home key and modulations, and of consonance and dissonance.

The background comes forward, until, in abstract painting, there is no distinction between foreground and background. The painting exists entirely at the surface. In modern music, we have, to use Schonberg's phrase, "the emancipation of the dissonance." No longer is dissonance held subordinate to consonance, "in the background" as it were.

Tonality, as based on the intervals of the overtone series, emphasized (as the overtone series emphasizes) the first of the series; octave, fifth and third, over all the others. Modern music no longer emphasizes these intervals at the expense of fourths, seconds, sevenths, and tritones. "Dissonant" intervals are treated on an equal basis with "consonant" intervals, until the term "dissonant" is meaningless. Furthermore, the sense of modulations to keys that "are distant" from a home key, or tonic, is supplanted by free chordal arrangements.

Two composers, Hindemith and Schonberg, have made attempts to codify the new treatment of all twelve tones on an equal basis, in their work as teachers and in their
very influential writings. Their ideas and their music are in strong contrast to each other. Yet both treat the twelve tones possible in the well-tempered system primarily from a melodic and intervallic point of view, chords being the result of these intervals. The chord is not thought of as a block-formation of thirds or fourths, but as a composite of an unlimited variety and number of intervals. Both Hindemith and Schonberg are interested in melodic flow and impetus of music.

Hindemith's system is the closer to tradition of the two. It is based on the overtone series, and, unlike Schonberg's system, establishes a sliding-scale of intervallic values therein. The simpler overtone-intervals are considered as less tension-producing than the chromatic intervals, both melodically and harmonically.

In comparison to that of Schonberg's system, that of Hindemith is mid-way between tradition and the modern break with tonality. His codification is at the same stage of development as early Mondrian, or Modigliani, perhaps, or the other artists just illustrated as bringing background into the foreground plane.

Hindemith derives the following row of twelve notes, as related to C, in a most complicated manner. Morris Carner explains,

Take the harmonic series on C: Supposing that we move the second overtone C one point down, that is to say, give it the function of a first overtone. It
thus becomes the fundamental of a new harmonic series which except for its transposition an octave higher does not differ from the original one. This new fundamental C represents the upper note of the octave within which the other eleven notes shall find their place. We will call it the basic octave. We now proceed to the third overtone G and move it first two points lower or give it the function of a first overtone. Thus G becomes the fundamental of another harmonic series. But as this fundamental lies outside the basic octave it cannot be used. The third overtone is consequently moved one point lower assuming the role of a second overtone. Its corresponding fundamental is then the lower octave G, a note which can be ranged in the basic octave. The next three overtones of the series on C are treated in the same way. The procedure is then reversed the overtones being moved one or more points upwards. The order in which the twelve notes are found is indicated by Hindemith's so-called row No. 1....This order determines the degree of relationship between the central and generating note C and the other eleven notes of the chromatic scale. The further we move from C to the right the lower becomes the degree of this relationship until it reaches zero on F sharp.16

One can see at a glance (the names of the intervals in relation to the central note C are mine) the relationship of Hindemith's system to classical tonality. In Hindemith's Row No. 2, these intervallic relations are stated harmonically; the arrows indicating what he considers the roots of the intervals.

Hindemith's Row No. 1 (red pencil notations mine)

\[16\text{Mosco Carner, A Study of Twentieth Century Harmony (London: Joseph Williams, Ltd.), pp. 72-3.}\]
Hindemith's Row No. 2 (red pencil notations mine)

Carner continues, speaking of Hindemith's Row No. 2,

Moving from left to right the intervals become, to use Hindemith's terminology, 'less simple' and 'less perfect' (weniger rein). Thus the clear distinction between consonant and dissonant intervals is dropped. By drawing no strict line between the seventh and eighth intervals Hindemith takes into full account the modern view of the relative nature of consonant and dissonant intervals. The transition from simple and perfect intervals of no or only slight harmonic tension (the first seven intervals) to less simple and perfect intervals of higher and highest harmonic tension (the next three intervals) is gradual and steady. The extremes are the octave as the most simple and most perfect and the major seventh as the least simple and least perfect intervals. As for the tritone, like Krenek, Hindemith considers it a neutral interval. Its harmonic value is uncertain and varies according to the context in which it appears. 17

According to Hindemith's Row No. 2, chords containing "simpler" and "more perfect" intervals have higher "harmonic value" than chords containing intervals toward the righthand side of the sliding-scale. The principle of building chords in thirds, and the inversions of these, is

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17 Carner, op. cit., p. 75.
excluded by the system. However, chords of higher "harmonic value" are considered as less tension-producing than those that tend to include the more radical intervals. A "harmonic incline" (harmonischer Gefalle) that is gradual, well planned and balanced is satisfying from the aesthetic point of view, according to Hindemith. Such a "harmonic incline" will include a balanced proportioning of the greater and lesser tension-producing chords.

Hindemith's system is a serious attempt to codify into a satisfactory and practical theory the extreme chromaticism of modern music, and to make modern music understandable in these terms. Unlike Schonberg's system, it seems more profitable as a method of analysis of music that has already been written. It does not open up new possibilities to the contemporary composer that have not already been explored. Hindemith's system is actually, by this time, a traditional one.

That is because Hindemith's system as stated deals with harmony. More interesting, from the point of view of the contemporary composer, are Hindemith's melodic practices. The role that melody played in Hindemith's music before the 1920's, before he returned to an almost tonal style, is experimental and all-important. Melody has been used in the twentieth century, much as it was used in the late middle ages, before the acceptance of the third as a consonance and the innovations of modal and
major-minor counterpoint. Machaut and his contemporaries combined melodies that were completely unrelated harmonically. Their melodic independence was further symbolized by polytextuality, the allotting of a different, though textually related, text to each voice. The result is of course very dissonant - a mesh of lines each beautiful in itself. Obviously, in such a style, just a few such lines were combined simultaneously. In modern dissonant counterpoint, counter-rhythms add to the effect of one voice jarring against another. The result is comparable to a painting which ignores depth except as it occurs accidentally by superposition of lines. The art of melody is an art of line.

Humphrey Searle says more of Hindemith's theories regarding melody in his book, *Twentieth Century Counterpoint*. Hindemith distinguishes between the implications of a root progression of the harmony of a piece, determined by selection of the lower note of the "best" or simplest interval in each chord and the implications of roots in a melody. Searle says,

In a piece made up of several simultaneous melodic parts, as many root-successions are possible as there are parts, and these may all be independent of one another. On the other hand the root-succession of the melody may fully coincide with that of the general harmony.

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19Ibid.
Hindemith considers seconds as the main building units of a melody (the opposite of his attitude toward seconds in a chord-structure). He considers the step-progressions of melody as the most important aesthetic factor in music (the step-progression of a melody is not to be confused with the implications of a root-succession of a melody). In speaking of the step-progression of melody Hindemith says,

More important are those notes which are placed at important positions in the two-dimensional structure of the melody: the highest notes, the lowest notes, and notes that stand out particularly because of their metric position or for other reasons.  

Furthermore, sevenths and ninths can replace seconds in the step-progression, melody may change register quickly, and "the prominent notes of a melody may not belong to either a chord or a step-progression, when the need for intense expression requires that the attention shall be riveted by the conspicuous strangeness of such notes."  

Triadic chords used to be all-important in separating foreground, roundly-modelled objects from moving, dissonant backgrounds in tonal music. Broken chords in melody assisted the definitions of space by means of tonality. In contrast to twentieth century practice, thirds were more important than seconds and the octave displacement

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20 Ibid.
21 Ibid.
of a note (sevenths and ninths instead of seconds) was rare before the decline of tonality. (The octave displacement of notes is all-important in atonal music of Schönberg, Webern and others). The prominent notes of a melody, never before the decline of tonality, occurred outside of both the chord and the step-progression. And the tritone was considered a "devil in music" for the very reason that it is acceptable, indeed favored, today — because of its neutrality as regards key. Thus, even in Hindemith's more conservative twentieth century system, the rigid classification of consonance and dissonance, and the determination of melody by harmony is abolished. Dissonance is no longer kept in the background and between consonances, either melodically or (as the result of melodic clashes due to independent part-writing), harmonically. Is this not like Whitehead's inter-relation and lack of distinction between the object and its environment?

In the painting of Mondrian and in the work of the German Expressionists, the background comes forward and fights with the foreground. Along with the generalization and distortion of the appearance of objects, this process helps in the dissolving of the object into the picture space. Soon one can no longer speak of objects at all, and we have abstract painting.

Similarly, Hindemith's system explains the breaking
of tonality in the music of many modern composers, notably Stravinsky, Honegger and Bartok. But even though these composers use as generous a helping of dissonance as do the atonal composers, still a remnant of the tonal system remains. This remnant of tonality takes, usually, one of the following four forms. But the tonal characteristics stated here are almost always accompanied by distinctly non-tonal characteristics, stated in parentheses. The tonal suggestions occur by means of (1) diatonic major-minor melody; possibly also modal melody (combined without tonal considerations, with much dissonance as the accidental result of independent part-writing), (2) triadic chords (employed non-tonally in chord streams, as in impressionist music), (3) tonal chord-progressions (more than one chord-progression in more than one key, employed linearly, in polytonality), and (4) the existence of a tonal center (the melody and harmony both being otherwise completely free).

It remained for Schönberg to do for music what Mondrian, Kandinsky, and the Synthetic Cubists did for painting. Schönberg carries the non-tonal characteristics so far, removing one by one the remnants of tonality stated above, that he arrives at the codification of atonal music in his positive "Method of Composing with Twelve Tones Related Only to One Another." Mondrian, Kandinsky and the Synthetic Cubists distorted the natural
aspects of representational forms until they ceased to suggest natural forms. They first flattened the form, using flat areas of color with contour-lines instead of modelled forms. The flattened form, defined by contour-line, corresponds to the dominance in modern music of melody. Just as painting abolished modelling, the musician abolished the triad (sometimes even the chord). Then the modern painter distorted the form as it suited him, either decoratively in the case of the French school, or expressively, in the case of the German Expressionists. The distortion of the contour-line into unnatural representations, corresponds to the distortion or tonality-breaking treatment of the melodic line by octave-displacements of sevenths and ninths instead of seconds, by the inclusion of tonally-ambiguous intervals such as the tritone or the unresolved dissonance, and by the long, unperiodic, uncadenced, and rhythmically unmetrical (or frequently changing in metre) flowing lines of modern melody. The final step towards abstraction in painting comes with Kandinsky's and Mondrian's abolition of subject-matter; the forms bear no relation to a natural appearance. The final step towards atonality in music comes with Schönberg's abolition of even the tonal center, completely disposed of by the rigid rules of serial music forbidding the repetition of a single note until all the other twelve notes have been heard.

In classical music there was a rigid separation
between consonance and dissonance that corresponded to the distinction between a chord and its environmental location in relation to other chords. "The Method of Composing With Twelve Tones Related Only to One Another" ignores any such important distinction between a chord and the chords that surround it. All that is important, harmonically speaking, is that the twelve notes occur before any one of them is repeated. Notes melodically adjacent may be sounded simultaneously as a chord. Because any intervallic-progression of the twelve notes is permissable, the particular "row" constituting the "theme" or "basic set" of that particular piece of music (each piece of music has a different intervallic-progression or basic-set), any chordal progression is permissable. Consequently, the basic set of a piece of music in twelve tone method, is actually the mode or scale of that particular piece, and each piece of music has its own scale or melodic-harmonic mode. There are as many modes, then, as there are pieces in twelve tone, and the major-minor modes of classical tonality and their resultant harmonic concepts of consonance and dissonance have absolutely no bearing on serial music.

