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Twelve-Tone and Serial Composition

Composition with Twelve Tones

Perhaps no person in this anthology has exerted more influence on modern musical culture than **Arnold Schoenberg** (1874–1951). As a young man, he met the leading musicians in Vienna, including Alexander Zemlinsky, Gustav Mahler, and Fritz Kreisler. A lifelong teacher, he attracted many composition students in Vienna, Berlin, and the United States. In the 1920s Schoenberg, together with his students Alban Berg and Anton Webern, formed the nucleus of the so-called Second Viennese School. Following his dismissal from the Prussian Academy of Arts in Berlin (1933), he emigrated to the United States, where he first taught at the Malkin Conservatory in Boston and the University of Southern California. In 1936 he accepted a position at the University of California at Los Angeles. His major writings include textbooks for theory and composition, some published posthumously: *Harmonielehre* (1911), *Models for Beginners in Composition* (1942), *Structural Functions of Harmony* (1954), *Preliminary Exercises in Counterpoint* (1963), and *Fundamentals of Musical Composition* (1967).

“Composition with Twelve Tones” was delivered as a lecture in 1941 and published in Schoenberg’s collected writings *Style and Idea* (1950/1975). Here he reflects on the principles of his profoundly influential method of composing with twelve tones that are related to one another through their respective positions in an ordered series. Using excerpts from his *Kammersymphonie* (1906), *Wind Quintet* (1923–24), *Suite* for piano (1923), and *Variations for Orchestra* (1926–28), Schoenberg illustrates the concepts that fundamentally shaped his compositional approach: form and comprehensibility, tonality, extended tonality, the emancipation of the dissonance, the historical necessity of his twelve-tone method, and the unity of musical space. Although he developed a radically new compositional method, Schoenberg rejected the notion that his music was revolutionary.

I

To understand the very nature of creation one must acknowledge that there was no light before the Lord said: “Let there be Light.” And since there was not yet

light, the Lord's omniscience embraced a vision of it which only His omnipotence could call forth.

We poor human beings, when we refer to one of the better minds among us as a creator, should never forget what a creator is in reality.

A creator has a vision of something which has not existed before this vision.

And a creator has the power to bring his vision to life, the power to realize it.

In fact, the concept of creator and creation should be formed in harmony with the Divine Model; inspiration and perfection, wish and fulfillment, will and accomplishment coincide spontaneously and simultaneously. In Divine Creation there were no details to be carried out later; "There was Light" at once and in its ultimate perfection.

Alas, human creators, if they be granted a vision, must travel the long path between vision and accomplishment; a hard road where, driven out of Paradise, even geniuses must reap their harvest in the sweat of their brows.

Alas, it is one thing to envision in a creative instant of inspiration and it is another thing to materialize one's vision by painstakingly connecting details until they fuse into a kind of organism.

And alas, suppose it becomes an organism, a homunculus or a robot, and possesses some of the spontaneity of a vision; it remains yet another thing to organize this form so that it becomes a comprehensible message "to whom it may concern."

II

Form in the arts, and especially in music, aims primarily at comprehensibility. The relaxation which a satisfied listener experiences when he can follow an idea, its development, and the reasons for such development is closely related, psychologically speaking, to a feeling of beauty. Thus, artistic value demands comprehensibility, not only for intellectual, but also for emotional satisfaction. However, the creator's *idea* has to be presented, whatever the *mood* he is impelled to evoke.

Composition with twelve tones has no other aim than comprehensibility. In view of certain events in recent musical history, this might seem astonishing, for works written in this style have failed to gain understanding in spite of the new medium of organization. Thus, should one forget that contemporaries are not final judges, but are generally overruled by history, one might consider this method doomed. But, though it seems to increase the listener's difficulties, it compensates for this deficiency by penalizing the composer. For composing thus does not become easier, but rather ten times more difficult. Only the better-prepared composer can compose for the better-prepared music lover.

III

The method of composing with twelve tones grew out of a necessity.

In the last hundred years, the concept of harmony has changed tremendously through the development of chromaticism. The idea that one basic tone, the

root, dominated the construction of chords and regulated their succession—the concept of *tonality*—had to develop first into the concept of *extended tonality*. Very soon it became doubtful whether such a root still remained the center to which every harmony and harmonic succession must be referred. Furthermore, it became doubtful whether a tonic appearing at the beginning, at the end, or at any other point really had a constructive meaning. Richard Wagner's harmony had promoted a change in the logic and constructive power of harmony. One of its consequences was the so-called *impressionistic* use of harmonies, especially practiced by Debussy. His harmonies, without constructive meaning, often served the coloristic purpose of expressing moods and pictures. Moods and pictures, though extra-musical, thus became constructive elements, incorporated in the musical functions; they produced a sort of emotional comprehensibility. In this way, tonality was already dethroned in practice, if not in theory. This alone would perhaps not have caused a radical change in compositional technique. However, such a change became necessary when there occurred simultaneously a development which ended in what I call the *emancipation of the dissonance*.

