TWELVE-NOTE METHODOLOGY IN THE
MUSIC OF ALEXANDER GOEHR

by

JEFFREY ROWLANDS B.MUS.(HONS.). M.MUS.

Submitted in fulfilment of the requirements
for the award of the degree of Doctor of Philosophy,
within the Department of Music,
University of Surrey

DECEMBER 1989
ABSTRACT

Alexander Goehr is a leading member of British musical life today through his manifold activities as composer, university professor, broadcaster and conductor. His music has received much critical attention but very little in the way of analytical attention. In fact what published analytical work does exist derives almost entirely from information supplied by Goehr himself during his lecture 'Poetics of my music' given in 1973 to inaugurate his appointment to the Chair of Music at Leeds University. Goehr's ideas, supplied in that lecture, have often been restated in other publications, but they have never been followed up and explored within the context of actual pieces. The need exists therefore for a detailed analytical study of his twelve-note music, the more so given that since 1976 his compositional preoccupations have moved away from his former twelve-note method.

Goehr is a prolific composer and to have attempted a comprehensive analytical coverage of his music would have been as impossible as it is unnecessary. Accordingly, I have selected a small number of pieces for detailed analysis while, at the same time, making reference to a range of other pieces in more cursory detail. The core of the thesis is the Little Symphony Op.15 (Chapter 3). This position reflects the significance of the piece within Goehr's output. It is the first piece in which the compositional implications of his twelve-note method are fully realized, a method which was to sustain his music for the next thirteen years. Chapter three is flanked on one side by analyses of pieces which were significant in the development of the method (Chapter 2) and on the other by an analysis of the Third String Quartet, together with a discussion of other later pieces (Chapter 4). The Third String Quartet is significant in two respects: it is the last piece in which Goehr uses his twelve-note method, and the first movement is explicitly modelled on the first movement of Beethoven's Piano Sonata Op.90.

The final chapter (Conclusions) discusses Goehr's method in the light of classical twelve-note models as well as other models apparent since 1945.

The Introduction attempts to give a general biographical and aesthetic background to the thesis.
ACKNOWLEDGEMENTS

I wish to express my thanks to my supervisor, Professor Sebastian Forbes, Head of the Music Department, University of Surrey, for his constant support, patience and invaluable advice. I also owe a debt of gratitude to Professor Alexander Goehr himself, Professor of Music in the University of Cambridge, who, in 1986, invited me to Cambridge where he gave freely of his time to answer my many questions. It was during one of my visits that he allowed me to see the manuscript sketches for the Little Symphony Op.16 and the Second String Quartet Op.23.
For C.S.
INTRODUCTION
In published interviews Goehr has said little about his early compositions except that he first thought of himself as a composer at around the age of fifteen when he wrote a piano suite "very obviously modelled on Stravinsky's Serenade in A". [NORTHCOTT, 1980, p.10] However, he has indicated in conversation [ROWLANDS, 1986] that by the time of his mid-teenage years he had already made an extensive compositional exploration of twelve-note methodology. That these early attempts should have been twelve-note is both understandable and exceptional. Understandable, because Goehr's particular family and cultural background, coupled with an intellectual cast of mind, created a milieu in which it was almost inevitable that he would become a twelve-note composer. Exceptional, because in early post-war Britain few composers wrote twelve-note music and those who did were largely ignored by the musical establishment.

Goehr's father, the conductor and composer Walter Goehr, had studied in Berlin as a member of Schoenberg's Master class. The extent to which the father's considerable Schoenbergian enthusiasms were taken up by the son can be gauged from the following:

... I modelled myself on Schoenberg, I've admired other composers, especially my teacher Messiaen, but I've really felt that I belonged to the Schoenbergian family.

[GRiffiths, 1985, p.18]
The attraction to Schoenberg and to twelve-note methodology is, however, as indicative of Goehr's intellectual and psychological make up as it is of his father's undoubted influence. In the first of his impromptu radio talks "Modern Music and Society" [GOEHR, 1979, BBC Radio 3] Goehr categorized composers into two camps: those who create music from "an actual act of the imagination" and those who use mental operations or "systems of construction". Within this broad dichotomy Goehr has identified himself with the latter category:

There are composers who are concerned with rigorous, problem-solving, formal composition ... Boulez is such a one, as were Schoenberg, Webern and Dallapicolla; ... I feel more linked to Boulez by the common interest in structural device ... this is not to say that expression is unimportant to me. But I believe expression is involuntary and arises as a by-product of intellectual effort.

[NORTHCOTT, 1980, p.13]

If this testimony to Goehr's belief in the efficacy of reason has its corollary in his adherence to serial methodology, that same belief also testifies to what Holloway has described as Goehr's reluctance "to trust to his truest intelligence which lies in his intuition [HOLLOWAY, 1980, p.86]. This reluctance was strongest at the beginning of his career:

When I began to compose I felt at a great disadvantage. I felt that other people could do much more than I was able, that I wasn't very good, and so had to invent systems as many composers do, to compensate for a feeling
of lack of natural ability. The attraction to be a systematic composer was there.

[GRIFFITHS, 1985, p.13]

Although Goehr's immediate family background provided the initial impulse for his Schoenbergian twelve-note inclinations, the broader musical environment of early post-war Britain could hardly have provided less fertile soil in which those inclinations might flourish. For while the twelve-note method had gained Schoenberg some notoriety in this country, Schoenberg's music, as well as that of Webern, Bartok and to a lesser extent Stravinsky, was, until the early 1960s, largely unplayed and hence unknown. Writing in 1961, Hugh Wood observed:

It is a curious fact that a large body of music composed before 1914 had little or no influence on English music between the wars, and is only now beginning to make a belated impression on our musical life.

[WOOD, 1961, pp. 155-56]

However the situation might have been otherwise. As Northcott has observed, Schoenberg, Stravinsky, Bartok, Berg and Webern had all visited London between the wars, either to attend or direct performances of their works [NORTHCOTT, 1975, p.3]. Furthermore, the 1930s also saw the arrival in this country of a number of highly significant European musicians; Roberto Gerhard, Walter Goehr, Egon Wellesz and Erwin Stein had all been members of Schoenberg's Berlin Master class, while Peter Stadlen, the pianist and critic had worked
closely with Webern. Hans Keller, though never a pupil of Schoenberg, was an ardent champion for his cause through his manifold activities as writer, broadcaster and teacher. Mention must also be made of three native musicians: Edward Clark, Elizabeth Lutyens and Humphrey Searle. As a young man Edward Clark had travelled widely in Europe to improve his languages prior to entering his father's coal-exporting business in the North-East of England. However, an abiding passion for music gained the upper hand and 1910 saw him meeting Schoenberg and Webern at an early performance of Schoenberg's "Pelleas und Melisande". He then became Schoenberg's pupil, as his widow, the composer Elizabeth Lutyens observed in her autobiography:

From 1910 when he first met Schoenberg Edward never wavered in his belief in and homage to the composer, the man, his work and life.

[LUTYENS, 1972, p.97]

It was Clark who ensured what few performances Schoenberg's music had in this country in the 1920s and 1930s, and in 1933, following the rise to power in Germany of Hitler and the National Socialist Party, it was Clark to whom Schoenberg wrote what Lutyens has described as an 'SOS postcard' now that Schoenberg's very existence was threatened:

Needless to say, Edward was prepared to move heaven and earth on Schoenberg's behalf at this tragic time and every possible effort to obtain performances, publisher or position for him in this country, including appeals to all the schools of music to take him on as a teacher. All, alas, in vain; no person or institution came to the rescue; so England's loss became America's gain.

[LUTYENS, 1972, pp. 116-117]
Elizabeth Lutyens herself, along with Humphrey Searle, had been bearing the brunt of this country's prejudice against twelve-note music for most of her composing career. Lutyens has described the attitude which her music aroused:

One was hardly ever performed; one was jeered at by the players, if silently, and was considered 'dotty' and the chief thing, one was considered un-English. Those were the days when people talked a lot about the renaissance of British Music; whereas we were writing in what was considered a 'mittel-European' style. Of course, a style deriving from Bach or Brahms wasn't considered un-English. But to adopt the procedures of say Schoenberg was almost anti-christ except for refugee composers.

[SCHAFER, 1963, p.105]

Not that refugee composers such as Gerhard and Wellesz were frequently performed either. Even though Gerhard came to England in 1937 it was not until the early 1960s that his music began to attract attention.