Serial music accomplishes the complete destruction of the distinction between chords and their surroundings. As in Whitehead's explanation of modern physics, matter equals energy, all matter can be reduced to identical components, and the thing cannot be separated from its
environment. In twelve tone music, the basic set is the source of every single note in the piece. The interval cannot be separated from its surrounding intervals in the row of twelve tones. No single note can be emphasized more than another.

V. THE ABOLITION OF SUBJECT-MATTER AND THE ABSTRACT TREATMENT OF TEXT

In Chapter III, Text and Subject-Matter, we set forth the premise that treatment of subject-matter and treatment of text are comparable. We have made much of the absence of subject matter in the more progressive styles of modern art, which is abstract. Is there any comparable musical movement that treats text in an abstract manner?

The development of sprechstimme in Schönberg's Pierrot Lunaire and subsequent works of Schönberg and Berg in particular. We discussed sprechstimme in the chapter, Instrumentation and Color in the Twentieth Century. The range of pitch and careful ordering of rhythm in sprechstimme are thoroughly unnatural in a speaking voice. In this same chapter, we also mentioned the combinations of sprechstimme and speaking and singing of separate texts simultaneously in Moses und Aron of Schönberg. Each voice or group has its own "instrumentation" in terms of tone quality and register: male, female, high, low, singing, speaking,
solo, choral, as well as its own music and its own text. Like the overlapping monologues in the duets, these polytextual choruses remind one of the polytextual motet of the middle ages, where the object is that the music should have symbolic meaning rather than that it should be immediately understandable in naturalistic terms.

The unnaturalistic treatment of text is even more strongly seen in Milhaud's settings of catalogue listings of agricultural machinery in *Machines Agricoles* and of flower seeds in *Catalogue des Fleurs*. Here, the voice which sings these meaningless words, including prices and catalogue numbers, is used abstractly and musically rather than naturally. William Walton's setting of *Facade* is likewise concerned only with the sound and not the meaning of Edith Sitwell's poetry. Berg wrote *Five Orchestral Songs on Postcard of Peter Altenberg*. These musical examples of words being used without regard to their meaning bears an artistic parallel to newspaper collages and to the post-collage insertion of painted half-words and half-sentences in the works of Picasso, Braque and Gris (illustration on next page). In the illustrated collage by Gris, the "ourn," probably the mid-section of "Journal" and the "aza" are senseless and without explanation. A twist of satire is offered in the word beginning "Gris," which, of course, amounts to the painter's signature.
Juan Gris. *Breakfast.*
The use of sprechstimme, while distorting the natural voice, and the symbolic abstraction of polytextuality, like the meaningless use of words as design-patterns, still all contain some literary connection, albeit slight.

The electronic composer, Karlheinz Stockhausen, is the first to use syllables in a completely abstract manner. In his *Gesang der Jünglinge*, he has serialized syllabic (vowel and consonant) sounds according to twelve tone principles. The syllabic sounds are first sung and recorded by a boy's voice and then the tape recording is cut and repositioned according to the composer's will. The pitch of the sung syllables, and the dynamic intensity and the duration (length of time taken by each, comparable to tempo-adjustment) can and are freely altered by electronic means. These sung syllables, in altered form, are called by Stockhausen "phones." Phones are combined in *Gesang der Jünglinge* with purely electronic sounds, note mixtures and the sinus tone. The serialization (twelve tone organization) of the phones results in such strange configurations, as "telbju, lebtuj, jubelt, blujet," etc.22 The musical result is as abstract and incomprehensible in literary terms as is the painting by Capogrossi on the next page, which, like the paintings of Bradford Tomlin, is made up of strange, hieroglyphic-like signs that are undecipherable and yet have the aspect of "writing."

Capogrossi. Surface No. 25.
In conclusion of this chapter, let us recount ways in which science is reflected in art and music. First we notice that, in the past four hundred years, science was based on human sense-perception, on observation and measurements. Volume was thought to be solid, space empty, time and space absolute, and man's senses were respected. The result of this view was a man-centered universe in the art of modelling for solidity, spatial realism in terms of perspective, etc., and a musical aesthetic based on the tonal intervals of the overtone series.

These common-sense, materialistic, scientific conclusions were disrupted in this century by the discovery that volume is not solid, space is not empty, time and space are relative, and man's sense-perception is highly inaccurate and limited compared to the capacities of the microscope and other instruments perfected and invented by an industrial society. The discovery that matter equals energy and is influenced and indeed inseparable from its environment, led to the equalization of foreground and background, of consonance and dissonance, and the activation of silence and space. To refer to Chapter II, The Time Element and Abstraction, modern art is concerned with time and the flux of forms in continual metamorphosis.\textsuperscript{23} In

\textsuperscript{23}Flux is the main theme of Henri Bergson's philosophy. Compare it with stream of consciousness technique in James Joyce and Proust.
music, dissonance, the motion-producing element, takes over, and the art of twelve tone writing is an art of "perpetual variation." Man ceases to be "the measure of all things" and the natural world disappears from representation. If abstract art has subject matter it is the microscopic view of forms or mathematical symbols and geometry. Music dehumanizes itself. In electronic music, the timbres of the natural world are replaced by man-made sounds and, by the equivalent of "pure light," the "pure tone" or sinus tone, without the partials of the overtone series.

The twentieth century presents a mixed picture, a transitional picture, half-way between two points of view and two aesthetics, and expression of both these opposite poles can be seen. Such great composers as Hindemith, Honegger, Messiaen, Bartok and Stravinsky, have, for the most part, retained elements of the aesthetics and point of view of tradition. So also have Picasso, Matisse, Kokoschka, Kirchner, Klee. But the seeds of the future, and the new point of view of the atomic era with its dehumanized aesthetic, arise in the music of Schönberg, Berg, Webern, Stockhausen, Skalkottas, Boulez, and in the painting of Kandinsky, Mondrian, Baumeister, Manessier, Deyrolle, Singier, and many others. The century is sixty years old and its principal paths can already be perceived.
CHAPTER X

MODERN MEANS OF ORGANIZATION

I. TEXTURAL AND CENTRALLY-FOCUSSED ORGANIZATIONS

The abolition of classical tonality meant the loss of the organizing principles possible by means of tonality. Sonata, rondo, and binary and ternary forms, depended on the symmetrical oppositions of contrasting musical sections by means of change of key and periodic melodic structures ending on cadences. With the modern departure from clearly-established and contrasting key relationships, and cadential consonances, classical sectional structures became relatively meaningless.

The same thing happened to painting, with the abolition of perspective organization. In a flat painting there was no question of the point of converging lines in the distance, that ordered the realistic-space painting in perspective. Formerly, the boundary-line of the painting, the picture frame (equivalent to the cadence in music, both being "stopping places," the beginning and ending of the work of art), influenced the picture's organization. Usually a tree, a figure, the plane of a table, or the horizon line, would echo the verticals and horizontals on either side of the painting, and establish the picture-frame thereby. Look
at the example by Leonardo on page -- the table's edge is exactly parallel to the bottom of the picture frame. In modern painting, there is a tendency, however, to unending space. The grid lines of a painting by Mondrian do not stop at the edge of the picture but extend beyond it. Kandinsky's abstractions exist in their own neutral field, usually black, grey or white, a kind of cosmic space capable of infinite extension. The picture frame cuts into this space -- it does not limit it.

Now a work of art must have coherence. Two principles of organization, giving coherence to the modern work of art, seem to stand out to the observer.

The first of these is that the forms within the work interact dynamically with each other, are interdependent and thus cohere. Such organizations might be compared to the pattern in a fabric, which may continue indefinitely if woven at length, and which is seemingly arbitrary in its limitation, that is, in the places in which it is cut off from itself. Naturally, some patterns lend themselves to large surfaces and some to small; the pattern of pillow-covering differs from that of drapery material, and the two are seldom interchangeable. Thus we have massive, lengthy pieces of music and mural paintings, as well as the miniature pieces of Webern, for example, or some of the smaller works of Klee. Paramount in this group are the "action painters" such as Pollock and Riopelle, mentioned in the discussion
of the role of intuition in art, pages 393–394. The overall texture of their paintings is similar to works of some of the twelve-tone composers, in which every single note relates to the single thread of the basic set. In "action painting," the result is usually a mesh of lines (melodies). Just as prominent in modern art is the painting made of seemingly isolated points of color, which are nevertheless

Pollock. No. 1. 1949.
related by shape and color effect. This art of the isolated areas is obviously comparable to "pointillism" in Webern and Nono especially, where notes are related always to the basic series from which they are all derived, but where these same notes are isolated and scattered by distances of pitch and instrumental color. Look at Through the Rainbow by Joan Miro, another "intuitional" painter, called an abstract surrealist. Small "motifs," most of them instrumented in red or black, are slightly varied each time they are repeated, and cavort before an endless, blank taupe ground. Music made

Miro. Through the Rainbow.
up of small motifs of two (an interval), three and four notes, finds its exact counterpart here. If the choice of motif and its placement seem in the least arbitrary and meaningless, cover up any one of these, or half the painting, or even just one of those white spots, and the balance will be destroyed -- the rest of the motifs will suddenly fall apart into isolation and cease to cohere.

It is not just twelve-tone music that follows "textural" composition, the result of the building up of a structural unity out of fragments and motifs, whether repeated and superimposed or varied at each occurrence. Alois Haba foretold such "athematic" composition, and most of Stravinsky's music is built out of rhythmic patterns of small motifs.

Listeners to modern music frequently complain that it has no structure because it has no focal point, no climax to which it has progressed, and no contrast -- it is indeed of a single, highly-dissonant texture. We must learn from the oriental in appreciating the over-all pattern of texture-composition. But look back at the example just given, by Miro. Seemingly it is a collection of dabs and shapes without a focal point. A closer look will reveal its center, slightly above center, a black and white "eye" surrounded by red, then black in a combination of the circular and triangular shapes that constitute the picture. Also this "eye" in an "hourglass" has more space to move in than any of the other forms; there is a fine line surrounding this space as
well. But we hardly notice the center at first glance, because so many things compete with it -- the single instances of contrasting colors pulling the observer's attention in off-shooting directions, the blue, green and yellow. The multiple small motifs compete with it also, as well as the carnival-like character in the lower right-hand corner.

The danger of atonal composition is the problem of limitation and form, since everything is possible and nothing systematized in atonal music. The problem is partly solved by the presence of a literary text in the most important atonal-expressionist works, Erwartung, Pierrot Lunaire and Wozzeck. Erwartung, when being heard, certainly gives the impression of a uniform emotionality of mood, and musical texture. Yet just as unobtrusively, one finds a central point in Erwartung, just as was found in the "textural" fabric of the painting by Miro. On either side of this center we have the literary division of action. Part I deals with the woman's search for her lover, and her discovery of his dead body. Part II is a Liebestod. Tension rises in Part I as the search becomes more and more anxiety-ridden, and the dominating voice part rises twice to a high Bb. The "center" comes in measure 194, when the soprano sings her highest note, a B natural, and drops nearly two octaves down to the C# above middle C, at the word "Hilfe" (she has discovered her lover's death). Part II, the Liebestod, is a gradual lowering of tension with some relatively consonant chords, and a
lowering of the voice-range accordingly, as the woman accepts death in love. ¹

Just as unobtrusive (and hard to notice just by hearing), are the central turning-points of the quantity of crab canons we find in modern music by otherwise widely contrasted composers. These canons are not only the province of the twelve-tone composers; they exist in music by other composers as well. The example by Milhaud, for example, in the section on polytonality, page , is a crab canon. Milhaud used the crab canon often. Of his Cinq Etudes for piano and orchestra, he describes the fourth, "The fourth Etude, both violent and dramatic in its content, is constructed crabwise; that is, the piece is divided into two, the second being an exact replica of the first, but reversed. From the mid-point it runs backward to the beginning." ²

The first movement of Bartok's Music for Strings, Percussion and Celesta is built on a series of entries arranged in the following pattern, plus a coda in which the original and its inversion are heard together. The notes' names indicate the first notes of the transposed theme as it enters. From the central Eb on, the theme is heard in inversion. The theme is of course varied in the process, and episodes are interpolated, but such is the main structure of the first


movement. 3

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&D \\
&A \\
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&Ab \end{align*}
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Lower Part:

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\begin{align*}
&Bb \\
&Eb \end{align*}
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Hindemith's *Hin und zurück* is a one-act opera in which the second half reverses the action of the first, and the situation at the end is the same as at the beginning. The music likewise reverses the order of its themes and movements, without conforming strictly to the rules of the medieval crab canon. 4

*Hin und zurück* was written in 1927; Berg's *Lulu* was begun in 1928 and not fully completed at the composer's death in 1925. There is a structural resemblance between the two. The principle difference is that the reversal of music and action in *Lulu* is not meant to be merely entertaining in that its implications are tragic.