The ear had gradually become acquainted with a great number of dissonances, and so had lost the fear of their "sense-interrupting" effect. One no longer expected preparations of Wagner's dissonances or resolutions of Strauss' discords; one was not disturbed by Debussy's non-functional harmonies, or by the harsh counterpoint of later composers. This state of affairs led to a freer use of dissonances comparable to classic composers' treatment of diminished seventh chords, which could precede and follow any other harmony, consonant or dissonant, as if there were no dissonance at all.

What distinguishes dissonances from consonances is not a greater or lesser degree of beauty, but a greater or lesser degree of *comprehensibility*. In my *Harmonielehre* I presented the theory that dissonant tones appear later among the overtones, for which reason the ear is less intimately acquainted with them. This phenomenon does not justify such sharply contradictory terms as *concord* and *discord*. Closer acquaintance with the more remote consonances—the dissonances, that is—gradually eliminated the difficulty of comprehension and finally admitted not only the emancipation of dominant and other seventh chords, diminished sevenths and augmented triads, but also the emancipation of Wagner's, Strauss', Moussorgsky's, Debussy's, Mahler's, Puccini's, and Reger's more remote dissonances.

The term *emancipation of the dissonance* refers to its comprehensibility, which is considered equivalent to the consonance's comprehensibility. A style based on this premise treats dissonances like consonances and renounces a tonal center. By avoiding the establishment of a key, modulation is excluded, since modulation means leaving an established tonality and establishing *another* tonality.

The first compositions in this new style were written by me around 1908 and, soon afterwards, by my pupils, Anton von Webern and Alban Berg. From the very beginning such compositions differed from all preceding music, not only harmonically but also melodically, thematically, and motivally. But the foremost

characteristics of these pieces *in statu nascendi* were their extreme expressiveness and their extraordinary brevity. At that time, neither I nor my pupils were conscious of the reasons for these features. Later I discovered that our sense of form was right when it forced us to counterbalance extreme emotionality with extraordinary shortness. Thus, subconsciously, consequences were drawn from an innovation which, like every innovation, destroys while it produces. New colorful harmony was offered; but much was lost.

Formerly the harmony had served not only as a source of beauty, but, more important, as a means of distinguishing the features of the form. For instance, only a consonance was considered suitable for an ending. Establishing functions demanded different successions of harmonies than roving functions; a bridge, a transition, demanded other successions than a codetta; harmonic variation could be executed intelligently and logically only with due consideration of the fundamental meaning of the harmonies. Fulfillment of all these functions—comparable to the effect of punctuation in the construction of sentences, of subdivision into paragraphs, and of fusion into chapters—could scarcely be assured with chords whose constructive values had not as yet been explored. Hence, it seemed at first impossible to compose pieces of complicated organization or of great length.

A little later I discovered how to construct larger forms by following a text or a poem. The differences in size and shape of its parts and the change in character and mood were mirrored in the shape and size of the composition, in its dynamics and tempo, figuration and accentuation, instrumentation and orchestration. Thus the parts were differentiated as clearly as they had formerly been by the tonal and structural functions of harmony.

IV

Formerly the use of the fundamental harmony had been theoretically regulated through recognition of the effects of root progressions. This practice had grown into a subconsciously functioning *sense of form* which gave a real composer an almost somnambulistic sense of security in creating, with utmost precision, the most delicate distinctions of formal elements.

Whether one calls oneself conservative or revolutionary, whether one composes in a conventional or progressive manner, whether one tries to imitate old styles or is destined to express new ideas—whether one is a good composer or not—one must be convinced of the infallibility of one's own fantasy and one must believe in one's own inspiration. Nevertheless, the desire for a conscious control of the new means and forms will arise in every artist's mind; and he will wish to know *consciously* the laws and rules which govern the forms which he has conceived "as in a dream." Strongly convincing as this dream may have been, the conviction that these new sounds obey the laws of nature and of our manner of thinking—the conviction that order, logic, comprehensibility and form cannot be present without obedience to such laws—forces the composer along the road

of exploration. He must find, if not laws or rules, at least ways to justify the dissonant character of these harmonies and their successions.

V

After many unsuccessful attempts during a period of approximately twelve years, I laid the foundations for a new procedure in musical construction which seemed fitted to replace those structural differentiations provided formerly by tonal harmonies.