The situation for Goehr's European contemporaries was, on the face of it, hardly more favourable; the disengagement from the mainstream of modern music which in England had been achieved through a combination of innate national conservatism and a belated preoccupation with native folk traditions, was in Europe achieved through Nazi oppression and the Second World War itself. Following Hitler's accession to power in February 1933, modern music in central
Europe was progressively denied any opportunity for performance, while many of the leading figures in modern music were forced to flee Europe, being of Jewish ancestry. In addition to Schoenberg, other composers such as Bartok, Stravinsky, Hindemith and Krenek all found new homes and varying degrees of prosperity in America. Gerhard, Wellesz, Seiber, Stein and Keller, as I have already indicated, found refuge in England. Not being of Jewish ancestry, Berg and Webern were able to remain in Germany but, succumbing to a blood infection, Berg died in December 1935, and Webern was accidentally shot by an American soldier in 1945.

However, the post-war period in Europe saw immediate attempts to restore opportunities for the dissemination of modern music; for example, the Musica Viva concerts organised by Karl Amadeus Hartmann in Berlin and the re-establishment of the ISCM. Goehr had observed that these revivals of modern music differed significantly in their attitudes from those which had prevailed earlier in the century:

After the long period of Nazism, of Fascism in Italy, followed by the war itself, again there was a great backlog of music, and the reforming of the world of artists after the second world war had something in common with the reformations after the first world war. Again we had a number of artists and friends of music, who had observed that all the important composers of music of the early part of the century had, in fact, been disregarded, while lesser figures had been promoted; and at the end of the war there was the spirit of
'Lets start again'. But there was one significant difference. Many of the people who were interested in modern music before the war were not composers but critics and writers on music. As opponents of the Nazi regime they now found themselves in positions of great power. In the radio stations, in the press, in the universities and elsewhere they were saying 'we will now do the thing as it always should have been done. The institutions which are there to disseminate culture will now be put at the service of the New'.

[GOEHR, 1979, BBC Radio 3]

Accordingly, Festivals such as those initiated at Darmstadt and Donaueschingen were wholly concerned with the study and performance of modern music; 'new' understood not as the merely contemporary, but as embracing a modernist aesthetic. The initial point of departure for the new music was Schoenberg and the twelve-note method; from 1948 the Schoenberg pupil Rene Leibowitz, the author of the first non-German study of twelve-note music 'Schoenberg et son école', taught at Darmstadt and was a dominating influence. Twelve-note music had enabled Schoenberg to achieve a rapprochement with the traditional aspect of music. In the eyes of Boulez and his contemporaries, however, this had represented what Boulez was to describe as the 'most perfect misdirection that could have been offered in contemporary music'. [BOULEZ, 1966, p.254] However, what was perceived in Webern to be a modernist, anti-traditional stance, led to Webern and his approach to serialism being set up as a kind of model for the new music. Boulez and his post-Webern generation intended that their music would owe nothing to
tradition. Indeed the strength of their music would derive from tradition's very rejection:

I believe that a civilization which tends towards conservatism is a declining civilization because it is afraid to go forward and ascribes more importance to its memories than to its future. Strong, expanding civilizations have no memory; they reject, they forget the past.

[BOULEZ, 1976, p.33]

By denying the past as a source of nourishment and inspiration, Boulez and his contemporaries placed their hopes for the New Music in the efficacy of reason; the New Music would be created by sheer intellectual will. Only one element of the past was to be admitted; the twelve-note series, but this only as a point of departure. The concept of the series - 'the germ of a developing hierarchy' [BOULEZ, 1975, p.35] was to be applied to all components of 'crude sound': pitch, duration, dynamics and timbre, so that all aspects of composition might be subject to intellectual intervention, rather than relying on the received practice of tradition.

Boulez's two-piano piece 'Structures 1a' was his first to employ the 'total serialism' outlined above. In this piece Boulez reduces personal choice - the pitch series is taken from Messiaen's "Mode de Valeurs et d'Intensités" rather than being invented by the composer and all forty-eight forms of the set are used. Boulez never intended that Structures 1a should be regarded as anything other than an
experiment:

I wanted to use the potential of a given material to find out how far automatism in musical relationships would go, with individual invention appearing only in some really very simple forms of disposition ... I had made it perfectly clear from the start by choosing someone else's material. Thus, this sort of absurdity, of chaos and mechanical wheels-within-wheels, tending almost to the random, was completely intentional and has probably been one of my most fundamental experiments as a composer.

[BOULEZ, 1975, pp.56-57]

Goehr never identified with the post-Webern aesthetic and the move towards total serialization, only in the piano piece 'Capriccio' Op.6 (written after a period of study in Paris between 1955 and 56) does he make occasional use of a dynamic and durational series. Goehr's aesthetic estrangement from his European contemporaries was partly due to his father who, according to the composer "shamed me from trying to become a Stockhausen type 'Darmstadt' composer [GRIFFITHS, 1985, p.13]. But more significantly, Goehr experienced fundamental difficulties in aligning himself with their ideas and methods. He objected strongly to the automation and expressionless regularity of much total serial music, and against the denial of tradition and the appeal to historical inevitability in the pursuit of the new. These objections surfaced in public form in 1960 when Goehr, published an article in the periodical, 'The Score':

(totally serialised music) is dull in its lack of formal complexity, of dynamic gesture. No amount of technical ingenuity can break the monotony of regularity. The dull impression
is simply due to the fact that all serial possibilities are continuously present in the work. Musical interest is always produced by the restriction of possibilities ...

[GOEHR, 1960, p.63]

The reference to the 'restriction of possibilities' marks Goehr out as a Stravinskian order of composer (and perhaps Messiaen), while the reference to irregularity points to a recurrent motive in his thinking:

... the composer, like any listener, will tend to be attracted by anything that is irregular in the context of the piece he hears. Our text books are full of examples of exceptions: strange harmonic progressions, odd contrapuntal combinations which, we feel, enhance the expression.

[GOEHR, 1960, p.63]

But the wonder is, and I think it tells us a great deal about the composer (Stravinsky), is the way he homes in on the irregularities of the harmonization ... and makes these the point of departure for compositional elaboration.

[GOEHR, 1981, p.3]

The musical idea is expressive in as far as it is spontaneous and irregular, in as far as it is self-contained, itself a form, rather than an element of a regular series, such as a scale or an arpeggio.

[GOEHR, 1973, p.174]

In his own music the notion of irregularity, at once a means of delimiting the range of possibilities and achieving expressive detachment, finds its most acute manifestation in the formulation of what Goehr has called "serial ideas"; linear formations derive from a basic set which Goehr
regards as being "irregular in relation to the symmetrical sound-space mapped out by a twelve-note series".

[GOEHR, 1973, p.179]

In the same 1960 article, Goehr also objected to the post-Webern denial of tradition and appeals to historic inevitability in the pursuit of the New.

For my own part, I can't see that post-Webernism, or any other stage of musical development, represents the 'only way'. It's a fallacy to suppose that at any given historical point there is a unique solution to the problems of composition, and that musical evolution is ascending to an even higher order of revelation. By that argument, a composer need only, as is so often said, be alive to some sort of musical law of progress in order to take his place on the train of 'serious advance', to write music which is legitimate because it is 'aware of its time', 'contemporary'. In point of fact, the best new music has already belied this kind of Historicism ... An artist is related to the tradition from which he comes, and this bond has little to do with time or progress. There is no common 'only way' to any future stage; all art is new art and all art is conservative.

[GOEHR, 1960, p.63]

Since the time of that article, Goehr's aesthetic position has changed little. He acknowledges that all composers have "got to find something new", [GOEHR, 1980, p.105] but he does not believe that the New is to be achieved through the denial of tradition or by seeking out new musical bases. Writing in 1977, Goehr reaffirmed these beliefs.
We could define music as a set of a priori problems which have to be dealt with at any and every time.

[GOEHR, 1977]

There is surely incontestable evidence that innovation is not so simply related to the search for new material. Composing the new means dealing again with the old. It depends on a continual reformulation of the same questions in new situations and with new sensibilities.