Berg analyzes the structure of *Lulu*, a condensation of two different dramas by Frank Wedekind into a libretto

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by Berg himself, as follows, "The interlude which bridges the gap between the last act of 'Earth Spirit' and the first act of 'Pandora' is also the focal point of the whole tragedy. In it begins, after the ascent of the preceding acts or scenes, the descent of the following scene, the inversion. (By the way: the four men who visit Lulu in her attic have to be represented in the opera by those singers who have represented the men who become Lulu's victims in the first half of the opera -- in inverted order of appearance, to be sure...) The interlude, of which Berg speaks, separates scenes 1 and 2, in Act II. Act I contains three scenes from *Earth Spirit*, and the first scene of Act II also is derived from *Earth Spirit*. Scene 2 of Act II and the two scenes of Act III are all derived from *Pandora's Box*. The long interlude at the center of the drama accompanies a silent film presenting Lulu's life from the time of her arrest (which marks the turning point from good to bad fortune), to her escape and return. The "flash-back" nature of the film strip warrants the retrograde character of the accompanying music. Redlich calls the music to the silent film a "large-scale ostinato movement, progressing dynamically on the lines of this figure:

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\begin{array}{c}
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The music of the second act contains mostly the same themes as the first, with a single addition, in the musical motive associated with Countess Geschwita. The action of Act III is a reversal of Fate but it is not a return to the initial status of Lulu. Act III ends in the total destruction of Lulu's social status, achieved in Act I, and in her physical destruction as well (by murder), to contrast with her physical domination of others in the first act. The music is less "retrograde" than Hin und zuruck, though many of the earlier themes are used in a manner expressive of the catastrophe of the formerly successful Lulu. There is one thematic addition, in Wedekind's Lautenlied, which symbolizes Lulu's decline, but long sections of I/1 return in III/2 in "literal quotation."7

Lulu not only shows central organization, it is also created from a single texture. All the music is based on one basic set, the retrograde of which represents the opera's heroine.

It has been said that central organization, and particularly the approximate form of the crab canon, is frequently characteristic of twelve-tone composers. Lulu is one example. The following quotation of Krenek's analysis of his own Variations for Piano, Opus 79, reveals another. The work consists of twelve variations divided into three sections. The first section, a sort of dramatic allegro, includes five variations; the second, a broadly constructed adagio, has two; and the third, again of a slightly agitated character on the whole, contains five. The forty-eight basic figures of the series are divided in such a way that the first variation employs but two transpositions of the original series; the second and the third variations have each two other transpositions, and so on until, with the sixth variation, all twelve original forms have been exhausted. Two transpositions of the inversion are added to the two original forms in the third variation, and two different ones in the fourth, and so on. Thus, a total of four forms of the series is called into play from the third variation to the sixth, two being original and two inverted. From the fifth variation on, two transpositions of the retrograde inversion are added each time, so that, in the fifth and sixth variations, three different forms are simultaneously active. In consequence, the two first transpositions of the retrograde form appear in the seventh variation. Owing to the fact that the two central variations (the sixth and the seventh) are welded together to strengthen a unified whole, all four fundamental forms are simultaneously represented at the center by a total of twelve different transpositions. From this point on, the structure becomes less compact until, at the end of the final variation, there remain only two transpositions of the retrograde form, corresponding to the two original forms of the first variation. The entire structure of the piece is symmetrical, built around an axis situated in the middle between the sixth and seventh variations. That is why the central part, the adagio, has been developed as a canon which returns to its beginning; in other words, starting from a certain turning point, the forms employed are retrogressions of those employed previously. The eventual development of this formal idea, down to the minutest detail, is reinforced by the circumstance that the composition is based on a series which is
symmetrical in itself, and in which the second half corresponds to the retrograde form of the first half.

Krenek's analysis presents several aspects of the new method of organizing music. The first is that the music is of uniform texture, being completely derived from a single row. The row is not repeated; rather it is varied constantly. There is a central organization, the center being situated between the sixth and seventh variations of the twelve. The central part is a crab canon, musically reversing itself at the turning point. Finally, the basic set also shows an "axial" organization, in that the second half is the retrograde of the first half.

This leads us to another manifestation of the modern artist's interest in forms that cohere to a center, and radiate outwards from that center. Krenek's composition is central in other ways than just the crab canon at its center. It is within the basic nature of the "method of composition with twelve tones related only to one another"; the fact that there are four fundamental forms of the same series; the series, its inversion, its retrograde, and its retrograde inversion. Krenek calls these four aspects of the basic set, "comparable to pictures of a geometrical curve in the four fields of a plane co-ordinate system. Each picture originates from one of the others through 180-degree revolutions around one of the co-ordinate axes." The following

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8Krenek, Music Here and Now (New York: W. W. Norton and Co., 1939, translated by Flees), pp. 185-186 (emphasis added).
9Krenek, op. cit., p. 173.
A prism is called to mind by the following statement by Krenek:

It is possible to shift every one of the four fundamental forms twelve times, keeping them parallel to each other; or, in other words, to transpose them on the twelve separate steps of the chromatic scale. From this it follows that we have always had forty-eight different fundamental forms of the same kind, but interrelated in conformity with a distinct law.

Schönberg speaks extensively of the axial nature of the twelve-tone series and its other forms. He says:

It is worth noting how the series, which rotates, as it were, in musical space, takes on at each repetition a different form which is an individual one each time, and which arises from the changing motivic and thematic development.

Earlier in the same treatise, Schönberg compared "musical space" to the "magic square" in which the same letters form the same words and the same meaning both horizontally and vertically. Add to this axial unity, the identification of horizontal and vertical elements, the unity of melody and "harmony" (polyphonic result of combined melodies or chords)

10 Krenek, op. cit., p. 173.
12 Ibid., pp. 46-50.
in the intervallic shape of the basic set. Finally, Schönberg says, "Music is the unconscious recognition, obtained from immediate intuition, of the unity of time and space in relation to music." 13

In his analysis of Schönberg's Moses und Aron, a full-length opera based on a single twelve-tone series, Milton Babbitt diagrams the "musical space" or "magic square" and shows us thereby the possibilities open to every composer of a piece in this style. The author has added red axis lines to Mr. Babbitt's diagram to help us see the axial nature basic to twelve-tone composition.

It is the habit of twelve-tone composers to think of the multiple possibilities of the series in Original, Inverted, Retrograde and Retrograde Inverted forms, as a "musical space." Below is an acrostic, which concluded one of Webern's lectures in "Der Weg zu Komposition in zwölf Tönen" (which we quote from Robert Craft's program notes to the recording of Boulez's Le Marteau sans Maitre). As Craft says, "It is a puzzle, i.e., an 'abstract' problem, and is at the same time 'expressive' (of itself); it is irreducible -- a perfect canon; it doesn't move, and each of its ways is another way of looking at the same thing."

It is strongly suggestive of the twelve-tone way of thought.

SATOR
AREPO
TENET
OPERA
ROTAS

13 Ibid., p. 48.
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left to right. Basic set plus 11 transpositions.

right to left. Retrograde set plus 22 transpositions.

top to bottom. Inversion plus 11 transpositions.

bottom to top. Retrograde Inversion plus 11 transpositions.
The axial concept of twelve-tone music finds its source in the way in which the four basic forms of the set are related. These are aptly called "mirrors," and the definition of a reflection is "the bending back of a part upon itself." In this sense the basic devices so essential to Composition with Twelve Tones; Inversion, Retrograde and Retrograde Inversion are mirror images or reflections of the Original or basic set (one is again reminded of a prism). Actually it takes the combination of the Original and one of the above, to make a complete mirror, in other words the object and the reflected image of the object. Crab canons are also mirrors, and we have seen the popularity of the crab canon in modern music. Schönberg often uses as a basic set a six-tone "image" in combination with a six-tone "reflection," making a complete mirror of the basic set. (See also Krenek's analysis of his Variations for Piano, and the majority of the works of Webern.) Schönberg says, "Personally I endeavor to keep the series such that the inversion of the first six tones a fifth lower gives the remaining six tones.... This has the advantage that one can accompany melodic phrases made from the first six tones with harmonies made from the second six tones, without getting doublings." 15 A mirror is hidden within the structure of the intervals themselves, for all intervals invert to a complementary interval except one, the diminished fifth, which can then serve as a pivot.

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15 Rufer, op. cit., p. 95.
for "modulations" or changes from one form of the basic set to another. Complementary intervals are minor 2nd-Major 7th, Major 7th-minor, minor 3rd-Major 6th, Major 3rd-minor 6th, Perfect 4th-Perfect 5th, Augmented 4th-diminished 5th.

The use of a tone-row that is a complete "mirror," i.e., one in which the last six notes are the inversion, retrograde inversion or retrograde of the first six, is important enough to the twelve-tone composer to warrant a textbook on the subject, The Hexachord and its Relation to the 12-Tone Row by George Rochberg. The book was written to save the 12-tone composer endless hours of trial and error in his quest for six notes that will invert to six other notes, without repeating a single note -- the most essential rule of composing by this method. According to Rochberg, "Mirror inversion is operative in any hexachord provided each tone of 0 is one member of each of the intervals of an expanding tetrachordal series." The tetrachordal series he mentions places the Original and its Inversion in a progressively enlarging series, as below, by simply rearranging the notes horizontally. It is significant that the horizontal series always reaches a limit at the interval of a fourth, which is exactly half of 12-note chromatic scale or octave, and always includes every other one (six) of the 12 possible vertical intervals, thus automatically excluding repetitions.

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Rochberg has analyzed all of Schönberg's rows showing a mirror-form of the first six notes in the second hexachord, and in each case the two hexachords can be combined vertically into an "expanding tetrachordal series," horizontally reaching from minor 2nd (minor 3rd, 4th, 5th, Major 6th) to Major 7th. This strictly theoretical "tetrachordal series" of intervals is not to be confused with the intervals occurring horizontally in the series. It is merely an aid in discovering whether the construction of the original hexachord makes it possible to invert it to six new notes, and if this is possible to aid in discovering what intervals of inversion will accomplish this purpose. If the composer has decided beforehand that an axial or self-reflecting 12-tone series is desired, then he must proceed from the possibilities in an expanding tetrachordal series, and only these. The mathematical, equational character of this process points up the fact that the composer in 12-tone method should be fully aware of all the musical potentialities of his 12-tone "subject," in other words, its "musical space" or "musical square" (cf. Milton Babbitt's diagram of the musical potentialities of the 12-tone series fundamental to Moses und Aron) before he begins to utilize it musically.