I called this procedure *Method of Composing with Twelve Tones Which are Related Only with One Another*.

This method consists primarily of the constant and exclusive use of a set of twelve different tones. This means, of course, that no tone is repeated within the series and that it uses all twelve tones of the chromatic scale, though in a different order. It is in no way identical with the chromatic scale.¹



Example 1

Example 1 shows that such a basic set (BS) consists of various intervals. It should never be called a scale, although it is invented to substitute for some of the unifying and formative advantages of scale and tonality. The scale is the source of many figurations, parts of melodies and melodies themselves, ascending and descending passages, and even broken chords. In approximately the same manner the tones of the basic set produce similar elements. Of course, cadences produced by the distinction between principal and subsidiary harmonies will scarcely be derived from the basic set. But something different and more important is derived from it with a regularity comparable to the regularity and logic of the earlier harmony; the association of tones into harmonies and their successions is regulated (as will be shown later) by the order of these tones. The basic set functions in the manner of a motive. This explains why such a basic set has to be invented anew for every piece. It has to be the first creative thought. It

1. Curiously and wrongly, most people speak of the "system" of the chromatic scale. Mine is no system but only a method, which means a *modus* of applying regularly a preconceived formula. A *method can, but need not*, be one of the consequences of a system. I am also not the inventor of the chromatic scale; somebody else must have occupied himself with this task long ago.

does not make much difference whether or not the set appears in the composition at once like a theme or a melody, whether or not it is characterized as such by features of rhythm, phrasing, construction, character, etc.

Why such a set should consist of twelve different tones, why none of these tones should be repeated too soon, why, accordingly, only one set should be used in one composition—the answers to all these questions came to me gradually.

Discussing such problems in my *Harmonielehre* (1911), I recommended the avoidance of octave doublings.² To double is to emphasize, and an emphasized tone could be interpreted as a root, or even as a tonic; the consequences of such an interpretation must be avoided. Even a slight reminiscence of the former tonal harmony would be disturbing, because it would create false expectations of consequences and continuations. The use of a tonic is deceiving if it is not based on *all* the relationship of tonality.

The use of more than one set was excluded because in every following set one or more tones would have been repeated too soon. Again there would arise the danger of interpreting the repeated tone as a tonic. Besides, the effect of unity would be lessened.

Justified already by historical development, the method of composing with twelve tones is also not without esthetic and theoretical support. On the contrary, it is just this support which advances it from a mere technical device to the rank and importance of a scientific theory.

Music is not merely another kind of amusement, but a musical poet's, a musical thinker's representation of musical ideas; these musical ideas must correspond to the laws of human logic; they are a part of what man can apperceive, reason and express. Proceeding from these assumptions, I arrived at the following conclusions:

THE TWO-OR-MORE-DIMENSIONAL SPACE IN WHICH MUSICAL IDEAS ARE PRESENTED IS A UNIT. Though the elements of these ideas appear separate and independent to the eye and the ear, they reveal their true meaning only through their cooperation, even as no single word alone can express a thought without relation to other words. All that happens at any point of this musical space has more than a local effect. It functions not only in its own plane, but also in all other directions and planes, and is not without influence even at remote points. For instance, the effect of progressive rhythmical subdivision, through what I call "the tendency of the shortest notes" to multiply themselves, can be observed in every classic composition.

A musical idea, accordingly, though consisting of melody, rhythm, and harmony, is neither the one nor the other alone, but all three together. The elements of a musical idea are partly incorporated in the horizontal plane as successive sounds, and partly in the vertical plane as simultaneous sounds. The mutual relation of tones regulates the succession of intervals as well as their association into harmonies; the rhythm regulates the succession of tones as well as the succession

2. Still sometimes occurring in my first compositions in this style.

of harmonies and organizes phrasing. And this explains why, as will be shown later, a basic set of twelve tones (BS) can be used in either dimension, as a whole or in parts.

The basic set is used in diverse mirror forms. The composers of the last century had not employed such mirror forms as much as the masters of contrapuntal times; at least, they seldom did so consciously. Nevertheless, there exist examples, of which I want to mention only one from Beethoven's last String Quartet, Op. 135, in F major (Example 2).

The original form, *a*, "Muss es sein," appears in *b* inverted and in major; *c* shows the retrograde form of this inversion, which, now reinverted in *d* and filled out with passing notes in *e*, results in the second phrase of the main theme.

Whether or not this device was used consciously by Beethoven does not matter at all. From my own experience I know that it can also be a subconsciously received gift from the Supreme Commander.