[GOEHR, 1977]

In accordance with these stated aesthetic beliefs, Goehr has, throughout his career, concerned himself with the reclamation of modes of form and continuity from the past, some of which have been largely abandoned. For example, the first movement of the Violin Concerto was conceived as a set of Chorale Variations on a monody announced at the very beginning of the work. In his more recent work, he has used fugue (Romanza on the notes of the Fourth Psalm Op. 38C, 1977) and chaconne (Chaconne for Wind, Op.34, 1974, and Symphony with Chaconne, 1977). His more recent work has also seen a turning away from twelve-note methodology and the usage of more simpler material such as mode and plainsong. For example, the Psalm IV setting, as Northcott has observed [NORTHCOTT, 1980, p.97] uses Lydian, Aeolian, Mixolydian and Ionian modes as a source of harmony, while both "... a musical offering (J.S.B. 1985) ... Op.46" and the "Symphony with Chaconne" both make use of plainsong Alleluias.
The 1977 references are taken from an article which Goehr wrote in response to an earlier article by Boulez (BOULEZ, 1977). The Boulez article amounts to the composer's inaugural lecture for the opening of Ircam in Paris. In his article Boulez proposes that all musicians should enter into a real dialectic with technology:

A virtual understanding of contemporary technology ought to form part of the musician's invention; otherwise, the activities of scientists, technicians, and musicians will be only marginal one to the other. Our grand design today, therefore, is to prepare the way for their integration and, through an increasingly pertinent dialogue, to reach a common language, which would take account of the imperatives of musical invention and the priorities of technology.

[BOULEZ, 1977]

Goehr's view is quite different to Boulez's. As I have already indicated, for Goehr, the new is to be achieved by a re-evaluation of the fundamentals of music, i.e. the traditional bases of music, rather than in seeking out new ones, a search which Goehr sees as being potentially harmful.

I think that the concept of a dialogue between artists and scientists is likely to produce superficial results and take composers' minds off the continuingly valid tradition within which they have to work.

[GOEHR, 1977]
THE EARLY COMPOSITIONS
SONATA FOR PIANO OP. 2
If the position of Goehr's European contemporaries in 1952 can be characterized as 'post-Webern', then Goehr's position as testified by the Piano Sonata can be characterized as post-Schoenberg. But like most labels in music, this should be regarded as a point of departure rather than a definitive statement. Whatever relationship does exist between Goehr's twelve-note method, in this and other pieces, and Schoenberg's method will be considered in the concluding chapter. For the moment, the term 'post-Schoenberg' is used less to identify a methodological model than to indicate the operation of a twelve-note method within a fundamentally traditional approach to composition. This is not least apparent in the Sonata's approach to texture.

Much of the Sonata observes textural distinctions and differentiations which are typical of diatonicism. Thus it is possible to identify distinct foreground and background areas to the extent, as Bill Hopkins has observed, that "the sonata seems to have been conceived as a work for right hand with left hand accompaniment". [HOPKINS, 1980, p.17]. This is nowhere more exemplified than in the Sonata's first allegro section at bars 36-82, where solo melodic writing for right hand is juxtaposed with and accompanied by chordal writing in the left hand.
Also against the trend of the times is Goehr's use of the Sonata's set as a theme; that is, as a compositional entity whose characteristic identity is preserved throughout the course of the piece. The right-hand melody at Fig. 1 is just such a theme using the series in its retrograde aspect:

Figure 1

Unlike many twelve-note pieces, the Sonata is not monothematic since Goehr extracts a variety of other elements which will also be used thematically. Among these are the chords with which the Sonata opens, deriving from a linear segmentation of the series into three tetrachords:

Figure 2

Figure 3
Over and above the specifically thematic function of these chords, their positioning at the outset of the Sonata is indicative of the importance that the Sonata will attach to harmonic identity and to chordal sonority, while the set itself seems to have been constructed to promote a harmonic ambience of distinctly diatonic inflection. This is accounted for by the interval structure of the set in which minor thirds, and their augmented fourth multiples, predominate. Apart from these intervals the only others represented are the major second (twice) and the perfect fourth (once). Hopkins has suggested that Goehr acknowledges the 'alien' fourth by segregating pitches 0-1 of the series and projecting these as a distinct drumming motif, which first appears as an appendage to the chordal sequence given at Fig. 3. [HOPKINS, 1980, p.18] In so doing, Goehr removes the perfect fourth from the, subsequently, more linear statements of the series;

![Figure 4]
This suggestion is supported later in the piece when a variant statement of the set, presented as a unison monody, removes the fourth interval by substituting a different pitch for the second pitch of the set even though this duplicates a pitch (f) later in the series.

Figure 5

Alternatively, the segregation of the perfect fourth can be seen as part of a distinct tendency to further segment the series into dyads, a tendency which is hinted at from the outset with the segmentation of pitches 0-1 and 2-3 to form two-part chords (see Fig. 3).

Figure 6

The natural affinity of dyads 1 and 6 (by virtue of their common interval class and terminal positioning) is
acknowledged when in bar 17 the two dyads are combined to make a new thematic element:

![Figure 7](image.png)

Subsequently at bar 21 this new thematic element appears as a component part of yet another new element which utilizes all six dyads:

![Figure 8](image.png)

These thematic identities, along with others to be discussed, articulate a form which, in terms of its broad structural divisions and the presentation and treatment of thematic ideas within those divisions, owes much to sonata form. The full title 'Sonata in one movement for piano' also suggests something of the compression of a multi-movement piece within sonata form's single span, after the manner of Liszt's B minor Piano Sonata and Schoenberg's
Chamber Symphony No. 1. However, the Sonata's relationship to either the single or the double-function sonata pattern is an oblique one, and any interpretation of its structure must necessarily reflect a degree of ambiguity. This arises not so much from the identification of the Sonata's principal points of structural articulation than in assigning structural significance to these points. In fact, the Sonata divides quite readily into five sections whose demarcations are indicated in the score by double bar lines and are clearly audible in performance, since each is sharply characterized in terms of mood, tempo and thematic material:

| Section 1:    | Maestoso   | (1-35)   |
| Section 2:    | Allegro    | (36-81)  |
| Section 3:    | Tempo I, Andante | (81-149) |
| Section 4:    | Calmo      | (150-177)|
| Section 5:    | Allegro    | (178-end)|

Applying the double function sonata model mentioned earlier, the sections can be further described as follows:

<table>
<thead>
<tr>
<th>Introduction</th>
<th>1st Movement</th>
<th>Scherzo</th>
<th>Slow Mvt.</th>
<th>Finale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maestoso</td>
<td>Allegro</td>
<td>Andante</td>
<td>Calmo</td>
<td>Allegro</td>
</tr>
</tbody>
</table>

Figure 9
The *maestoso* section, although part of the exposition proper, is introductory in nature. Its abundance of thematic ideas, and frequent changes of mood and tempi, prevent the establishment of sustained momentum and continuity. Looked at another way, this first section might also be regarded as a piece in its own right, or perhaps a succession of pieces. Hopkins has observed how the four statements of the opening chordal succession comprise, within their brief span, the functions of exposition, development and recapitulation, corresponding to the progressive linearization, and eventual restoration, of the initial chordal alignment. [HOPKINS, 1980, p.18].

Figure 10
As well as asserting the harmonic priorities of the Sonata, this opening passage also reveals an interest in the manipulation of rhythmic cells, a technique which traces a line of descent from Debussy and Stravinsky to Goehr's teacher, Messiaen.

\[ \frac{3}{8} \quad \frac{3}{8} \quad \frac{3}{8} \quad \frac{5}{8} \]

Figure 11

The use here of the methods of regular and irregular augmentation and diminution is, later on in the section, applied to the monodic variant of the series to produce a passage which, in its approximation to the fifth movement of Messiaen's *Quatuor pour la fin du temps*, represents the closest that Goehr's music comes to imitating the actual sound of his teacher's music.
The Sonata's opening chords return at the close of the introduction. The feeling of finality and conclusion that this return to a point of initial departure brings is suspended by a brief passage (a piacere accel.) in which dyads of the series at P-0 are used to build up a quasi-impressionistic haze, which eventually comes to rest on an expectant pause, before the Sonata proper begins at section 2.

Where the first section was introductory, fragmentary and discontinuous, this second section is affirmative, coherent and continuous. That this is so has much to do with the restoration of a regular pulse as well as with the restoration of melodic continuity. The primary melodic idea of this section (see fig.1) establishes few points of contact with the motivic and thematic material of the Introduction. It employs the set in its retrograde aspect and avoids giving linear expression to the dyadic segmentation of the set.
In addition to this primary melodic idea, three other motivic ideas can be identified in this section. These motives differ from those of the Introduction in that, although all three are derived from the Sonata's basic set, they are used as independent units rather than as components in an otherwise complete compositional unfolding of the set. The three motives are as follows: a 'murmurando' motive, first heard at bar 49 (poco meno mosso), an 'arpeggio' motive, first heard at bar 72, and a 'wedge' motive, first heard at bar 41.