The following are a few illustrations of Rochberg's system. (1) A hexachord "Original" is presented, plus its "Inversion" which contains six entirely new notes, that is, none of the notes in the inversion duplicate any of the notes
in the original. (2) The vertical intervals between the original and inversion forms are charted. (3) They retain the same notes, in the same vertical relationships, but are rearranged for illustrative and not compositional purposes into what Rochberg calls an "expanding tetrachordal series."
(1) Original

(2) Perfect 5th, minor 2nd, Major 6th, minor 3rd, Major 7th, Perfect 4th

(3) Expanding *terzoidal* series, vertical intervals rearranged:

min. 2nd, min. 3rd, 4th, 5th, Major 6th, Major 7th
Now, we see that each of the vertical intervals of the "expanding tetrachordal series" was necessary to accomplish the self-reflecting basic set. From this hypothesis we derive the rule, "the point of inversion must be a member of a tetrachordal interval of which the first note of the original is the other member." The only intervals of inversion that will result in a series without note-duplication are those six intervals in the tetrachordal series; minor second, minor third, fourth, fifth, Major sixth, Major seventh. The composer can write you for himself a tetrachordal series beginning on any pitch he chooses. If he chooses his first hexachord from any desired arrangement of the notes given horizontally in the top line of the tetrachordal series, without repeating any of these of course, and selects the interval of inversion corresponding to the first note, he will have a self-reflecting series. Rochberg gives us the following: (4) is a tetrachordal series beginning on F-Gb. (5), (6) and (7) are three horizontal arrangements, preserving the vertical correspondences given by (4). The rules are stated thus, that a) The tones of the Originals in each case were drawn from one member of each interval thereby insuring the production of its complement in the Mirror Inversions, and b) The point of inversion in each of these three cases was a member of the interval of which the first note of the Original was the other.
We found central focuses in the general textural designs of Schönberg's main Expressionist compositions, as well as in the later works in the twelve-tone system. In Erwartung, the highest notes of the piece, a B-natural at "Hilfe", divides the work into two musically-similar sections (illustration on page ). In Pierrot Lunaire we find, among other contrapuntal forms, a crab canon which reaches a center and reverses itself. But in both of these cases the "center," although it may work unconsciously on the listener, is difficult to perceive. Now in Kandinsky's "Abstract Expressionist" compositions, preceding his geometrization of design in the 1920's, there are, according to the painter himself, certain "centers." These centers are, however, rather difficult for the casual observer to perceive -- otherwise the forms seem to live both within and beyond the borders of the canvas. Kandinsky's analysis of his Composition no. 4 (1911) is that it contains "2 centers; 1) of the knotted lines, 2) of the modelled angle of the blue which are separated through vertical black lines (spears)."

These two centers are related, both containing attention-attracting black lines. Of Composition No. 6, Kandinsky again mentions two centers, "1) On the left the delicate, pinkish, slightly vague center with feeble, uncertain lines in the middle. 2) On the right (slightly higher than the left one)

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the rude, red-blue, a little out of key, with sharp, malign­nant strong and very precise lines.\textsuperscript{19}

In the 1920's, however, the central focus of Kandinsky's style is clarified, along with the geometrization of his shapes. As in twelve-tone music, there seems to be little or no cadence, the music drawing together in the center (or turning around from a central point) but beginning and ending unobtrusively -- so in the paintings of Kandinsky illustrated on the next few pages, a neutral background tone serves as the spatial "field" in which the forms exist, there is little or no enframement, and the forms draw together about a central point or axis, thus cohering to the center, and gradually fade out on all sides. Perhaps the prevalence of flat, filled-in circles, bears a relation to the kind of centralization seen in series constructions wherein the second six notes are the inversion (or a mirror) of the first six notes, and this basic shape or individual arrangements of notes, being symmetrical on all sides, is repeated and/or varied throughout the composition. The coherence to a center, by Kandinsky, is here likened to the crab canons so frequent in modern music, particularly in the 1920's.

\textsuperscript{19}\textit{Ibid.}, p. 11. (Note how emotionally Kandinsky de­scribes his abstract forms. Kandinsky is an "expressionist" at the same time that he is an "abstractionist," negating the common belief that abstract painting is necessarily formalistic and emotionless.)
In the first Kandinsky example, *Ausgewogen*, the axial focus is slightly off-center, the crossing diagonals lead the eye off the page, the central axis is approached by a lemon-yellow triangle, from the top of the picture, and a background-colored rectangle from the bottom. Both the triangle and the rectangle are "unfinished," and seem to continue beyond the picture frame, ignoring the interception of the frame entirely. Parts cross in this painting as melodies and parts may cross in music, yet each part retains its identity and independence, by means of color. Thus blue strips cross into the yellow circle, and where they cross they become yellow and blue combined, or green, and both retain their identity.

In the second example, *Dunkle Kühe*, the field in which the forms exist is the deep blue of a night sky, the forms clash and shoot out from the center like a double stroke of lightning, and miscellaneousely-shaped, vague pieces of matter float aimlessly around the central explosion, out toward the edges of the painting, which, again, do not seem to have any effect on the painting's inner organization.
Kandinsky. Ausgewogen. 1925.
Kandinsky. Dunkle Kähle. 1927.
Strong central focus does not remain a prominent feature of Kandinsky's style after the early 1930's. It occurs in the work of many other artists, after that time, however. On the next pages are illustrations of Constructivist sculptures by the brothers Pevsner and Gabo, both with an engineering background, and combining three features of much modern sculpture not seen before the twentieth century; central axis or point of focus, plastics and metals as a medium, and a frequently geometric and abstract vocabulary of forms. The pages following the illustrations of Gabo and Pevsner contain two paintings by Americans of the youngest generation of modern art, Frank Stella and J. deFeo. The variety and contrasts of styles, between Stella and deFeo and Kandinsky and the Constructivist sculptors, reminds one of the variety of musical styles in which we see crab canons, by Schönberg, Berg, Webern, Bartok, Hindemith and Milhaud.
J. de Feo. Deathrose. 1958 (unfinished)
Centralization is not specifically the province of totally abstract painters, any more than crab canons are of the atonal and twelve-tone musicians. Picasso's frequent presentation of two sides of a face simultaneously, profile and front view, with the profile in the center, is a "mirror" style. The great synthesis of Picasso's use of mirrors is the masterpiece, Girl Before a Mirror. A slightly off-center axis divides the picture, and the two versions of the girl, herself and her reflection. The girl's face is another "mirror" in that we see both front and side views at once, divided by the profile.
II. "PERPETUAL VARIATION", SUPERPOSITION AND MONTAGE

Central focus is just one of the means of organizing modern music and art, in crab canons and series-construction, and in paintings and sculpture with a central axis or point. Looking at our examples, one wonders if perhaps this means of organization is more characteristic of the 1920's especially, and some of the 1930's, with a few later adherents, than it is of modern art and music since that time. As we have said in an earlier chapter, it is impossible to have a comprehensive picture of music and art in the very fertile period since the second World War (most artistic and musical activity declined during the war and picked up afterwards). We can only discuss the styles and trends we are sure exist, since 1945, without presuming that this is at all a rounded or balanced appraisal of the whole situation. Activity since 1945 involves two generations, and while the younger men are undergoing new experiments radical enough to rate comparison with the exciting first quarter of this century, the older men, Picasso and Stravinsky, cease to lead us, and many of the other leaders of their generation have passed on, such as Kandinsky, Klee and Mondrian and Schönberg, Berg and Webern.

What other means of artistic unity are there, in modern music and art? At the beginning of the chapter, we briefly mentioned uniformity of texture, before we proceeded
to discuss central focus. "Perpetual variation" or the repetition of basic shapes, which may be varied by means of color, size and position, and slightly altered in contour, results in over-all designs of uniform texture. These basic shapes may be geometrical or they may be "free form," and we must remember that the twelve-tone series organization allows a tremendous variety of basic shapes. Do not confuse the twelve-tone series with the chromatic scale, which is the source of its notes. Each composition in twelve-tone style has an individual twelve-note series, which is the melodic and harmonic foundation of that particular composition only, and which is different from the twelve-note series in any other composition. Of the basic shape selected there are 48 variations of shape in each composition aside from variations of color or dynamic values. These are caused by the original shape, its 3 "mirrors," and the 11 transpositions of each. The twentieth century has already witnessed several styles of twelve-tone composition; the long-lined counterpoint of Schönberg, the Expressionist fusion with tonality of Berg, the "pointillism" of Webern, the Oriental-impressionist style of Boulez, the electronic music of Stockhausen, to mention just one, and serialism, and this lists only those that seem to be the most important. We have discussed several of these. Schönberg's twelve-tone compositions are a mesh of lines, with the twelve-tone series seldom broken up into separate motifs, and just as seldom blocked or massed into chords.
Berg uses more chords and sometimes combines twelve-tone, tonal, and Expressionist-atonal styles. Webern individualizes each note (each interval) by means of dynamics, instrumental color and register. His tone-row (or series) is often divided into groups of three or four, for example, the row of Webern's *String Quartet, op. 28*, is, according to Leibowitz, divided into three segments of four notes each; the second is the inversion of the first, the third a transposed repetition of the first. The twelve notes are also divided into two equal halves, because the second half is the retrograde inversion of the first half (which means that if the second half is read backwards it equals the inversion of the original form of the first half). Consequently the retrograde form of the entire twelve-note series is the same as its inversion. This row allows only half as many possibilities as does a row less tightly turned upon itself. Also, the row is made up of six two-note motives and each of these stresses the half-step interval.\footnote{Leibowitz. *Schönberg and His School*. (New York: Philosophical Library, 1949, trans. by Newlin) pp. 42-43.} With a row thus divided, the resultant style is made up of short motifs, closely related.

The twelve-tone styles of Messiaen and Boulez indulge in a sensuous, resonant colorism of odd instruments, such
as a vibraphone, an ondes Martinot, an Oriental gong. Like Webern, Boulez uses a very delicate palette and acknowledges his debt to Debussy in his choice of pretty pastels and reverberating tone-colors. On listening to Boulez's *Le Marteau Sans Maitre*, the listener is so struck by the exotic beauty, strangeness and uniqueness of the timbres, that he almost forgets to listen to the twelve-tone organization of pitches and to the rhythmic subtleties. Electronic music, and musique concrete as well, often derive their uniqueness from sound-color also. The style of Stockhausen is much more austere and penetrating, less delicate, than that of Boulez, whether he writes for electronic combinations of sinus tones ("pure" or colorless tones) and "note mixtures" (artificially constructed timbres) or for an ensemble of conventional wind instruments as he does in *Zeitmasse*.

Serialism submits the rhythm and dynamics to the same type of series-construction as we have in twelve-tone music. Developed from Messiaen theories of rhythmic modes, by Boulez, it has been adopted by several other composers, especially those working in musique concrete and electronic media. Stockhausen continues these rhythmic innovations. Many are very mathematical and hard to understand, and the author shall limit our discussion to serialism as explained by Stockhausen in his article, "How Time Passes" in the third volume of *Die Reihe*. As Stockhausen quite reason-

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ably explains, rhythmic organization has traditionally been bound up with pitch organization. In tonality, music was metred, with equal bars containing the same number of beats, and with the strongest accent always expected on the first beat. Consonance and dissonance were understood rhythmically. Dissonance occurred on the weak beat only, had a short time value usually, and if it occurred on the strong beat it was subsequently resolved by the strictest rules. As music, in the late nineteenth century and into the twentieth, modulated more and more frequently, so also did we find changes of metre and more frequently. In our explanation of polytonality we find also an example of polyrhythm (usually a matter of ostinatos superimposed). In our explanation of "fluctuating tonality," where tonal centers are shifted so often, we see also an example of fluctuating or constantly-changing rhythmic accents, or displaced accents. In atonal and early twelve-tone music, rhythm is hardly organized at all, but engages in freedom of accents that defies metrical organization. The great innovator in the changing and more complex use of rhythms has been Stravinsky, and Boulez acknowledges Stravinsky this place, as a source of his own experiments in serialization of rhythm. To the non-composer it seems extremely logical that just as pitch, after the freedom of atonality, submitted to twelve-tone organization, so also
does modern music require a rhythmic organization different from the metres of the past, yet much more ordered than the chaos of displaced accents that occurs in atonal music.