The two principal themes of my *Kammersymphonie* (Chamber Symphony) can be seen in Example 3 under *a* and *b*. After I had completed the work I worried very much about the apparent absence of any relationship between the two themes. Directed only by my sense of form and the stream of ideas, I had not asked such questions while composing; but, as usual with me, doubts arose as soon as I had finished. They went so far that I had already raised the sword for the kill, taken the red pencil of the censor to cross out the theme *b*. Fortunately, I stood by my inspiration and ignored these mental tortures. About twenty years later I saw the true relationship. It is of such a complicated nature that I doubt whether any composer would have cared deliberately to construct a theme in this way; but our subconscious does it involuntarily. In *c* the true principal tones of the theme are marked, and *d* shows that all the intervals ascend. Their correct inversion *e* produces the first phrase *f* of the theme *b*.

It should be mentioned that the last century considered such a procedure cerebral, and thus inconsistent with the dignity of genius. The very fact that there exist classical examples proves the foolishness of such an opinion. But the validity of this form of thinking is also demonstrated by the previously stated law of the unity of musical space, best formulated as follows: *the unity of musical space demands an absolute and unitary perception*. In this space, as in Swedenborg's heaven (described in Balzac's *Seraphita*), there is no absolute down, no right or left, forward or backward. Every musical configuration, every movement of tones has to be comprehended primarily as a mutual relation of sounds, of oscillatory vibrations, appearing at different places and times. To the imaginative and creative faculty, relations in the material sphere are as independent from directions or planes as material objects are, in their sphere, to our perceptive faculties. Just as our mind always recognizes, for instance, a knife, a bottle or a watch, regardless of its position, and can reproduce it in the imagination in every possible position, even so a musical creator's mind can operate subconsciously with a row of tones, regardless of their direction, regardless of the way in which a mirror might show the mutual relations, which remain a given quantity.

Beethoven, String Quartet, Op. 135, 4th movement

Introduction
Grave

Allegro

Muss es sein? Es muss sein! Es muss sein!

VI I
VII
Head-motives
Vla.
Vcl.

a) 3 4

b) 3 4 c) 4 3

d) 4 3

e) e1)

e2)

Example 2

Kammersymphonie, Op. 9, E major

a)

b)

c)

d) -6 +2 +2 -3

e) -6 +2 +2 -3
Inversion

f)

Example 3

VI

The introduction of my method of composing with twelve tones does not facilitate composing; on the contrary, it makes it more difficult. Modernistically-minded beginners often think they should try it before having acquired the necessary technical equipment. This is a great mistake. The restrictions imposed

on a composer by the obligation to use only one set in a composition are so severe that they can only be overcome by an imagination which has survived a tremendous number of adventures. Nothing is given by this method; but much is taken away.

It has been mentioned that for every new composition a special set of twelve tones has to be invented. Sometimes a set will not fit every condition an experienced composer can foresee, especially in those ideal cases where the set appears at once in the form, character, and phrasing of a theme. Rectifications in the order of tones may then become necessary.

In the first works in which I employed this method, I was not yet convinced that the exclusive use of one set would not result in monotony. Would it allow the creation of a sufficient number of characteristically differentiated themes, phrases, motives, sentences, and other forms? At this time, I used complicated devices to assure variety. But soon I discovered that my fear was unfounded; I could even base a whole opera, *Moses and Aaron*, solely on one set; and I found that, on the contrary, the more familiar I became with this set the more easily I could draw themes from it. Thus, the truth of my first prediction had received splendid proof. One has to follow the basic set; but, nevertheless, one composes as freely as before.

VII

It has been mentioned that the basic set is used in mirror forms.

From the basic set, three additional sets are automatically derived: 1) the inversion; 2) the retrograde; and 3) the retrograde inversion.³ The employment of these mirror forms corresponds to the principle of *the absolute and unitary perception of musical space*. The set of Example 4 is taken from the Wind Quintet, Op. 26, one of my first compositions in this style.

Later, especially in larger works, I changed my original idea, if necessary, to fit the following conditions: the inversion a fifth below of the first six tones, the antecedent, should not produce a repetition of one of these six tones, but should bring forth the hitherto unused six tones of the chromatic scale. Thus, the consequent of the basic set, the tones 7 to 12, comprises the tones of this inversion, but, of course, in a different order.

In Example 5 [see ahead], the inversion a fifth below does not yet fulfill this condition. Here the antecedent of the BS plus that of the INV 5 consists of only 10 different tones, because c and b appear twice, while f and f# are missing.