The 'murmurando' motive is largely based on one of the tetrachordal segments of the set. When first heard, the motive does not form part of a complete statement of the set, and in subsequent appearances it occurs at its original transpositional level, regardless of its immediate transpositional context.

The arpeggio motive is based on a succession of trichordal segments of a number of different set forms:
The relative transpositional levels of the set segments of the motive are determined by a new ordering of the pitch content of hexachord 0-5 in its inverted aspect.

The 'wedge' motive presents dyadic segments of the series in simultaneously ascending and descending motion in right and left hands respectively. At first appearance the motive uses the major second of dyads 1 and 6, but subsequently the minor third of dyads 4 and 5 and the tritones of dyads 2 and 3 are used:
The interval relationships between dyads of the ascending limb of the motive are, like the segments of the arpeggio motive, determined by a linearization of the pitch content of hexachord 6-11 of the basic set:
The hexachordal rationale of the ascending limb of the motive does not inform the descending limb on the motive's first appearance but at bar 230 the descending limb of the motive is an exact inversion of the ascending limb, but one which is disguised by distributing the descending tritones within linear statements of tetrachord 1 of several set forms.

Figure 18
The conclusion of section 2 marks the end of the Exposition. No new material is introduced beyond this point. Goehr might object to the term 'Development' to describe the section that follows, agreeing with Schoenberg that the term is inappropriate because it suggests germination and growth, which rarely occur, and because in many sonatas at least as much development takes place in the other sections as in the development section so called. In this sonata, for example, attention has already been drawn to the various and varied statements of the chords of the Introduction, the different rhythmic profiles of the octave monody at bars 25-30, and the variant forms of the 'wedge' motive. However these developmental tendencies took place within a context which is essentially stable. It is against this background that the development section proper derives its meaning and its function, which is one of disruption; disruption through variation and the placing of thematic material in new environments. How these things are achieved within a twelve-note context is the concern of the following pages.

The first thing to be said is that the serial procedures of inversion and retrogradation are not used as agents of thematic variation and metamorphosis. Like Berg, Goehr seeks to preserve the compositional identity of his material which is seen to reside in such features as melodic contour, texture and rhythmic physiognomy. Only the primary melodic idea of the second section appears in inversion, but significantly, this theme is excluded from the development...
section and only reappears at the start of the truncated recapitulation section. Given that most of the thematic/motivic material of the sonata is based on a tetrachordal or dyadic segmentation of the set, variation focuses upon the realignment of motivic components and set segments. The varied appearances of the 'cantando' theme first heard in the introductory section 1 make use of this technique. It will be remembered that this theme is a compound of 3 motivic ideas, and derives from a dyadic segmentation of the set:

![Figure 19](image)

The extensive restatement of the theme from bar 107 onwards realigns the figuration of motive Y with dyads other than 1 and 6 with which it was originally associated.

![Figure 20](image)
At bars 128-131 (lusingando a piacere) motives Y and X are presented as a linear unfolding of the series at RI-1:

\[ \text{Figure 21} \]

At bars 81-90 the music is based on the Maestoso chords at the beginning of the sonata. The music at these bars consistently acknowledges the tetrachordal and dyadic segmentation of the set, with which the chords were originally associated, but retains only vestiges of the textural and figurative characteristics of the original
In all the instances of thematic variation so far cited, the set context within which variation has taken place has always been readily apparent. This is not always the case. In certain sections, the relevance of the set to linear and harmonic formations is hard to establish suggesting that criteria other than those derived from the set are operating. This is also the case in section 4. For example, while the left-hand ostinato which extends from bars 150 to 158 is readily identifiable as dyads 1 and 2 of the set at P-O, the right hand figuration cannot be unequivocally resolved in terms of P-O or any other set form.
Looking back over the Sonata and its approach to twelve-note method, two principal features emerge: the thematic use of the set and a tendency to conceive the set in terms of segmental pitch content rather than interval succession. In the pieces following the Piano Sonata, the thematic approach to twelve-note method recedes in favour of a more athematic, Webern-like usage. Thematicism emerges again with the pieces approaching the Little Symphony. The tendency to conceive the set in terms of segmental pitch content remains central to Goehr's twelve-note method. One further feature is prophetic in the light of Goehr's later development and that is the tendency to promote a diatonically orientated musical language.
CAPRICCIO FOR PIANO OP.6
Capriccio was composed in August 1957. It is the last in a line of pieces, beginning with the Fantasias for clarinet and piano Op.3 of 1954, in which Goehr's compositional preoccupations reflected a closer contact with members of the post-Webern generation of European composers.

For a brief period, Goehr joined his European contemporaries on their home ground. Between 1955 and 1956 Goehr was a member of Messiaen's Master Class at the Paris Conservatoire, at the same time studying privately with Yvonne Loriod, to whom Capriccio is dedicated. During this time, Goehr became friends with, amongst others, Boulez and Nono, and also visited the Darmstadt Summer School of Music where in 1955 the Piano Sonata Op.2 and in 1956 the orchestral Fantasia Op.4 had both been performed.

Like the pieces immediately preceding it, Capriccio abandons the traditional textural differentiations, to which the Piano Sonata consistently subscribed, in favour of a textural norm in which such differentiations are dissolved within a single pitch continuum. Fragmented units comprising 2 or 3 pitches are pervasive, only occasionally coalescing into larger units. Properly speaking, melodic writing no longer exists; the consistent application of a Klangfarbenmelodie-like method of registral displacement militates against the perception of such fragments as being linearly connective. Equally, it is inappropriate to speak
of a distinctly harmonic dimension. Chords, or more accurately simultaneities, are still present, but they do not contribute to a consistently differentiated harmonic dimension against which other components are projected. Consistent with these post-Webern characteristics, Capriccio is atheamic, in as much as its elements are not projected within stabilized compositional presentations which have referential significance for the piece as a whole. Accordingly, the set on which Capriccio is based is defined solely in terms of its hexachordal pitch content rather than interval sequence. Each hexachord is further partitioned into four trichordal segments AB and CD of which B and D are, respectively, inversions of A and C. Occasionally an alternative type of trichordal segmentation is used, but this does not revise the hexachordal segmentation of the set.

![Diagram of hexachordal pitch content]

**Figure 1**

The set is all-combinatorial and will generate only two non-equivalent set-forms, P-0 (I-1) and P-1 (I-2). Goehr further delimits the pitch material of the piece by restricting the selection of trichords to those of the set at P-0. (See Figure 2.)
In other respects, Capriccio does not wholly identify with the post-Webern aesthetic: with the rare exception of occasional passages in which durational and dynamic series are used, only pitch is subject to serial manipulation. More significantly, however, the piece demonstrates a concern, if only vestigially, for traditional notions of form and continuity. Like much of Webern's music which operates against a background of traditional patterns, Capriccio, in terms of its broad morphology and to some extent its internal functioning, demonstrates some relationship to sonata form. For example, Capriccio reaches a major climax at roughly its two-thirds point (bars 46-47). Thereafter, the piece makes reference back to earlier music and it is tempting to label this part of the music a recapitulation, except that this would imply too literal a
restatement of material than actually takes place.

Within these broad continuities, Capriccio subsumes short term ones. This is to say that Capriccio is compounded of short sections of music which for the most part follow on from each other without a break. Each section is characterized according to texture, mood, tempo and most significantly, musical material: notwithstanding the general athematism of Capriccio, individual sections achieve a localised thematicism by means of an internal antecedent/consequent structure, in which the antecedent functions as model and the consequent as variant.