Stockhausen devises a twelve-tone scale of rhythmic values to correspond to the twelve-chromatic pitches within an octave. He calls it a "scale of twelve durations" based on the "multiplication of a smallest unit," whether there be one to twelve times one 32nd note, sixteenth note or eighth note, etc. Based on the 32nd note, a rhythmic scale would look as follows. Stockhausen calls it a "subharmonic series of proportions," (p. 13)

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\[ \begin{align*}
\text{1} & \cdot \text{2} & \cdot \text{3} & \cdot \text{4} & \cdot \text{5} & \cdot \text{6} & \cdot \text{7} & \cdot \text{8} & \cdot \text{9} & \cdot \text{10} & \cdot \text{11} & \cdot \text{12} \\
\text{\textsuperscript{1/32}} & \text{\textsuperscript{1/16}} & \text{\textsuperscript{1/8}} & \text{\textsuperscript{1/4}} & \text{\textsuperscript{1/2}} & \text{\textsuperscript{2}} & \text{\textsuperscript{4}} & \text{\textsuperscript{8}} & \text{\textsuperscript{16}} & \text{\textsuperscript{32}} & \text{\textsuperscript{64}} & \text{\textsuperscript{128}} \\
\end{align*} \]
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Stockhausen points out that the octave is a 2:1 relationship, and uses the term 2-relationship instead of the term octave, which he considers obsolete and confusing in reference to twelve-tone music. He requires a rhythmic change to correspond to the pitch changes in the 2-relationship. A "2:1" transposition up (an octave above) would halve the note-values, and down would double them. Consequently \( (\text{\textsuperscript{1/2}} \text{\textsuperscript{1/4}} \text{\textsuperscript{1/8}}) \), transposed 2:1 above (an octave above) would become \( (\text{\textsuperscript{1/64}} \text{\textsuperscript{1/32}} \text{\textsuperscript{1/16}} \text{\textsuperscript{1/8}}) \). On the other hand, this same \( (\text{\textsuperscript{1/2}} \text{\textsuperscript{1/4}} \text{\textsuperscript{1/8}}) \), transposed 2:1 below would become \( (\text{\textsuperscript{64}} \text{\textsuperscript{32}} \text{\textsuperscript{16}}) \). Similarly, if \( (\text{\textsuperscript{1/2}} \text{\textsuperscript{1/4}} \text{\textsuperscript{1/8}}) \) were transposed in a 2:3 relationship upwards (a fifth up), it would become \( (\text{\textsuperscript{64}} \text{\textsuperscript{32}} \text{\textsuperscript{16}} \text{\textsuperscript{8}}) \), etc.

One wonders if such a system of multiplication and division
of rhythms will not eventually require an entirely new notation. Can an instrumental or vocal performer acquire sufficient facility with "pointillist" rhythms, or will this become a capacity of electronic instruments only? One thing seems possible, which is that a rhythmic scale (here called a "subharmonic scale of proportions") corresponding to the chromatic scale, may facilitate performance of twelve-tone music. A specific rhythm would become consistently identified with a specific pitch. Since the problem, in performing twelve-tone music, has been the isolation of individual notes, when the human mind finds it easier to remember configurations of notes, or notes that fit into a context, as they did in the era of tonality. In twelve-tone music, each composition has a new series, a new configuration of the twelve notes, and the performer feels he starts from scratch, rather than from the background of a context, each time he attempts to perform a new composition in twelve-tone technique. If a performer has in his mind an association of the chromatic scale with the rhythmic scale, then the odd intervals and pitches (and rhythms) may be that much easier to memorize.

Below are two examples given by Stockhausen of twelve-tone series of rhythms (numbers correspond to the pitch in terms of the chromatic scale). They both use as the smallest unit, as does the "subharmonic series of proportions" on page 431.
Stockhausen's article goes on to discuss the problems of aesthetic rhythmic organizations using the above "subharmonic series of proportions." Although he used this technique of rhythmic organization in his own compositions, Zeitmasse, Gruppen für drei Orchester and Klavierstück XI, he does not set forth, in any way, the "subharmonic series of proportions" as being the best organization for the new music. He clearly feels that more experimentation is in order, and that this "subharmonic series of proportions," while contributing to order in one sense, may be destroying it in others. He recognizes the problems of the performer, for one thing, and has the reputation of being able to perform (and conduct) all his own, very difficult compositions himself.

The direction which experiments in serialization of rhythmic values has taken can nonetheless be understood from the particular example above. The idea is to give a basic rhythmic shape, as well as a basic pitch shape, and to vary these throughout the composition. From the point of view of an artistic comparison, the serialization of rhythm is an overdue phenomenon, and is inextricably related with twelve-tone technique in general. Here we can only say that the serialization of rhythm is part of the musician's twelve-tone technique, in the same sense that regular metre was connected with tonality, polyrhythm with polytonality, constantly changing and displaced accents.
with fluctuating tonality, lack of metrical organization with lack of tonal organization, and so forth. Whether or not Stockhausen's "subharmonic series of proportions" is the rhythmic organization of the future is not important for us here. Perhaps Boulez's rhythmic organization is profoundly different from Stockhausen's, and so forth. What is important is that both pitch and rhythm have, in the past five years, been submitted to organization into a "freely" composed shape that is individual to each composition, and that is perpetually varied throughout the composition, with no thematic or rhythmic elements that do not conform to this basic shape allowed to intrude into the composition. A repetition is implied in this technique of "perpetual variation." Aspects of the basic shape may change. We see the basic shape from different sides (mirrors) and in different lights (colors), in its entirety (the whole series) and broken up into motives (groups of 2, 3, 4, or 6 notes). But the basic shape remains the same throughout a single composition, and is different from the basic shape seen in any other single composition.

The techniques that the twelve-tone composer has at his disposal are the same, whether they are used by Schönberg, Berg, Webern, Stockhausen, Eimert, Boulez, Stravinsky, Nono, Dallapiccola, Elliot Carter, etc., etc., etc. They are the same, in a sense, whether the medium is instrumental, vocal or electronic. What can the composer do with this
basic shape and its three mirrors and their eleven transpositions?

He can use the series as a long line, and create a predominantly linear counterpoint. Or he can block adjacent notes into chords. He can cut up the series into short motifs.

He can create canons and ostinatos. He may cross parts or leave each part its own sphere, space or register in which to move. He has great choice in his uses of color and dynamic values.

A most important feature of the new music is that it contains subtle techniques of superposition and alternation. The same shape may be overlaid on one of its variants. This is a "flat" technique, very different from the careful voice-leading of the past, where lines never crossed and always followed a predetermined choice of directions.

This is a technique akin to those of polytonality and polyrhythms, because in both instances two keys, two rhythms, or two shapes, are superimposed on top of each other. The composer does not care to relate these two shapes to each other. Rather he enjoys the jarring effect of their juxtaposition. For clarity, each shape, key or rhythm may be understood individually as well as in superposition. The close juxtaposition of keys in polytonality is usually caused by the choice of adjacent keys, C and C# for example.
Distant keys would lose the effect of polytonality. There is some difference in the degree of individuality each shape, key or rhythm may retain when juxtaposed with another. The area where the two are combined may be relatively fused or unfused. The two keys, rhythms or shapes may interlock and blend into a new shape that is the total of the two, but which is divisible and understandable in terms of what precedes and follows the juxtaposition.

It should be understood here that keys and rhythms cannot be juxtaposed without some manner of melodic or chordal organization also. Look back at the examples given in Chapter VIII, The Decline of Tonality, pages to . Even in polytonality and polyrhythms, there are juxtapositions of "shapes" as well. These shapes retain features of traditional (tonal, metrical) chords, melodies and patterns. They are not "free" in form as are the twelve-tone shapes. (See examples of "free" shapes in Chapter IX, pages .) In our discussion of polytonality in Chapter XI, we described only the fact that two keys are juxtaposed. Yet in our examples of artistic showing two spatial planes juxtaposed, those spatial planes were expressed by the represented objects within each plane, a pitcher or bowl of fruit in one plane, a table in another plane, the wall behind in a third plane. Polytonality and polyrhythms are understood in terms of the juxtaposition of chords or melodies taking place in one key or metre, on the one hand,
and in another key or metre, on the other.

So we have a most surprising situation. We have adherents to radically divergent musical schemes, twelve-tone versus tonality, using their musical material in a similar way. Both seem to superimpose, juxtapose or alternate, melodic or chordal shapes. This is as opposed to the rigid rules of voice-leading that applied to tonal music before the late nineteenth and early twentieth centuries.

We include, on the next page, an example. Webern has inverted some of the intervals to their complementary intervals in the accompaniment (seconds to sevenths, etc.). While the basic shape is introduced in its complete and original form in the voice part, it is divided into motifs, transposed, and varied by means of complementary intervals in the accompanying part. While the voice part is clearly a line, the accompaniment is made up of massed notes in chords, singly isolated notes and motives. The piano part freely overlaps the voice part. In spite of this overlapping, the slightly louder dynamic value in the voice, the timbre of the voice, and its contrasting linearity will insure its individuality. One is reminded of the painting, Ausgewogen, by Kandinsky, on page where the massed circle area of yellow is crossed by blue linear strips which become green at the crossing section, yet retain their linear individuality.
Webern. Songs Opus 23#1.

Raw
It is in the basic nature of the electronic, tape and musique concrete media, to use overlapping, superposition and montage as a basic technique. A sound is taped, and then manipulated. The tape can be cut apart and joined in various ways to other parts of itself, or of other tapes. Sound can be varied easily by these technical media; shortened, so that the same number of notes are diminished, elongated so that they are augmented, to any duration, listened to backwards, and timbre can be altered in any way. Pitch is affected by speed (just as a record played at the wrong speed is altered in pitch), and a scale can be constructed from a single stroke of a drum, while the normal range of instruments can be extended. A tape-loop equals an ostinato, playing the same tape at different speeds causes a fugue, and a canon at the unison can be done by using one track with several heads.

The uses of tape in electronic and tape recorder media and in musique concrete, resembles the use of the film strip in movies, where there is also much cutting and montage and manipulation of speeds. Before we discuss the use of superposition and montage in the making of films, let us illustrate examples of modern painting in which we see a basic shape, varied, repeated, and altered. Let us first look at examples of abstract art, which would coincide with twelve-tone music.

In this painting by Heinz Trökes, called Staccato
(1952), the basic shape is a "free" form rather like an elongated amoeba. The shapes exist in their own whitish atmosphere against a mottled pink field. All the colors of the spectrum (some of them muted, off-shades but still to be designated as red or blue or green, etc.) are present. None of the colors are blended into each other, however, and even the softest shades are clear-contoured against the whitish atmosphere. First the shapes are varied by color. Secondly, though all the shapes are related, or mutations of the same shape, no two shapes are exactly alike. This might be an example of total serialization, except for color.
Trökes. Staccato.
In Ernst Wilhelm Nay's "Black Points" (Mit schwarzen Punkten) painted in 1954, we find more exact repetition of the basic shapes which are (1) filled-in ovals of nearly one size (some smaller), mostly in black and red, with few in blue or white; (2) white rectangles slightly out of shape, some of them transparent and showing colored areas upon which they are superimposed, and outlined in black, and (3) black, white and blue chequers. Underneath or behind this surface made up of colored ovals, transparent rectangles and checks, is a more amorphous activity made up of clearly-defined, "free" form, cloudlike areas in red, yellow, orange, blue, black and white. An example of the technique of superposition should be noticed in the upper left-hand corner. Here, a transparent white rectangle reveals the edge of the orange, vaporous mass behind it. The orange is, in turn, in front of (or on top of) the black oval, and both black and orange are on top of the yellow area which is, again, on top of the white background.
Nay. **Black Points.** 1954.
Composition, 1950, by Poliakoff shows us that the basic shape need not be a small motive, or a line, but may be a large, angular, filled-in mass. The wedge which overlaps two areas, one very light and the other very dark, and touches on two others, holds the form together, towards the center.
The example below is an exquisite example by Jacques Villon, done in 1921, of overlapping and interlocking and juxtapositions of shapes which seem either to be derived from or made up of simple rectangles.