VIII

In every composition preceding the method of composing with twelve tones, all the thematic and harmonic material is primarily derived from three sources: the

3. BS means Basic Set; INV means inversion of the Basic Set; INV8, INV5, INV3, INV6 means inversion at the 8ve, 5th, minor 3rd, or major 6th from the beginning tone.

Example 4

tonality, the *basic motive* which in turn is a derivative of the tonality, and the *rhythm*, which is included in the basic motive. A composer's whole thinking was bound to remain in an intelligible manner around the central root. A composition which failed to obey these demands was considered "amateurish"; but a composition which adhered to it rigorously was never called "cerebral." On the contrary, the capacity to obey the principle instinctively was considered a natural condition of a talent.

The time will come when the ability to draw thematic material from a basic set of twelve tones will be an unconditional prerequisite for obtaining admission into the composition class of a conservatory.

IX

The possibilities of evolving the formal elements of music—melodies, themes, phrases, motives, figures, and chords—out of a basic set are unlimited. In the following pages, a number of examples from my own works will be analyzed to

reveal some of these possibilities. It will be observed that the succession of the tones according to their order in the set has always been strictly observed. One could perhaps tolerate a slight digression from this order (according to the same principle which allowed a remote variant in former styles) in the later part of a work, when the set had already become familiar to the ear. However, one would not thus digress at the beginning of a piece.

The set is often divided into groups; for example, into two groups of six tones, or three groups of four, or four groups of three tones. This grouping serves primarily to provide a regularity in the distribution of the tones. The tones used in the melody are thereby separated from those to be used as accompaniment, as harmonies or as chords and voices demanded by the nature of the instrumentation, by the instrument, or by the character and other circumstances of a piece. The distribution may be varied or developed according to circumstances, in a manner comparable to the changes of what I call the "Motive of the Accompaniment."

X

The unlimited abundance of possibilities obstructs the systematic presentation of illustrations; therefore, an arbitrary procedure must be used here.

In the simplest case, a part of a theme, or even the entire theme, consists simply of a rhythmization and phrasing of a basic set and its derivatives, the mirror forms: inversion, retrograde, and retrograde inversion. While a piece usually begins with the basic set itself, the mirror forms and other derivatives, such as the eleven transpositions of all the four basic forms, are applied only later; the transpositions especially, like the modulations in former styles, serve to build subordinate ideas.

Example 5 shows the basic set (with its inversions in the octave and fifth) of my *Wind Quintet*, Op. 26.

Wind Quintet, Op. 26

Example 5 shows the basic set (with its inversions in the octave and fifth) of my *Wind Quintet*, Op. 26. The notation is presented in three staves: B.S. (Bass Saxophone), I.s (First Instrument), and I.s (Second Instrument). The basic set is shown in the first staff, and its inversions are shown in the second and third staves. The notes are numbered 1 through 12.

Example 5

Wind Quintet, Op. 26

Example 6 shows the first phrase of the main theme (Example 6) and its accompaniment. The notation is presented in two systems of three staves each. The first system shows the first six tones (1-6) and the second system shows the next six tones (7-12). The accompaniment is built using octave doubling of tones 1-6 with tones 7-12, and vice versa. The notation includes various musical symbols such as notes, rests, and dynamics.

Example 6

Many themes of this work simply use the order of one of the basic forms.

The main theme of the first movement (Example 6) uses for its first phrase the first six tones, the antecedent; for its second phrase, the consequent of the BS. This example shows how an accompaniment can be built. As octave doubling should be avoided [see section IX], the accompanying of tones 1-6 with tones 7-12, and vice versa, is one way to fulfill this requirement.

Example 7 proves that the same succession of tones can produce different themes, different characters.

Example 8, the principal theme of the Rondo of this Quintet, shows a new way of varying the repetitions of a theme. The production of such variants is not only necessary in larger forms, especially in Rondos, but useful also in smaller structures. While rhythm and phrasing significantly preserve the character of the theme so that it can easily be recognized, the tones and intervals are

changed through a different use of BS and mirror forms. Mirror forms are used in the same way as the BS. But Example 9 shows a more complicated procedure.

At first a transposition of the retrograde is used three times in succession to build melody and accompaniment of this subordinate theme of the Rondo from the same Quintet. The principal voice, the bassoon, uses three tones in each of the four phrases; the accompaniment uses only six tones, so that the phrases and the sets overlap each other, producing a sufficient degree of variety. There is a definite regularity in the distribution of the tones in this and the following Example 10, the Andante from the same Quintet.

Here also the form used, the BS, appears three times; here also, some of the tones appear in the principal voice (horn) while the others build a semi-contrapuntal melody in the bassoon.