This formal device is well demonstrated in sections 2 and 3. In section 2 (bars 6-12) antecedent and consequent relate as prime to inversion. The linear expression of trichordal segments of the antecedent is, in the consequent, subject to exact inversion. The rhythmic structure of the antecedent is largely retained in the consequent, subject to the modification of individual durational cells.
Section 3 (bars 13-18) demonstrates a similar inversional relationship between antecedent and consequent, but in the consequent the resultant pitches of the inverted antecedent provide a framework around which other figures aggregate themselves. This section is also significant in its use of a dynamic series which is inverted in the consequent:

---

1 The incongruent $B^h$ in bar 14 is assumed to be a misprint for $B^b$ (see Figure 4).
The climax of Capriccio at the end of section 7 (bars 46-47) gives way to a more continuous section in which reference is made to music already heard in the earlier part of the piece. As I have already suggested, to describe this section as a recapitulation might indicate too literal a reprise. However, much of the compositional identity of the musical material is preserved. For example, the reprise of the antecedents of sections 2 and 3 preserve very accurately the rhythmic and textural aspects of their originals. Variation is achieved by inverting the linear direction of the music and by changing the trichordal orientation.
These rhythmic and textural features are preserved even when the earlier music is conflated into a single compositional event as at bars 57/58:
If these and other variational techniques, which preserve above all else the rhythmic identity of Capriccio's musical material, indicate a subsidiary role for pitch, this would seem to be supported by the properties of Capriccio's basic set which, as I have already observed, is all-combinatorial and will generate only two non-equivalent set forms. This acute compression of pitch content, which the choice of set imposes, coupled with severe harmonic delimitation, whilst ensuring a distinct harmonic ambience, also has the potential to frustrate harmonic interest and invention. It is this essential harmonic immobility of Capriccio which provides the necessity for the hyperdefinition of rhythmic cells as well as the juxtaposition of dynamic extremes, all of which serve to enliven the fundamental stasis of the piece.
TWO CHORUSES OP.14; NO.1
The two Choruses Op.14 arose out of Goehr's experience of choral writing acquired in the composition of his cantata Sutter's Gold Op.10. This piece, commissioned by the Leeds Festival in 1961 was Goehr's first attempt at choral composition and he has told how he approached the task with a disregarding attitude for the amateur traditions of the genre:

I encouraged myself not to be too concerned with its practicality, partly from an anti-conventional attitude of "Let them have it" and partly from my simple lack of knowledge about how to write for a big chorus.  

[NORTHCOTT, 1980, p.14]

By all accounts the first, and only, performance was an almost unmitigated disaster; according to Hugh Wood "even minimum standards of rhythmic accuracy and ensemble were not achieved".  

[WOOD, 1980, p.24]  

In the aftermath, Goehr identified the essential problem to be one of harmony. Like the pieces immediately preceding and succeeding it, Sutter's Gold is informed of a certain harmonic anonymity, or rather a harmonic identity which is a secondary rather than a primary part of the music's intention. While this has little significance for the orchestral player, it can cause problems for the singer who is not blessed with perfect pitch: the pitching of notes and the gauging of intervals becomes difficult when these cannot be related to...
a clearly defined harmonic context. However, in the first of the Two Choruses, Goehr not only established harmony as a compositional priority, but also laid the basis of a harmonic method that was to sustain his music until the Psalm IV setting of 1976.

The nature of this new-found harmony centres upon the formulation of pitch collections which, if not wholly diatonic, are reminiscent of the euphony associated with traditional diatonic harmony, and the projection of those collections either as chords or as criteria for the harmonic association of pitches.

However, the harmonic ambience of the piece may not be the only factor to strike the listener forcibly. He may well be impressed by a strong sense of melody; for the first of the Two Choruses is as much concerned with melody as with harmonic euphony. Indeed, the two dimensions are polarized at the beginning and the conclusion of the first Chorus: between an opening solo recitative and a concluding chorale. Between these polarities occurs a process of mediation, of harmonic and melodic integration in a way that is audibly significant in terms of the chorus's formal divisions, and the sense of the text. This is drawn from Milton's Paradise Lost and forms a continuous narrative whose inner sense suggests four divisions. The narrator (the text is written in the first person) considers the nature of man: that he is corrupted in peace no less than he is wasted by
war. The question "How comes it thus?" closes an initial introductory section (p.4) The two following sections consider respectively the susceptibility of oppressor and oppressed alike to corruption. The former "shall change their ways to pleasure ease and sloth", the latter "shall all virtue lose". The concluding fourth section reflects that the "earth shall bear more than enough that temperance may be tried".

The broad divisions of the chorus may be traced to those of the text. After an introductory section which alternates solo recitative with choral writing of implicitly harmonic type at "peace would have crowned with length of happy days the race of man" (pp.1-3) and explicitly harmonic type at "How comes it thus?" (p.4), the piece continues in alternation of sections which relate respectively to these two musics: recitative and harmony. Goehr had proceeded in a similar manner in the first movement of the Violin Concerto Op.13 where sections deriving from a solo Cantus alternate with sections from which the Cantus is absent. In the Chorus those sections deriving from the recitative progressively take on the identity of the harmonic sections in their tendency to appear in a progressively increasing state of harmonization. The first culmination of this tendency coincides with the conclusion of section three of the text (Tempo 1 p.9) and marks the point of most sustained and chordally aligned harmonization of the recitative thus

1 Page numbers refer to those in the published score.
far. Significantly, this is followed by the most expanded version of the other harmonic section (Tempo 2 p.10). The piece now continues in consideration of the "conquered" and the process of harmonic/recitative sectional alternation continues, coupled with increasing mediation between the two. This culminates at the words "Therefore cool'd in zeal" and continues to the final section of the piece and the closing chorale.

Although the identity of the recitative sections is to some extent modified by that of the harmonic sections, there are other factors which serve to maintain a differentiation between the two types of music. Each is consistently assigned a distinct tempo: con moto (Tempo 1) for the recitative music, and Piu Mosso (Tempo 2) for the harmonic music. Where the harmonic music is always imitatively polyphonic in its textural presentation, that of the recitative music varies from overt homophony to free counterpoint, and where the recitative music is multi-durational, the harmonic music is mono-durational.

The Recitative with which the Chorus opens is a modified version of the work's basic set; a linear segment comprising pitches 1-2-3 is extracted and stated before pitches 0-5 are allowed to proceed in their normal order. In turn, these latter pitches are restated before pitches 6-9 are announced. Pitches 10-11 are not used in the initial presentation of the Recitative.
Figure 1

The Recitative cannot properly be regarded as a theme. Only in the introduction are the Recitative's initial rhythm and contour preserved, and even here not without modification.

Within the main body of the Chorus, the Recitative is sometimes regarded as an abstract interval succession. For example, the following linear extracts relate more directly to the interval succession of the recitative than to that of the basic set.

a) Recitative Interval Succession cf. Fig. 1
At other times, the fragmentation of the Recitative is such that linear elements can be as readily identified in terms of the set as much as the Recitative itself:
Since the Recitative is closely aligned with the set, fragmentation of the kind shown at Figure 3 does not significantly undermine the identity of such passages. On the other hand, the linear writing of the harmonic sections derives only from the hexachordal pitch content of the set and owes nothing to its interval succession; where the linear writing of the Recitative sections has both wide and narrow intervals, that of the harmonic sections is built up almost entirely from tones and semitones, arranged in either ascending or descending scalic patterns. This denial of a distinct melodic identity serves to focus attention on the
essentially harmonic nature of the so called 'harmonic sections'. In such sections, linear independence is subordinated to vertical alignment, which in turn is determined by linear and non-linear trichordal segments of the basic set. The first harmonic section (Introduction, bars 12-19) will serve as a useful first example. In this section trichordal segments of the set at P=6 are used.

Figure 4

Segments 3 and 4 are linear segments (in as much as they represent linearly adjacent pitches of the set) and as such can be seen as models for segments 1 and 2 (their respective inversions) which are non-linear selections from the pitch content of hexachord 0-5. In the following example the vertical alignment of pitches is determined by a continuous alternation of segments 1 and 2:
Trichordal segments only allow for the alignment of three pitches, but as the above example shows, there are many alignments of four pitches. In each instance, the additional pitch is located in the complementary hexachord of the set and demonstrates a consistent association between pitches of trichords 1 and 3 and trichords 2 and 4. This
association can be understood as a function of the semi-combinatorial property of the set. Over and above the combinatorial pairing that exists between the set in its Prime and Retrograde aspects, and which all sets demonstrate, the set of the Chorus also forms combinatorial pairs between Prime and Inverted forms. It is to the combinatorial pairing of P-6 and I-9 that the trichordal association at Figure 5 can be traced.