Jacques Villon. **Color Perspective.** 1921.
In the following example by Lapicque, the repeating shapes are isolated not in terms of one single color to a single area, but in terms of a color-configuration to a single area. These color-configurations are the "basic shapes." They remind us of the all-over patterns, which we compared to ostinatos, in our discussion of rhythmic counterpoint in Chapter IX, page 447. This is a polyrhythmic design, and polyrhythms are part and parcel of the serialization of rhythm, according to Stockhausen's description (see pages 447). If an original statement of the series is set in counterpoint against its inversion, or any other of its mirrors, the result is polyrhythmic, and the patterns are associated with the "basic shape" and its mirrors. It is interesting to note the evolution of both. Messiaen and Boulez evolved serialization of rhythm from Stravinsky's displaced and changing accents, which were frequently arranged in overlapping ostinatos. They submitted rhythm to the new organization of pitch, the twelve-tone method. We have compared ostinatos to the all-over patterns, side-by-side or overlapping in the French art of Matisse and Picasso. Lapicque has submitted these all-over patterns to the new organization of forms, the abstract style.
Lapicque. *Armed Figure*. 1953.
On pages , we noted that not only did the new
twelve-tone music (comparable to recent abstract art) use
the technique of juxtaposition and overlapping, but that
it was a feature inherent in polytonality and polyrhythm
(comparable to distorted representational art). We did
not include cubism therein, but there is no reason why
cubism (especially in its later reordering, known as the
"synthetic cubist" style) cannot contain spatial multiplicity.
Nor is there any reason why there would not be instances of
polytonality in music that is full of "fluctuating tonality,"
since both distort and nearly destroy the traditional tonal
system. The two examples which follow are synthetic cubist,
indeed almost post-cubist in style. They show as much
spatial multiplicity as the examples we gave by Klee,
Matisse and Braque. Each contains three principal spatial
planes, smashed up against each other near the picture sur-
face. Within each of these three spatial planes, the forms
are made up of the smaller planes, sides or aspects of a
single figure flattened rather than modelled, of cubism.

These examples of Leger and Gris are included to
show the way in which "basic shapes" are varied and over-
lapped in a design which is not quite, though very nearly
abstract. The comparison is to examples of polytonality
and polyrhythms which are almost, but not quite, atonal.
Juan Gris. *Fruit Bowl.* 1917.
In conclusion we find that the same techniques serve artists and composers throughout the century. As soon as tonality and perspective begin to decline, new means of organization must arise. In France, in the first two decades, there is a mid-stream approach to the oncoming abstraction and atonality. In Austro-Germany, abstraction and atonality are developed before 1920, and codified after that time. Since 1945, abstraction and atonality (twelve-tone) have become international phenomena, yet each nationality retains an instinctive link, formally and emotionally, with its own traditions. The variety within the currents of abstract art and twelve-tone music are manifold, as manifold as were the various representational and tonal styles of preceding periods.

Within this variety, we find recurring certain means of achieving unity and order. One of these, which was discussed first, was the tendency to cohere to a center, in crab canons, for example, or Picasso's "simultaneity" exposures. Another was the repetition through variation of a basic shape, which again, occurs in both French and Austro-German art, before and since 1920. The basic shape may be manipulated by color change, superposition, alternation, etc. It may mean the superposition of various versions of the twelve-tone and/or rhythmic series, or the superposition of spatial planes, keys and metres.
Let us look at just one more example of superposition and montage in modern art before we close this chapter. It is the montage particular to a media, that of the film, just as it is also particular to the medium of electronic or tape recorder music. In the film, however, we do not have an abstract art comparable to the serialism of the electronic composers. (The rare exceptions, by Hans Richter, are not available and seldom seen.) Thus the formal result, the picture, in the following example from the film Potemkin, is closer to polytonal than to twelve-tone examples, while the technique by which it is achieved is akin to that of electronic music. Hauser describes the picture resulting from montage:

The revolutionary quality of this montage technique consisted... in the speed and rhythm of the change of shots and in the extension of the boundaries of the cinematically feasible... that it was no longer the phenomena of a homogenous world of objects, but of quite heterogeneous elements of reality, that were brought face to face. Thus Eisenstein showed the following sequence in The Battleship Potemkin: men working desperately, engine-room of the cruiser; busy hands, revolving wheels; faces distorted with exertion, maximum pressure of the manometer; a chest soaked with perspiration, a glowing boiler; an arm, a wheel; a wheel, an arm; machine, man; machine, man; machine, man.

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APPENDIX

A FEW RELATED MOVEMENTS IN MODERN MUSIC AND ART

It is, of course, impossible to give a summary of all of the related movements in the twentieth century, or even to thoroughly appraise those we mention here. The function of this chapter is to draw together some relationships that have been spread out over several chapters, and to fill in a few of the most conspicuous gaps. Our discussion of these few related movements must be of the most general variety, with little or no illustration. It should be understood that, for multiple reasons, there is not always a large movement in music to coincide with a large movement in art. A national imagination may lean toward music, or toward art, and neglect the other. A movement in art, may have stronger comparisons with literature than with music, as is the case with Surrealism. The purpose of this paper is not to invent movements and comparisons but to point out those that exist. One of the major reasons for differences between music and art of a particular time and place, may be the role played by the individual composer or artist. The great composer, the great artist, is to some extent beyond comparison with any other. He transcends the boundaries of nation, time and style, at the same
time that he works within these boundaries. He creates something never created before. One cannot account for the incidence of genius. He may spring up, like Prometheus, from the most unpromising ground. There may be a single composer or artist who towers over his contemporaries working in a compatible style with his own. Or there may be a very fecund movement that produces no geniuses, yet has many adherents. It is for reasons such as these that we find no Hungarian artist to compare with Bartok, although Bartok is the most indigenous of composers. Likewise, we refrain, for the most part, from comparing a single composer with a single artist. Is Stravinsky like Picasso or like Matisse? The answer is both and neither. For all the similarities we may find between artists and composers engrossed in parallel movements, there will always be differences due to the differences between a medium's, and also an individual creator's, capacity for expression. For these reasons, this paper has concentrated on devices, techniques, trends, that, in the larger light offered by history, seem to be comparable and related. For these reasons also, the discussion of related movements will be limited to a few generalities and comparisons only.
I. EXPRESSIONISM: A BRIEF REVIEW

In Chapters V and VII, we discussed the Expressionistic use of color; and of instrumentation and dissonance. In Chapter VIII, we discussed the subject matter of Expressionism, as it is found in representational art and music with a text. In all of these instances, there was a common tendency, which we will call the "Expressionistic attitude."

The Expressionistic attitude is one of almost hysterical emotion. The desire to express unnatural degrees of feeling caused the intensification of color, and the distortions of form and tonality. At the same time, Expressionism, perhaps because it was strongly based on the humanistic values of the past four hundred years, and partly because of its roots in the late nineteenth century art of Van Gogh and a few others (Ensor, Munch, Gaugin) who lived into the beginning of the twentieth century, clung stolidly to representation and tonality. Subject-matter was too important to Expressionism for it to be very quickly abandoned by the artist of Die Brucke group especially. Their work corresponds to works in the tonal, Expressionist style, in this century, by Mahler, Strauss and some of Bartok and early Schonberg. It was influenced by primitive art, folk art, medieval art; and by jazz (see later discussion), folk music and shows
occasional similarities to medieval music.

The hysteria of Austro-German composers and artists reaches a peak at the outset of the First World War. After the war, which crushed the last hopes for humanity, there is the Expressionists' version of Neo-Classicism. Extreme subjectivity turns itself inside out and becomes extreme objectivity. The intensity of the Expressionistic attitude remains, however. The period between the wars is a period of "Social Realism" and of clear-lined counterpoint.

While many Expressionists continued along the lines of representation and tonality, the complete break with perspective and tonal systems was also made by Expressionists. Kandinsky paints the first abstract painting long before 1920, and Schonberg, contemporary with Kandinsky, writes the first atonal music. The works of Kandinsky and Schonberg still are inspired by the "Expressionistic attitude," however. Their works are impressively emotional and dynamic in character. Their break with realism and tonality is perhaps due to an excess of emotion, which can no longer confine itself within bounds. They are very much pained by the world situation, and the decline of human values (as were the Expressionists mentioned earlier, of Die Brucke, Mahler, etc.) and can no longer find beauty in it worth portraying. They seek emotional and spiritual fulfillment of a new
order, as can be seen immediately in the writings of both Kandinsky and Schonberg.

In the 1920's, contemporary with the Social Realism of Grosz and Dix, the practical innovations of the Bauhaus, the jazz operas of Weill, and the neo-classical counterpoint and Gebrauchsmusik of Hindemith, there is a new constructivist tendency. Those who broke with past traditions, i.e. the abstract and atonal Expressionists, Kandinsky and Schonberg, attempt to create a new order. With Schonberg, this results in the twelve-tone system. With Kandinsky, it results in a geometric style.

Berg freely uses Schonberg's twelve-tone system in combination with tonal and atonal features, in his very Expressionistic operas, Wozzeck and Lulu, and the very moving Violin Concerto. Klee, who was associated with Kandinsky at Der blaue Reiter group in Munich, and again at the Bauhaus, is also primarily concerned with emotional and spiritual expression. Klee has a "constructivist" phase in his "magic square" series, some of which are abstract, and some of which are a fusion between abstraction and representation.

The "constructivist" tendency nearly replaces the "Expressionistic attitude" in the twelve-tone music of Webern. One is reminded of the Neo-plasticism of Mondrian, the Suprematism of Malevich and the Constructivism of Gabo,
but also of the late works of Kandinsky.

After World War II, abstract art and twelve-tone music become international and dominate all other tendencies. World War II had completely stopped all creative production in Austria and Germany, by force. Communication also was stopped, and new artists and composers had no instruction in the new techniques until after the war, and then they found it, most often, outside of their country.

Music and art since 1945 in Austria and Germany seem to embody neither the "constructivist" nor the Expressionistic extremes. Individuals lean toward one extreme or the other, as it suits them.
II. FRENCH ART - A BRIEF REVIEW

The situation in France at the turn of the century was entirely different from that in Austria and Germany. France had had a tremendous artistic and musical flowering in Impressionism, whereas in Germany and Austria, the visual arts had lagged far behind the musical, in the late nineteenth century. Impressionism was the last movement in that great cycle of humanism, tonality and spatial realism, and the forerunner of the new trends. Impressionism continued to find a limited following well into the twentieth century. Its influence can be traced in impressionistic passages in the music of Ravel, Satie, early Stravinsky and Honegger, and in the painting of Bonnard, early Picasso, early Matisse and all of Les Fauves.

The resurgence of line and melody seemed to destroy Impressionism. The confining of a single color to a single form seemed directly opposite to the delicate shimmer and change of pure color, of Impressionism.