Wind Quintet, Rondo (4th movement)

Example 7

Wind Quintet, Rondo

Example 8

Wind Quintet, Rondo, measures 117-124

R.

(♩=60)

Bassoon

Example 9

Wind Quintet, Andante (3rd movement)

Horn

Bassoon *dolce*

Example 10

In the Scherzo of the same work (Example 11), the main theme starts with the fourth tone after the accompaniment has employed the preceding three tones of the BS. Here the accompaniment uses the same tones as the melody, but never at the same time.

In Example 12, inversion and retrograde inversion are combined into a contrapuntal unit which is worked out in the manner of the elaboration of the Rondo.

Wind Quintet, Scherzo (2nd movement)

Example 11

Example 12

XI

Obviously, the requirement to use all the tones of the set is fulfilled whether they appear in the accompaniment or the melody. My first larger work in this style, the *Piano Suite*, Op. 25, already takes advantage of this possibility, as will be shown in some of the following examples. But the apprehension about the doubling of octaves caused me to take a special precaution.

The BS as well as the inversion is transposed at the interval of a diminished fifth (Example 13). This simple provision made it possible to use, in the *Praeludium* of this Suite, BS for the theme and the transposition for the accompaniment, without octave doubling (Example 13A).

But in the *Gavotte* (Example 14) and the *Intermezzo* (Example 14a) this problem is solved by the first procedure mentioned above: the separate selection of the tones for their respective formal function, melody or accompaniment. In both cases a group of the tones appears too soon—9–12 in the left hand comes before 5–8. This deviation from the order is an irregularity which can be justified in two ways. The first of these has been mentioned previously: as the *Gavotte* is the second movement, the set has already become familiar. The second justification is provided by the subdivision of the BS into three groups of four tones. No change occurs within any one of these groups; otherwise, they are treated like in-

Suite, Op 25
B5 (transposed a diminished 5th)

I (transposed a diminished 5th)

Suite, Op 25, Praeludium

B5 (transposed)

Example 13 and 13A

dependent small sets. This treatment is supported by the presence of a diminished fifth, *Db-g*, or *g-Db*, as third and fourth tones in all forms of the set, and of another diminished fifth as seventh and eighth tones. This similarity, functioning as a relationship, makes the groups interchangeable.

In the Menuet of the *Piano Suite* (Example 15) the melody begins with the fifth tone, while the accompaniment, much later, begins with the first tone.

The Trio of this Menuet (Example 15a) is a canon in which the difference between the long and short notes helps to avoid octaves.

The possibility of such canons and imitations, and even fugues and fugatos, has been overestimated by analysts of this style. Of course, for a beginner it

Suite, Op. 25, Gavotte

B.S.

Suite, Op. 25, Intermezzo

B

B

Example 14 and 14A

might be as difficult to avoid octave doubling here as it is difficult for poor composers to avoid parallel octaves in the "tonal" style. But while a "tonal" composer still has to lead his parts into consonances or catalogued dissonances, a composer with twelve independent tones apparently possesses the kind of freedom which many would characterize by saying: "everything is allowed." "Everything" has always been allowed to two kinds of artists: to masters on the one hand, and to ignoramuses on the other. However, the meaning of composing in imitative style here is not the same as it is in counterpoint. It is only one of the ways of adding a coherent accompaniment, or subordinate voices, to the main theme, whose character it thus helps to express more intensively.

Suite, Op. 25, Menuet

Suite, Op. 25, Trio

Example 15 and 15A

XII

The set of my *Variations for Orchestra*, Op. 31, is shown in Example 16a.

A work for orchestra must necessarily be composed of more voices than one for a smaller combination. Of course, many composers can manage with a small number of voices by doubling them in many instruments or in octaves, by breaking and doubling the harmony in many ways—sometimes thereby obscuring the presence of a content, sometimes making its absence clear. It must be admitted that most orchestral combinations do not promote what the artist calls unmixed, unbroken colors. The childish preference of the primitive ear for colors has kept a number of imperfect instruments in the orchestra, because of their individuality. More mature minds resist the temptation to become intoxicated by colors and prefer to be coldly convinced by the transparency of clear-cut ideas.

Avoidance of doubling in octaves automatically precludes the use of broken harmonies which contribute so much to the pleasant noise that is today called "sonority." Since I was educated primarily by playing and writing chamber music, my style of orchestration had long ago turned to thinness and transparency, in spite of contemporary influences. To provide for the worst seems better wis-

dom than to hope for the best. Therefore, I declined to take a chance, and, by making some slight changes, built the basic set so that its antecedent, starting a minor third below, inverted itself into the remaining six tones of the full chromatic scale.