![Figure 6]

As I have already suggested, the harmonic ambience of the piece is strongly diatonic. That this is so is due to a tendency to combine a complete trichord with a single pitch from its combinatorial partner so that the resultant collection resembles a major or minor triad plus one additional pitch. At Figure 5 there are many instances of simultaneities that would attract diatonic interpretation of which the following are just three examples:
Presented within the rather atomized textures of the Tempo 2 sections, the diatonic effect is somewhat mitigated. But at other times the effect is very strong, nowhere more so than at the closing Chorale where the overtly chordal presentation as well as the spacing of the parts indicate that such an effect is a primary and frank part of the music's intention:

**Figure 7**

**Figure 8**
Not all vertical alignments or simultaneities in the Chorus conform to this quasi-diatonic interpretation: certain trichordal pairings simply do not lend themselves to such an interpretation while other simultaneities depend upon criteria not directly related to the combinatorial model discussed so far. For example, the 'liberamente' passage that closes the Introduction prolongs the bass C# into harmonic associations not sanctioned by the combinatorial model, while at the sixth bar of Figure 9 a chord is presented which contains pitches from trichords 1, 2 and 3.

\[\text{Figure 9}\]

The means by which the identity of the harmonic sections is transferred to the Recitative sections derives from the combinatorial model already discussed. Pitches of the Recitative at, say, P-0 are located within the appropriate
trichordal segment of P-O (the Dominant trichord) and thereby gain access to the pitches of the combinatorial trichordal partner (the Recessive trichord). 2

![Musical notation diagram](image)

Figure 10

In the following example (p.13 of the score) the Recitative at P-11 is harmonized according to this method:

---

2 The terms Dominant and Recessive are here used by analogy with the differentiation that distinguishes Dominant and Recessive genes in the study of genetics. No analogy with the function of the Dominant in Tonal theory is intended.
I have drawn attention to the various compositional factors which serve to distinguish the Recitative and Harmonic sections. In this respect, one further factor remains: the Harmonic sections are consistently derived from a single set form but the Recitative sections may relate to a number of set forms. Further, the single set form of the harmonic sections always maintains the concluding set-form of the preceding Recitative sections. In this way, the alternation of Recitative and Harmonic sections can also be seen as a succession of pairs which are bonded by a common
set form. In this pairing the Recitative sections are determinant and the Harmonic sections resultant. Accordingly, any rationale for the Chorus's choice of set forms will reside within the Recitative sections and at the point of interface between successive pairs of sections.

An examination of set form choices within Recitative sections indicates that they are associated on the basis of commonly held linear segments. The extended Recitative section (Tempo 1) at pages 12/13 is typical in this respect. Forms of the Recitative at RI-0, I-0 and P-11 are compositionally associated on the basis of commonly held linear segments:

![Figure 12](image-url)
At the interface of Harmonic and Recitative sections the linear arrangement of pitches within one or other part of the Harmonic section will frequently identify with a Recitative segment at the beginning of the following Recitative section:

![Musical notation](image)

Figure 13

The association of set-forms on this basis will have some significance in the formulation of linear ideas in the last movement of the Little Symphony and is central to Goehr's concept of the 'Serial-idea' which is discussed in the final chapter.
Goehr composed his Little Symphony between February and May 1963. It was commissioned by the York Festival to be performed at a concert given in memory of the composer's father, Walter Goehr, who had recently died.

The circumstances of the commission had a direct effect upon the nature of the Symphony. The first performance was to take place in York Minster itself, and this venue accounts for the work's reduced symphonic forces (of strings, tuba, 2 horns, bass clarinet, 2 oboes and flute doubling piccolo) to take account of the resonant acoustics. More significantly perhaps, the form of the piece arose out of the difficulty Goehr experienced in writing what was in effect a memorial to his own father: a man of some considerable irony and "not the sort of person for whom one would lightly write a memorial" [GRIFFITHS, 1985, p.14]. Because Goehr's father would have rejected the very idea of a memorial piece, Goehr felt obliged to avoid any hint of sentimentality, and saw what he has described as 'objective forms' as the surest way of doing this [ROWLANDS, 1986]. Hence the first movement is a simple chorale, consisting of 19 chords of uniform rhythmic duration; the second movement is a set of 18 variations on the first movement chorale and the third movement a scherzo and trio. The final movement is the most complex, combining slow and fast music within a detailed reprise structure that also incorporates a brief sonata.
movement. This movement is also the most obviously dedicative, since it includes a quotation from Schoenberg's Chamber Symphony Op.9, which was a favourite piece of the composer's father.

The first music to be notated was that of the theme of the Scherzo, i.e. bars 1-25 of the third movement. According to the composer, this was composed at a single sitting one evening in Berlin [ROWLANDS, 1986]. Thereafter the Symphony was completed very rapidly in about three weeks [GRIFFITHS, 1985, p.14]. The composer's sketches, as revealed to the author, relate very closely to the finished Symphony with very few revisions.

The title 'Little Symphony' is in imitation of a symphony of the same name by the composer's mentor and friend, Hans Eisler [GRIFFITHS, 1985, p.14]. However, correspondence between the two works is negligible.
Before proceeding to a discussion of individual movements of the Little Symphony it will be useful to consider first the Symphony's basic pitch assumptions.

With the exception of the scherzo music of the third movement (i.e. all of the third movement, excluding the Trio at bars 148-188), the Little Symphony is based on the following basic set:

![Figure 1](image)

As I have already indicated, first ideas for the Symphony related to the scherzo music of the third movement which, as the composer has said, was written at great speed and without reference to a priori pitch formations[GRiffITHS, 1985, p.14]. The basic set on which the rest of the Symphony is based was formulated later in the compositional process and, as the composer has further indicated, was derived from the scherzo music itself [ROWLANDS, 1986]. As fig. 2 demonstrates, the linear ordering of pitches 0-6 of the basic set at R-0 is clearly revealed by the primary scherzo theme, but the succession of pitches 7-11 only
Having isolated one hexachord of the basic set, it is possible to isolate, at least in terms of pitch content, the remaining hexachord. The rationale for the linear ordering of this remaining hexachord derives from the ordering of hexachord 0-5 of which hexachord 6-11 is an inexact inversion. Inexact, because hexachord 0-5 will not produce a twelve note aggregate in conjunction with its own inversion under any transposition. Therefore, some minor adjustments are necessary as indicated below;

At fig. 3 the exact inversion of the interval sequence at 0-5 duplicates pitches 2 and 3. Changing these pitches in the inversion as indicated removes the duplication and produces the second hexachord of the basic set at R-0.
Although it is possible to identify a fixed linear ordering for the basic set, the basic set itself is rarely projected across the surface and breadth of the music as a melodic entity, much less a thematic one. Such compositional appearances as it does make are few, and almost exclusively confined to the variations of the second movement. For example, in variations 14 and 15 the basic set is used in the manner of a cantus firmus, successive pitches appearing singly, predominantly one pitch per bar, and functioning as points of reference in relation to which other components of the texture are co-ordinated.

Figure 4
In other variations, the linear ordering of the basic set forms part of the music's figurative surface, as in variations 6 and 7 in which the basic set at R1-1 is employed. But these appearances do not form part of the Symphony's thematic intention, since they do not contribute to a stabilized compositional guise. For the most part then, the basic set functions as a sub-thematic entity, since it determines and informs all pitch relations within the piece, while only occasionally intruding onto the music's immediately perceptible compositional surface.

The primary linear/thematic formation of the Symphony is the melody of the first movement Chorale. The relationship of this melody to the Symphony's basic set takes account of the set's interval succession and hexachordal pitch content. As the following example shows, pitches 1-8 and 9-20 of the chorale melody are, respectively, permutations of the pitch content of hexachord 0-5 and 6-11 of the basic set. However, as fig 5 also shows, the original set ordering also has relevance for the Chorale Melody in as much as they both share the same initial and terminal pitches while the succession of pitches 8,9 and 13,14,15 of the Chorale Melody are also derived from the ordering of the set.
Figure 5

The Chorale Melody also assumes a non-linear trichordal segmentation of the basic set.