Certain techniques seemed more popular in France than anywhere else; polytonality, polyrhythms, and spatial multiplicity; all-over patterns and a rhythmic counterpoint of ostinatos; primitivism; constant modulation and Cubism; flat filled-in areas with clear contours, linear strips and chordal melodies; and were especially prominent in works of Stravinsky, Milhaud, Honegger,
Messiaen, Matisse, Picasso, Derain, Braque, and others.

The French attitude was less emotionalistic than that of the Expressionists, and more concerned with art for art's sake. Music was concerned with dancing, entertainment or the ballet; Matisse painted his Joie de la Vie, and Dance, and Picasso played with the forms of innumerable still lifes. The attitude was not particularly humanistic either, since the forms of figures seemed to be more important than their personality and activity; Cezanne's Bathers already showed an abstract attitude. Primitivism broke out full blast in Paris before all the world, in Les Fauves and in Stravinsky's Rite of Spring and in Picasso's Les Demoiselles d'Avignon, but the tremendous, almost barbaric vitality and dynamism which shocked the world still had little to do with an "Expressionistic attitude." Primitivism in France was more abstract, less literary, than Expressionism and very shocking in its rejection of tonal and spatial realistic values. Still, the observer looking back on 1910 from 1960, would say that the French attitude, even when primitivistic and revolutionary, was compatible with a love of beauty and pleasure and formal order. One remembers the serenity and burning, pleasurable glow of that first primitivist, Gaugin.

Rather than distort form or tonality, the French analyzed and rationalized their deviations. Milhaud's
polytonality is as systematic and intellectually-pre-determined as is Cubism. There was no special movement in music to correspond to Cubism, except the frequent modulations and changes of metre of so many modern composers.

Neo-classicism of the 1920's was a particularly French movement, as we shall see later, and was particularly strong in the works of Picasso and Stravinsky. Both Picasso and Stravinsky, who had been revolutionary and primitivistic before 1920, were berated by their critics for turning away from their own, very creative innovations, to a style that showed influences of traditional music and art of the eighteenth century, especially. In these fusions of classical and modern, they created works of great beauty fully worthy of their genius. Great music and art must not fall victim to a public's pressure for novelty. However, although both continued to create fine works, neither one resumed his leadership as an innovator. Their reputation of today as revolutionaries rests on their work before 1920. One must not forget, all the same, that for the general public, the break with tonality, metred rhythm, human representation and spatial realism was accomplished almost single-handedly by these two figures, who were far better known and acknowledged at the time than were the abstract, atonal Expressionists, Schonberg and Kandinsky.

Curiously enough, just as the Expressionistic attitude began to decline in the Germanic countries, and
be replaced by a more constructivist, or geometric approach, it began to become more intense in France. Surrealism, which portrays the world of dreams and nightmares in weird juxtapositions and unrealistic combinations of realistically-detailed objects and figures, is certainly emotionalistic and subjective in the same sense as is Expressionism. The distortions of Picasso become Surrealistic (or Expressionistic), and display a certain nausea and disgust at the real world and its humanity not seen before in France. The horror of war is best expressed by Picasso's *Guernica*, his figures become Freudian, and the dream worlds of Dali, Masson and Tanguy seem to say that it is the real world that is a bad dream, and a dirty trick that has been played on the conscious mind. It is difficult to find any musical affinity with the Surrealistic aesthetic. Two examples come to mind. One is Satie's *Parade*, with its costumes by Picasso. Satie has written pleasant, gentle entertainment music for the ballet, but it is almost suppressed by the intrusion of all manner of natural noises, typewriters, machines, whistles, etc. (in the manner of collage). It was the idea of Cocteau to include these extraneous noises. The costumes by Picasso include the normal ballerina attire for the "dancers," but the costumes for the "managers" (who take part in the ballet) are phantasmagoric constructions, unreal, almost Cubistic, and which raise the size of the "managers" to superhuman
The second example is by Poulenc. David Drew makes much of Poulenc's tendency to juxtapose incongruous elements and incompatible styles. The two most successful works of Poulenc are his settings of surrealist poems of Edward James, _Secheresses_ (1956) and his opera bouffe, _Les Mamelles de Tiresias_ (1944), inspired by Cocteau's _Le Coq et L'Arlequin_.

Since 1945, the dominant trends in French music and art have been abstract and twelve-tone compositions. These show a resurgence of the Impressionist brushstroke, play of textures, variety and purity of color, in painting; and unusual, vibrant and reverberating, colorful but delicate instrumentation in many cases. In painting, the adherents of the rich texture and color-variety of Impressionism are the "Tachistes." The Tachistes are "action-painters" in the same sense as Jackson Pollock, and have carried on the subjectivism, and automatism of the Surrealist theories. The main differences between Tachism and abstract Surrealism (comparable to abstract Expressionism) are the "spotting" or dabbing brushstroke and colorism (there is no contour) of the Tachiste fusion.

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2Ibid.
with Impressionism. Like the Tachistes, the composers of Musique Concrete, mainly Pierre Schaeffer and Pierre Henry, and Varese, compose free, emotionalistic explosions of unheard-of instrumental colors. The composers Pierre Boulez and Olivier Messiaen are more closely affiliated with the twelve-tone constructivism of Germany, and with serialized rhythms, but they too enjoy a beautiful colorism of new instrumental combinations, delicate as were the harp, flute and string sounds of Debussy, but new, such as the Ondes Martinot and the Vibraphone.

Like their contemporaries in Germany, Austria, Italy, and the United States, French composers and artists, while almost completely abstract and atonal or twelve-tone, do not conform to either the "constructivist" extreme or the "expressionist" or "surrealist" extreme. Some are at either extreme - others are in the middle.
III. PRIMITIVISM

The term "primitivism" refers specifically to Stravinsky's *Rite of Spring*, and certain works of Orff, Prokofieff and Bartok. "Primitivist" music is characterized by irregular, repeating rhythms, causing a volcanic rhythmic impetus and drive of great dynamism. The rhythmic asymmetry of the Russians, and of the Hungarian, Bartok, are in part derived from the folk dances of these countries, but the way in which these folk rhythms are combined is original to each composer. For example, Stravinsky will change the accents within a 4/4 metre from \(1 \ 2 \ 3 \ 4\), to \(1 \ 2 \ 3 \ 4\), back and forth, or he will change metres constantly, or he will combine ostinatos of repeating rhythm patterns. Orff uses a few unusual accents but his music is mostly primitivistic for its strong, repeating rhythmic accentuation. Prokofieff has used unusual, asymmetrical groupings with conventional 3/8 or 4/4 metre, (but repeats a single accentuation rather than changing it as does Stravinsky), such as a 3-3-2 grouping of the eight eighth notes to a bar, and dotted note variants of this grouping retaining the same asymmetrical accents; or five equal eighth notes within a 3/8 metre, etc.

The programme of *Rite of Spring* refers to a primitive Russian religious rite.

Constant syncopation is the major feature of modern jazz, and jazz has been a strong influence in other musical
examples that might be added to those defined as "primitivist." Jazz is our most important source of African rhythms, and like the Magyar rhythms of Bartok, the Andalusian rhythms of DeFalla, and the rhythmic modes of Indian music which have influenced Messiaen and Boulez, jazz rhythms have revitalized modern music and helped it to break with conformity to tradition. Stravinsky's Ragtime for Eleven Instruments, Ragtime section in L'Histoire du Soldat and the Ebony Concerto, Milhaud's Creation du Monde and Le Boeuf sur le Toit, Krenek's jazz opera, Jonny Spielt Auf and Kurt Weill's The Three-Penny Opera, and George Gershwin's Rhapsody in Blue, American in Paris and Concerto in F are the most successful examples of the jazz influence in contemporary music.

The influence of jazz includes, besides dynamic, displaced rhythmic accents, the influence of the small jazz ensemble with the large percussion department.

Primitivism in modern art refers to the influence of African and pre-historic Iberian sculpture particularly in Picasso's Les Demoiselles d'Avignon, and works of Picasso, Modigliani and the German Expressionists, Kirchner, Heckel and Schmidt-Rotluff. The influence is mainly in the area of distortion, simplification and conventionalization in an expressive or aesthetic manner, of representations of figures and natural objects. Since African art is mainly sculpture of wood or stone, in black or greys or
Picasso. Les Demoiselles d'Avignon.
Matisse. Egyptian Curtain.
browns, we do not think of this influence as being coloristic. Because of the link with past cultures of Africa, the author tends to associate this influence with the influence of jazz in music, rather than the examples which are first and foremost known as "primitivistic."

The influence of Moroccan and Algerian textiles in Matisse's all-over patterns, which have an Eastern tendency toward dynamic and hypnotic repetition, seems closer to the rhythmic repetitiousness and dynamism and irregularity of pattern of Stravinsky, Prokofieff and Bartok. We have no Hungarian comparison, but Hungarian peasant costumes are characterized by these dynamic all-over patterns, as are those of Russia also. We noted that the source of primitivist rhythms in these musicians seemed to be the native art of their homelands, Russia and Hungary, both countries bordering on Eastern lands.
IV. UTILITARIANISM

The two movements of the 1920's of Gebrauchsmusik and the Bauhaus have made attempts, in music and fine arts respectively, to close the twentieth century gap between the artist and his public. Hindemith initiated Gebrauchsmusik, as music that could be sung and played by amateurs, such as his cantata for schoolchildren, Let Us Build a City, and his educational music for instrumental ensembles, opus 44, including Nine Pieces in First Position for Violin Choir, Eight Canons in First Position for Violin Choir, Eight Pieces in First Position for String Choir, and Five Pieces in First Position for String Orchestra - pieces of progressive difficulty. Music for beginners, amateurs has been written by Stravinsky (Eight Pieces Faciles) and Bartok (Mikrocosmos). Strictly for the education of children are Prokofiev's Peter and the Wolf and Benjamin Britten's Young Person's Guide to the Orchestra. In the 1920's Kurt Weill (Three-Penny Opera) and Ernst Krenek (Jonny Spielt Auf) reverted to musical comedy-jazz styles, in hopes of meeting the average public on its own grounds.

Film background music was another branch of Gebrauchsmusik, classical music simplified and romanticised to suit the average public. The interest in writing good, rather than mediocre, music for films which are consumed
by the uncultivated majority as well as the artistically appreciative minority, has been most successfully utilized by the Russians, with Prokofiev's music for *Lieutenant Kije* and *Alexander Nevsky*. These are, however, still considered "art films" by Americans.

In *Notes Without Music*, Milhaud speaks of Satie's prophetic attempt at Gebrauchsmusik. Satie had thought of adding to the intermission of a musical program, ritornellos or background music, "Musique d'ameublement," music not to be listened to but constituting a room's atmosphere in the same manner as its decor, and varying with each room. Unfortunately, music is not a functional article as are the pieces of furniture that constitute decor. When clarinets were posted in three different corners of the theatre, a pianist in a fourth, and a trombone in a box on the balcony, people streamed back to their seats to listen - the effect was spoiled. Milhaud says,

In any case, the future was to prove that Satie was right: nowadays, children and housewives fill their homes with unheeded music, reading and working to the sound of the radio. And in all public places, large stores and restaurants the customers are drenched in an unending flood of music. In America cafeterias are equipped with a sufficient number of machines for each client to be able, for the modest sum of five cents, to furnish his own solitude with music or

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supply a background for his conversation with his guest. Is this not 'musique d'ameublement,' heard, but not listened to?

Unfortunately, music so cheaply provided is generally cheap music, and the fact that it is heard without being listened to (by osmosis perhaps) is hardly to be desired. There is no doubt, however, that radio and the phonograph, productions of the modern machine age, have provided more and more people with more and more music, and at less expense and effort than ever before, and these new mechanisms are potentially culturally very profitable. In America, at least, money-hungry business-mongers have pushed the music market to a new all-time high, and music, very good and very bad music both, now reaches the masses whereas, in past periods of musical culture, it reached just the privileged few. But the proponents of Gebrauchsmusik in America have hardly been able to combat the commercialism of the popular music record-makers with their well-paid and packaged disc-jockeys, and the market for music of quality, live or recorded, is extremely limited by comparison, in the United States at least. All the same, there is no denying the advantage of democracy in music, made possible by reasonable prices on concert admission, by radio, particularly FM radio, by TV and the phonograph. Good music is available to the masses.