Besides, I used in many places a device, derived from double counterpoint of the tenth and twelfth, which allows the addition of parallel thirds to every part involved. By transposing BS a third up (BS3) and INV a third down (INV3), I obtained two more basic forms which allowed the addition of parallel thirds.

Variations, Op. 31

Variations, Op. 31

RI 12 11 10 9 8 7 6

5 4 3 2 1 R 12 11 10

9 8 7 6 5 4 3 2

1st Violins I 1 2 3 4 5 6 7

pp 8 9 10 11 12

Example 16A and B

Variation I

BS I.(transp.)

Example 17

In the First Variation (Example 17) I used this device often, but not as often as I had expected. Very soon I recognized that my apprehension was unnecessary. Of the following examples, chosen at random to illustrate other peculiarities, none shows the addition of parallel thirds.

After an introduction successively revealing the tones of the BS and its INV3, the "Theme" of the Variations appears (Example 16). Built as a ternary form, it uses the tones of the BS and its three derivatives in strict order, without any omission or addition.

The motive of the Fifth Variation (Example 18) is based on a transposition of the INV (INV8). Here are six independent parts built from only one set, comprising only the first two beats; the continuation carries on this system and finds ways to produce a satisfactory amount of variety.

The motive of the Sixth Variation (Example 19) is built from another transposition of the INV (INV6). It is composed of a contrapuntal combination of two melodic parts, using some tones of INV6 in the upper and others in the lower voice. This combination allows a great number of forms which furnish material for every demand of variation technique. New forms result through inversion of both voices (Example 20a) and other changes of their mutual positions such as, for instance, canonic imitation (Example 20b).

One should never forget that what one learns in school about history is the truth only insofar as it does not interfere with the political, philosophical, moral or other beliefs of those in whose interest the facts are told, colored or arranged. The same holds true with the history of music, and he who guilelessly believes all he is told—whether he be layman or professional—is defenseless and has to "take it," to take it as they give it. Of course, we know their guesses are no better than ours.

Variation V

Musical score for Variation V. It consists of two systems. The first system has four staves: a treble staff with a melodic line, a grand staff (treble and bass) with a 6/4 time signature, and two more staves. The second system has two staves, with the first labeled 'I. (transp.)'. The notation includes various notes, rests, and dynamic markings like 'etc.' and 'mf'.

Example 18

Variation VI
Clarinet

Musical score for Variation VI, labeled 'Clarinet'. It consists of two staves. The first staff has a treble clef and a melodic line. The second staff has a bass clef and a bass line. The notation includes various notes, rests, and dynamic markings like 'I₈'.

Example 19

Variation VII

Musical score for Variation VII. It consists of two systems. The first system has three staves: a treble staff with a melodic line, a grand staff (treble and bass) with a 6/4 time signature, and a bass staff. The second system has three staves: a treble staff with a melodic line, a grand staff (treble and bass) with a 2/4 time signature, and a bass staff. The notation includes various notes, rests, and dynamic markings like 'p' and 'mf'.

Example 20 A and B

But unfortunately our historians are not satisfied with rearranging the history of the past; they also want to fit the history of the present into their preconceived scheme. This forces them to describe the facts only as accurately as they see them, to judge them only as well as they understand them, to draw wrong conclusions from wrong premises, and to exhibit foggy visions of a future which exists only in their warped imaginations.

I am much less irritated than amused by the critical remark of one Dr. X, who says that I do not care for "sound."

"Sound," once a dignified quality of higher music, has deteriorated in significance since skillful workmen—orchestrators—have taken it in hand with the definite and undisguised intention of using it as a screen behind which the absence of ideas will not be noticeable. Formerly, sound had been the radiation of an intrinsic quality of ideas, powerful enough to penetrate the hull of the form. Nothing could radiate which was not light itself; and here only ideas are light.

Today, sound is seldom associated with idea. The superficially minded, not bothering with digesting the idea, notice especially the sound. "Brevity is essential to wit"; length, to most people, seems to be essential to sound. They observe it only if it lasts for a comparatively long time.

It is true that sound in my music changes with every turn of the idea—emotional, structural, or other. It is furthermore true that such changes occur in a more rapid succession than usual, and I admit that it is more difficult to perceive them simultaneously. The Seventh Variation offers just such obstacles to comprehension. But it is not true that the other kind of sonority is foreign to my music.

The rapid changes of the sonority in this Seventh Variation make it difficult for the listener to enjoy. The figure in the bassoon part continues for some time, while the instrumentation of the harmonies in eighth notes changes rapidly and continuously.

Examples 21-24 show that a great multitude of thematic characters can be derived from one set. Various methods are, of course, applied. It may be worth while to mention that in Example 25, as a homage to Bach, the notes B-flat, A, C, B, which spell, in German, BACH, were introduced as a contrapuntal addition to the principal thematic developments.

The main advantage of this method of composing with twelve tones is its unifying effect. In a very convincing way, I experienced the satisfaction of having been right about this when I once prepared the singers of my opera *Von Heute Auf Morgen* for a performance. The technique, rhythm and intonation of all these parts were tremendously difficult for them, though they all possessed ab-



Example 21

Variation VII

Variation VIII

Example 22

solute pitch. But suddenly one of the singers came and told me that since he had become familiar with the basic set, everything seemed easier for him. At short intervals all the other singers told me the same thing independently. I was very pleased with this, and, thinking it over, I found even greater encouragement in the following hypothesis:

Finale (measure 332)

Example 23

Example 24

Prior to Richard Wagner, operas consisted almost exclusively of independent pieces, whose mutual relation did not seem to be a musical one. Personally, I refuse to believe that in the great masterworks pieces are connected only by the superficial coherence of the dramatic proceedings. Even if these pieces were merely "fillers" taken from earlier works of the same composer, something must have satisfied the master's sense of form and logic. We may not be able to discover it, but certainly it exists. In music there is no form without logic, there is no logic without unity.

Finale



Example 25

I believe that when Richard Wagner introduced his *Leitmotiv*—for the same purpose as that for which I introduced my Basic Set—he may have said: “Let there be unity.”

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Twelve-Tone Invariants as Compositional Determinants

Mathematics has been a guiding force in **Milton Babbitt's** mature work; he taught on the music and mathematics faculties at Princeton University. By 1947 he had begun to extend the principles of Arnold Schoenberg's method of twelve-tone composition to apply to rhythmic duration, dynamics, timbre, and the pacing of musical events. In “Twelve-Tone Invariants as Compositional Determinants” (1960), Babbitt meticulously traces the principles of twelve-tone composition, explores its basic operations, and illustrates the seemingly infinite number of possibilities available to composers who use Schoenberg's method.

At the present moment, when many of the jagged edges of abruptness have been smoothed by time and practice, there are those who—presumably in the spirit

of mediation and moderation—would minimize, not so much Schoenberg's achievement as a composer, as the degree to which the twelve-tone system is genuinely “revolutionary” in its nature and implications, the degree to which it imposes new demands of perception and conception upon the composer and listener, and—therefore—the degree to which it admits of further and extensive exploration and discovery.

Such an attitude does a disservice not only to Schoenberg, but to the cause of understanding, particularly since it so often involves the invocation of the alleged historical-analogical origins of the operations of the system, along with conjectures as to Schoenberg's mode of and motivation for arriving at the system. However intriguing such conjectures may be, they are as irrelevant as they are futile; however pedagogically convenient and intuitively suggestive a quasi-genetic approach may be, eventually it succeeds only in obscuring both the character of the system and the profound differences between the twelve-tone system and those musical systems in which the “historical forerunners” of the twelve-tone operations appear. The crucial point here is that these “forerunners” are not independent and fundamental structural determinants, but means of immediate procedure, neither necessarily present nor, if present, of more than local significance and influence.

Therefore it is appropriate to precede even so informal a decision as the one to follow with the reminder that the twelve-tone system, like any formal system whose abstract model is satisfactorily formulable, can be characterized completely by stating its elements, the stipulated relation or relations among these elements, and the defined operations upon the so-related elements. Such a characterization, though explicitly presented in verbal form at the earliest stage of the twelve-tone development, is likewise easily and explicitly inferable as the maximum procedural intersection among the “classical” twelve-tone works of Schoenberg, Webern, and Berg.

If the elements of the twelve-tone pitch system are, indeed, “traditional” ones, both insofar as they are pitch classes with class membership defined by octave equivalence, and as there are twelve such pitch classes—corresponding to the chromatically equal-tempered quantization of the frequency continuum—even here essential deviations must be noted. In the twelve-tone system there is a one-to-one correlation between pitch notation and presented pitch, as opposed to the many-to-one correlation of triadic-tonal music; there can be no such distinctions as those between explicit and functional “dissonance,” or between enharmonically identical “consonance” and “dissonance.” The independent assumption of octave equivalence has been a frequent point of attack upon the system, particularly by those who assert that the corresponding assumption in the tonal system serves to define classes of equivalent function; it need be answered only that, similarly, this assumption in the twelve-tone system serves to define classes of equivalent order position.

It is in the definition of relations among the elements that the system diverges significantly from systems of the past, for relations are defined entirely by the