The basic tenet behind Gebrauchsmusik was not the availability of good music, but its popularity which seems
to have declined in the twentieth century. Modern music, in particular, is distinctly unpopular (even among cultivated people) in our century. Hindemith and his followers attempted to make better musicians of the average person by educational music. Was the attempt successful? Hardly. One of the reasons it was not, was that "easy" music, easy to listen to as well as easy to play, is seldom good music. It is not much better than popular music. It has few converts.

Utilitarianism in the visual arts has been much more successful than Gebrauchsmusik. Modern architecture is an eminently functional art, lacking the allotments for superfluous decoration of other periods, but creating exquisite, simple, sculptural buildings wherein the spatial planning depends on the uses of its dwellers. Industry has developed new building needs of great variety, and also has developed new techniques of building that have added greatly to the formal possibilities of architecture.

The great forerunner of utilitarian, visual arts was the Bauhaus, headed by Walter Gropius, in Weimar after World War I, and later moving to Dessau. Attracting top-ranking artists from all over Germany, Austria, Switzerland, Russia, and Holland, and concentrating on applied aesthetics, the Bauhaus experiments in industrial design, typography and poster art, architecture, etc., have revolutionized contemporary design in furniture, fabrics, eating utensils
and advertising art, not only stylistically, but also by raising their standards of aesthetic quality. The experiments of the Bauhaus have been lasting, and accepted by the average man everywhere throughout the world.

V. CHANCE AND DADA; AUTOMATISM

A very short-lived movement in art history was that of "Dada." Dada was a nihilistic movement which, discouraged by World War I and the complete disintegration of human representation, professed an anti-art. In Dada, anything could be art and was - a machine, a plumbing fixture, a broken piece of glass. In the Dada exhibition in Paris in 1920, Duchamp showed a version of the Mona Lisa with a mustache and labelled LHOOQ. Obviously such an artistic tendency came to a dead end and could no longer continue. Its most lasting examples were the "rubbish pictures" or "Merzbilder" of Kurt Schwitters, which are fine examples of collage. By 1922, Dada gave way to Surrealism, which likewise manifested the futility of conscious painting, but which gave precedence to the subconscious. Surrealism professed an automatic process of artistic production, but the result was the "dream pictures" of Dali and Ernst.

Later on in the century, "automatism" became the inspiration of several schools of abstract art, "action painting" in

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New York (Pollock), Tachisme in Paris (Riopelle and Bryen), and in Germany (Schultze, Gaul, Hoehme). Thus what began as a completely nihilistic rejection of any aesthetic philosophy of beauty (Dada) evolved into a subjectivist attitude (Surrealism, Action Painting, Tachisme) which has borne fruit.

Anyone at all aware of the techniques of musical organization would assume immediately that music could not be submitted to the laws of chance. On the other hand, what makes a composer choose one melody rather than another, if it is not the choice of his intuition and his subconscious mind? The content of music is and has always been preeminently subjective.

One composer, a Zen Buddhist by philosophy, has attempted to submit musical organization to the rule of chance. Just as a Dadaist might drop a string to the floor, and trace its pattern and call it a painting, so John Cage might drop a string to the floor, trace its pattern and call it a melody. Cage will notate only the pitch, and not the durations of a composition, leaving the matter of rhythm entirely to the performer. In his *Music for Piano 21-52*, he tossed a coin eight times to determine whether to use bass or treble clefs on the eight staves.\(^5\) Cage frequently

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depends on an ancient Chinese book, *I Ching*, for his method of throwing coins or marked sticks, like our use of dice. He sometimes suggest that the performer drop the pages on the floor and perform them in any order in which they may fall.

Feldman, Brown and Wolff also compose "by chance."

VI. NEO-CLASSICISM

Neo-classicism in a confusing term with many meanings. In its first meaning it has referred to the recurrence of elements of ancient Greek art. There are endless examples of Grecian source material as subject matter in music and art of the 1920's. Picasso and Matisse paint nymphs, satyrs, shepherds and muses. Stravinsky uses Greek myth and drama in *Oedipus Rex* and *Apollon Musagettes*. Honegger writes *Antigone* and Milhaud an operatic trilogy based on the Orestes cycle. Strauss' *Ariadne* must be included. But this is only subject matter and not form. The technique of artistic and musical expressions bears unmistakably a twentieth century idiom. Furthermore, these Grecian elements have served as subject matter for art, from the early days of Christianity through the middle ages in symbolism, philosophy, and chant, in the Renaissance and the Baroque era both, and again the

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nineteenth century particularly in the poetry of Keats. There has been an opera based on the story of Orpheus and Eurydice in every century since opera began. In other words, the Greeks have always been with us, although one admits there is a certain resurgence and concentration of Greek subject matter in the 1920's.

As for Grecian style, we have no knowledge of Greek music, so it is not a musical influence. Grecian style of line, especially as seen in vase-painting, and the Grecian emphasis on sculptural volume is prominent as a stylistic influence in the work of Picasso of the 1920's. Picasso is not simply imitating the Greeks. His style is still individual, but with this influence.

Certain qualities, such as serenity, repose, symmetry, simplicity, balance, order, transparency, are present both in Grecian art and in neo-classic art. These qualities make themselves felt whenever there is a synthesis of style, a summation of its evolution. We have a classic period in every style. Bach and Mozart are both classic, albeit very different from each other, the one being a "baroque" master and the other a "classical" (that word again!) composer. The influence of these eighteenth century musical styles, rather than the Greek, is the strong influence in music of the 1920's, replacing that of Grecian vase-painting and sculpture, and the line of the neo-classic 18th century Ingres, in the visual arts.
The eighteenth century musical styles were considered "classical" phases, and have nothing to do with classicism, or with the rococo character of some eighteenth century painting.

The influence of Bach came naturally in an era already tending toward the dominance of melody and counterpoint, chamber ensemble, and the contrapuntal forms of canon, fugue, and passacaglia. The "Back to Bach" movement embraced Hindemith, Busoni and to a lesser extent, Stravinsky. All these composers, and Honegger as well, wrote "dissonant counterpoint" in the 1920's, as did Schonberg.

The influence of Mozart is more evident in sonata, rondo and variation forms which appear in the 1920's in works by the atonalists and twelve-tone composers, as well as the French. While one would question the description of these twentieth century examples as being authentic eighteenth century, Mozartian forms, still the use of clearly-separated movements or sections was a basic feature of the 1920's. Important instances are Stravinsky's Octet for Wind Instruments, and Berg's organization of the opera, Wozzeck. The eighteenth century opera buffa is reflected in Stravinsky's Mavra, and the Rake's Progress, in Strauss' Der Rosenkavalier and in the inserted operetta in Ariadne auf Naxos by Strauss.

The following examples of neo-classicism show
influences of the eighteenth century in the 1920's. The first is by Picasso, exemplifying the cry of "Back to Ingres" in subject matter, in delicate monochrome, and in its exquisite solo line. The next example is taken from Zerbinetta's aria in Strauss' Ariadne. It recalls the virtuosity of the eighteenth century singer, with its fantastic coloratura. Here again, it is the solo line that is important. We see in Ariadne (dominance of high voices), in Stravinsky's Octet (dominance of wind instruments), both with their high white sounds, a parallel to the "whiteness" of Picasso's Three Graces.

There is a brief recurrence of such traditional means of organization as tonality and spatial realism in the 1920's. The preceding examples by Picasso and Strauss are relatively realistic and tonal for the twentieth century.

The 1920's is also "classic" in that this is a period of synthesis of the radical experimentations of the first twenty years of our century. Advances are codified and masterpieces made of them. The results of cubism are summed up in Picasso's Three Musicians and atonality finds a new order and synthesis in twelve-tone method of composition.
Strauss. Ariadne auf Naxos (Aria of Zerbinetta).
VII. NEW MEDIA

It seems very suitable to conclude this comparison of Related Trends in Music and Painting of the Twentieth Century, with a description of some of the new media that perhaps will determine the art of the future.

The intrusion of things into art is an attribute of collage, which makes art out of bits of newspaper, cardboard, sand, string, etc. Things or noise-makers were introduced into Satie's Parade which included a dynamo, a siren, a telegraph key, an airplane propeller and typewriters. Max Brand's opera, Machinist Hopkins, contains a "chorus of the machines," and Hindemith's Neues vom Tage includes a chorus of stenographers singing to the rhythmic accompaniment of clacking typewriters.

The odd textures and sounds of "things" alien to art and music of the past, which seems a topical joke in the examples above, eventually enriches the twentieth century. In the examples that follow the collage by Picasso and the semi-collage of "combine-painting" by R. Rauschenberg, this can be seen. Burri's Composition, done in 1953, is oil with gold on canvas and burlap. Mallary's, done in 1959, uses composition stone in a resin base. The second example by Mallary is wood, polyester resin, paint, and sand on plywood. Stankiewicz's Panel of 1955 is constructed of iron and steel. We remember
Picasso. Still Life with Chair Caning. 1911.
Burri. Composition. 1953.
the constructivist sculptures in metals and celluloids of Gabo and Pevsner.

The machine age has contributed other new possibilities, in the form of photograph, photogram and films. An art of light has been attempted by Thomas Whitford and Moholy-Nagy.

Contributions to the music world by the machine age have included the media of electronic, tape recorder and concrete musical composition.

The electronic music studio usually uses only the pure sinus tone of the electronic sound generators, such as audio-oscillators, noise generators, pulse generators, etc. The electronic music studios at Cologne and Milan have been the most restrictive in their materials, and have recently rejected two sound-generators previously invented by them, such as the Monochord and the Trautonium.

The Cologne group dismisses such non-electric sound materials as are used in Musique Concrete and Tape Music as 'uncontrollable sounds, which belong to the accoustical but not to the musical domain.' The logic which this group employs to distinguish 'controllable' from 'uncontrollable' is the logic of the total serial organization of every structural element in a composition, which makes it mandatory to be able to describe the timbre and the dynamic, intervallic and positional aspect of every sound or sound combination.


8Ibid.
The Cologne group, led by Stockhausen, composes its own instrumental "colors" or timbres, made up of "note-mixtures."

The composers of Musique Concrete, such as Varese, Schaeffer, Henry, and Ferrari, do not restrict themselves to the "pure sound" of the electronic generator or the electronically devised "colored noise" of the Cologne Studio led by Eimert and Stockhausen. The composers of Musique Concrete use all the electronic instruments of the Cologne studio, and then some. Along with tape-recorded sounds, several machines such as the Phonogene, the Machine à Trois Pises and the Morphophone, have been built for variety of timbres. Musique Concrete is characterized by greater compositional as well as instrumental freedom, in contrast to the restrictiveness of the Stockhausen studio at Cologne.

In America, Ussachevsky and Luening, have composed works using the tape recorder as their medium, in terms of manipulation of recorded sounds and as a "solo instrument" with orchestra.

What will be the end result of all of this? Who can say? Certainly a new art is about to be, and it may or may not be based on what has already come about in this century. This is still an experimental period. All of the examples from the visual arts, in this chapter, were individual experiments. Composers in Musique Concrete,
Electronic Music and Tape-Recorder Music are all still experimenting. They are the first to recognize that even the capacities of their media are not yet established, and are still being discovered and transformed. Before what has been twentieth century music and art can settle down into a continuous style, more experimentation will have to intervene, particularly in the area of the media itself.