Figure 6
Trichordal segments 1, 2, 3 and 4 of the basic set also determine the vertical alignment of pitches throughout the Symphony. Each vertical alignment or simultaneity also assumes an association between hexachordally corresponding trichords, so that trichord 1 is associated with trichord 3 and trichord 2 with trichord 4. This association can be understood in terms which are related to the combinatorial model established in the first of the Two Choruses. It will be remembered that in the first Chorus the combinatorial pairing of P & I set forms provided a rationale for the association of trichordal segments of the basic set. In the Little Symphony the same association of trichordal segments also depends upon combinatorial pairing. By pairing pitches of the Symphony's basic set in this way an association is set up between constituent pitches of trichords 1 and 3, and 2 and 4 as follows:

![Figure 7](image_url)

Although the combinatorial pairing of trichords in this way produces collections of 6 pitches, the normative density of simultaneities in the Symphony, as in the first Chorus, is
only 4 pitches, consisting of a complete or Dominant trichord and one additional pitch selected from the Recessive trichord. The comprehensive application of this procedure produces a range of twelve such simultaneities, to one of which all simultaneities of the Symphony refer:

\[ \text{Figure 8} \]

**MOVEMENT 1: Lentississimo, molto sostenuto**

In the first movement, the simultaneities at fig. 8 are projected as a succession of 19 four part chords, rather in the manner of a chorale.\(^1\)

\[ \text{Figure 9} \]

\(^1\text{(This figure reproduces Julian Rushton's short-score transcription of the Chorale [RUSHTON, 1980, p.62].)} \)
In each chord, the Dominant trichord accounts for the three upper pitches, and a single pitch from the recessive trichord for the lowest pitch. The trichordal orientation of the chorale melody also determines the harmonic succession of the chorale. Pitches of the melody which are, say, components of trichord 1 are incorporated into the chordal presentation of trichord 1, after the manner of the harmonization of the Recitative of the first Chorus. In this way, the harmonic succession is segmented into trichordal regions which mirror those of the chorale melody itself:

<table>
<thead>
<tr>
<th>Chorale Chord</th>
<th>1-3</th>
<th>4-6</th>
<th>7-8</th>
<th>9-10</th>
<th>11-12</th>
<th>13</th>
<th>14-17</th>
<th>18-19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Melodic and)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harmonic )</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Trichordal )</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Succession )</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bass trichordal Succession</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Figure 10

The Chorale also seems to have been conceived as much a polyphonic as a purely homophonic structure in that the four pitch layers of the chorale can be identified as 'voices' in just the same way as the chorale melody: that is, as trichordal permutations of the hexachordal pitch content of the basic set.

In this respect, the bass voice warrants special attention. It will be seen from fig. 10 that the bass represents a
retrogradation of the trichordal sequence of the three upper voices. This is simply a function of the combinatorial pairing of trichords, the preservation of which accounts for the disruption of the bass retrograde sequence at regions 4 and 5. Like the three upper parts, the bass is conceived as a voice, but since it is consistently drawn from the recessive trichord, it thereby qualifies or defines each individual chord. In this respect the bass of the chorale is analogous to a bass or root in diatonic music.

In subsequent movements of the Symphony the chorale functions as both a compositional and sub-compositional entity. While its characteristic compositional features are often recognisably preserved so that the chorale is projected as a theme, the chorale also functions as a matrix or source from which other non-thematic pitch relationships are derived.

MOVEMENT 2 (18 Variations)

The 18 chorale variations which comprise the Symphony's second movement demonstrate this duality of function particularly clearly. Certain variations such as 1 and 10 bear a direct and immediately perceptible relationship to the chorale, involving little or no revision of the chorale's basic pitch assumptions. In others the variational relationship is more oblique. It is with this latter type of variation that the following discussion is
Variations 3, 4, 5, 11 and 17 are primarily concerned with the presentation of varied statements of the chorale melody and with the melody's varied harmonization. In each of these variations the pitch sequence and contour of the chorale melody are more or less preserved, the main method of variation being the interpolation of additional pitches, which are always hexachordally and sometimes trichordally congruous. A simple example of this is provided by variation 3. It will be seen that the pitches marked with an asterisk correspond in sequence and contour to the chorale melody. The ascending grace note figures form trichords of the basic set in conjunction with their host pitches, while additional pitches within the melodic line itself are hexachordally congruous:

\[ \text{Chorale Melody pitches} \text{, Interpolated pitches} \]

\[ * = \text{Chorale Melody pitches} \]
\[ o = \text{Interpolated pitches} \]

**Figure 11** (cf. fig. 5)

In variations 11 and 17 the chorale melody pitch sequence is preserved in retrograde, but the melodic contour is largely
abandoned. The additional pitches in variation 11 almost always form adjacencies that relate to the trichordal segments of the basic set:

![Figure 12](image)

The location of melody pitches at various levels within the four-part harmonic structure of the chorale enables a given pitch to be associated with a choice of four different chords. For example, the pitch e occurs at soprano, alto, tenor and bass levels respectively in the following chords drawn from the chorale at P-O:

![Figure 13](image)

Variations 3, 4, 5, 7, 11 and 17 all provide examples of this method of alternative harmonization. In variation 11 the
pitches of the solo oboe melody are consistently regarded as bass pitches of the chorale at P-O. The accompanying two-part harmony on violas represents the melody and alto voices of the particular selection of chords which this procedure produces:

Figure 14

In variation 17 the melody pitches of the solo horn, a largely unvaried statement of the chorale melody at R-O, are located at progressively lower levels within the harmonic structure, a procedure which mirrors the progressive descent of the melody through the texture of the music: when the melody pitches are located in the alto register they are harmonized as alto pitches and so on:
The most extensive transformation of the chorale occurs in variations 8, 13, 15 and 18. In these variations Goehr employs for the first time in his music a method of transformation which systematically alters the transpositional relationship among the chorale's constituent chords.

In the Poetics, Goehr demonstrates this method in relation to the same dyadic structure that was used at fig. 7. By reconstructing each dyad on the lower pitch of the first dyad and then the second, and so on, rather in the manner of successive pedals, the relationship between individual pitches of the originating set is altered:
Although this transformational pedal device is presented in the Poetics as a means of distorting linear structures, in the second movement of the Little Symphony the devise is used as a means of distorting the transpositional relationship between chords of the chorale. Variation 8 provides a good first example of this. This variation uses two pedal pitches, d & f, respectively pitches 10 and 11 of the basic set at R1-1, given out on strings at the close of the preceding variation. Pitches d & f substitute for pitches of the chorale melody at P-0. The 19 chord sequence of the chorale is reconstructed in relation to either of these two pedal pitches, thus disrupting the original transpositional relationship between those chords:

![Figure 17](image)

Variation 13, like variation 8, uses two such pedals in alternation, but in conjunction with a chordal sequence which does not derive from the chorale succession although individually all the chords can be identified as one or other of the 19 chorale chords:
The chordal sequence 152634 which occurs in bar 98 (fig. 19) also informs variations 14, 15 and 16. Variation 14, it will be remembered, used pitches of the basic set at P-0 in the manner of a cantus firmus, individual pitches of the set appearing singly, one pitch per bar. Each pitch is harmonized as a melody pitch of the chorale at P-0, each such harmonization initiating a permutation of the chordal sequence 152634:

The second part of variation 14 promotes a sequence of chords drawn from the latter part of the chorale: 14.10.12.9.11.19. Again, permutations of the sequence are determined by the initial harmonization of pitches 6-11 of the basic set:
Much of the same procedure can be observed in variation 15 when each pitch of the basic set at P-0 acts as a transformational pedal to the two chordal sequences identified in the previous variation:

Figure 20

Figure 21^2

^2 Bar 118 has consistent mistakes in the D# in the violins. If Db, as is expected after Db earlier on in the bar, the result is correct and as shown in the example.
Variation 16 combines both sequences of chords. In the first part of the variation, two statements of pitches 0-5 of the basic set at P-0 are presented in canon at the highest and lowest parts of the texture. The sequences 152634 and 14.10.12.9.11.19 are preserved and constructed in relation to the upper and lower statements of the set respectively. In the second part of the variation pitches 6-11 of the basic set at P-0 are employed, but only one statement is used:
Figure 22
MOVEMENT 3 - TRIO (Quasi andante, molto semplice)

As I have already indicated, of this movement, only the Trio is referable to the chorale matrix established at the outset of the piece in the form of the nineteen chord chorale. The Trio demonstrates variational techniques familiar from the first movement, techniques which focus on the alternative harmonization of individual pitches. For example, at bars 148 to 160 the melody of horn 1 is, for the purposes of harmonization, regarded as the alto line in a sequence of chords extracted from the chorale at P-0:

Figure 23
At bars 161-173, the horn melody is taken up by solo oboe (and later by the bass clarinet) and, for the purposes of harmonization is regarded as a bass line upon which harmonies of the chorale at P-0 are constructed:

Figure 24
Similarly, the cello melody at bars 196-198, harmonized at its first appearance as a bass line, is subsequently given a variety of treatments. For example, if the melody is transposed and inverted in the following manner:

![Figure 25](image)

and if the formation T is then regarded as the uppermost layer of pitches in a sequence of chords of the chorale at p-0, then the inner parts produced can be identified as the series of descending dyads on horns at bars 202-204:

![Figure 26](image)

**MOVEMENT 4 - Quasi recitando, tempo commodo**

The finale has a compound, sectional approach to musical form in which a central sonata structure is flanked on one side by slow introductory music, which is subsequently interpolated between the development and recapitulation of
the sonata, and on the other side by a coda:

<table>
<thead>
<tr>
<th>Section</th>
<th>Slow Music</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-22</td>
</tr>
<tr>
<td>2</td>
<td>23-31</td>
</tr>
<tr>
<td>3</td>
<td>32-47</td>
</tr>
</tbody>
</table>

**Sonata**

<table>
<thead>
<tr>
<th>Section</th>
<th>Slow Music</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>48-83</td>
</tr>
<tr>
<td>5</td>
<td>84-111</td>
</tr>
<tr>
<td>6</td>
<td>112-117</td>
</tr>
</tbody>
</table>

**Slow music**

<table>
<thead>
<tr>
<th>Section</th>
<th>Slow Music</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>118-141</td>
</tr>
<tr>
<td>8</td>
<td>142-145</td>
</tr>
<tr>
<td>9</td>
<td>146-166</td>
</tr>
</tbody>
</table>

**Sonata**

<table>
<thead>
<tr>
<th>Section</th>
<th>Slow Music</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>167-202</td>
</tr>
<tr>
<td>11</td>
<td>203-end</td>
</tr>
</tbody>
</table>

**Figure 27**

The music of sections 1 and 2 brings back thematic material not so explicitly stated since the first movement. The opening solo flute figure has the first nine pitches of the chorale melody while section 2 has the opening chords of the chorale itself in its original compositional guise. The closing pitches of the opening flute figure g\#-a-f\# (respectively pitches 5, 6 and 7 of the basic set at P-O) are taken up by the clarinet at bar 7 and harmonized as melody

---

3 The score has an F\# for pitch 8 of the Chorale Melody instead of the expected G\#. This is assumed to be a printing error.
pitches of the chorale at P-0:

Figure 28

At bars 17-18 pitches g♯-a-f♯ are taken up by the horns and regarded as pitches 8-9-10 of the basic set at I-1:
Figure 29

A similar association of P-0 and I-5, on the basis of common linear segments, takes place in section 7. As before, comparison of P-0 with I-5 reveals a number of common linear segments:

Figure 30

At fig. 31 the commonly held linear segment e-f-e-g provides the point of contact between the two set forms:
The three forms of the chorale, to which P-0, I-1 and 1-5 give rise, define similar pitch areas. Pitches are duplicated between corresponding and non-corresponding hexachords of P-0 and I-1 which in turn produce pitch duplications between certain of their respective trichordal segments:

Figure 31

Figure 32
It follows that the chords of chorales constructed from set forms I-1 and I-5 will often have similar pitch contents to those of the chorale at P-0, and that the chorales as a whole will define different but related pitch areas. In the following diagram the chorales at P-0, I-1 and I-5 have been rearranged to make apparent the pitch duplications between the constituent chords of each chorale:
To this extent, the chorales can perhaps be regarded as analogous to keys or tonalities in diatonic music in as much as they each define a unique pitch area while at the same time sharing pitches in common. The structural disposition of music derived from the chorales at P-0, I-1 and 1-5 suggests that some such equation of key and chorale was in operation as the following plan attempts to show: that which originally appears at I-1 returns at 1-5, while overall, P-0 functions as a kind of tonic or area from which to depart and ultimately to return.

Sections:

1, 2 and 3  Slow music  P-0/I-1
4  Sonata Expo.  I-1
5  Development  I-1
6, 7, 8 and 9  Reprise of slow music  P-0/I-5
10  Sonata recap.  I-5
11  Coda  I-5/P-0

Figure 34

Both sections 3 and 9 give rise to linear formations whose derivation depends upon the multi-layered structure of the chorale and upon the possibilities that the chorale as matrix offers for the variable harmonization of individual pitches. The first such formation occurs at bars 32-35 where pitches of the solo violin melody are regarded as bass pitches of the chorale at I-1:
The underlying rationale for this passage derives from a chord sequence which is only made compositionally explicit in the reprise of section 3 (section 9). Between bars 153 and 156, the chord sequence 62463 at 1-5 underpins the decorative figuration on solo clarinet and violin:
If this sequence is rendered in terms of I-1 it will be noticed that the tenor sequence d-d♭-g-d-f comprises the pitches of the violin solo at bars 32-35 (see fig. 36):

![Figure 37](image-url)

The sequence 62463 at I-1 constitutes the matrix from which the violin solo at bar 36 is derived. Treating the soprano pitches of the 62463 sequence at I-1 as bass pitches, the sequence 11, 19, 12 (15), 16, 18 (9) is produced:

![Figure 38](image-url)

Each of the three upper voices is now regarded as an independent linear segment, the arrangement of which, in the order 1,3,2 provides the pitch sequence for the violin solo at bar 36:
Similar operations upon the chord sequence 62463 at I-5 will produce the violin solo at bar 157:

The factors surrounding the quotation from Schoenberg’s Chamber Symphony No 1 in section 9 have already been mentioned in the introduction. Julian Rushton has rightly
commented on the feeling of inevitability with which the quotation is heard. [RUSHTON, 1980, p.65]. At the same time, the quotation marks which appear in the score are, in a sense, heard in performance, implying a certain detachment from context. An early anticipation of the quotation occurs at bars 32-35, which, in terms of the movement's reprise structure, correspond to those of the quotation. These corresponding bars share a similar four-part harmonic texture, similar orchestration of solo violin and string accompaniment. Perhaps more significantly, the quotation's semitonally descending figure g-f#-f is anticipated by the solo violin's d-c#-c figure at bars 32-33. Similarly, the quotation's predominant rhythmic figure is widely adumbrated at bars 17-18, 19-20, 55-57 and 81-82.

To a great extent the pitch relationships within the sonata exposition are determined by the non-linear chordal sequences already discussed in relation to the slow music of sections 1, 2, 3 and 7, 8, 9. Broadly speaking, the exposition juxtaposes three thematic elements: a chordally repeating for horns and strings (first heard at bars 48-51), a contrapuntal passage for strings (first heard at bars 52-55), and a tutti chordal idea cast in predominantly dotted rhythms (first heard at bars 55-58).

The horns/strings at bars 48-51 derives from the compositional separation of the different pitch layers of the matrix. This was already hinted at in section 1 of the
movement at bars 14-16 where the repeated statements of chord 14 of the chorale at I-1 omit the soprano f♯ only to restore it at the entry of the solo violin at bar 16:

![Musical notation of a piece of music](image)

**Figure 41**

This technique is expanded at bars 48-51 where two chords of the chorale at I-1 are used (2 & 6), each omitting their soprano pitches b♭ & b, which are restored at bar 50 by solo violin:
Figure 42

At bars 59-62 the same technique is used in conjunction with chords 6 & 3 of the chorale at I-1 while at bars 70-75 the sequence 2634 is used, a permutation of the sequence already observed in connection with the violin solo at bar 36. In this example, the horn parts at bars 70-71 are derived from the alto and tenor layer of the chord sequence while the entry of the soprano and bass layers on strings is delayed until bar 72.
The second thematic element of the exposition makes use of linear material already familiar from the chordal sequences of sections 3 and 9. For example, the cello figure at bar 52 has the soprano line of the sequence 62463 at I-1 while the tenor line of that sequence supplies the pitches of the unison melody at bar 76.

The third thematic element relates more directly to the primary pitch sources of the symphony. In its fullest statement at bars 79-83 it comprises a harmonization of the pitches 7-8-9-10-11-7-6 of the basic set at I-1 according to chords of the chorale also at I-1:
The development also makes a return to material more immediately perceivable in terms of the symphony's primary pitch sources. The chordally repeating motive of the exposition is adapted to the presentation of linear segments of the chorale melody at I-1, individual pitches appearing singly, one pitch per bar, as in certain of the variations of the second movement. When presented in this way, pitches of the chorale melody are treated as bass and tenor pitches of the chorale at I-1:
The Recapitulation (bars 167-202) is a more or less exact repetition of the exposition but relating to the chorale at I-5 instead of I-1. The Coda comprises a complete statement of the chorale at I-5 giving way at bar 232 to a partial statement of the chorale at P-0.
STRING QUARTET NO. 3 OP. 37: 1st. MOV. E.
In an interview with the composer [ROWLANDS, 1986] it was disclosed that the first movement of the String Quartet No.3 had been modelled on the first movement of the Piano Sonata Op.90 by Beethoven. Goehr's use of specific models as a basis for original composition goes back some considerable way. He has told how one of his earliest compositions, a piano suite, written at the age of 15 was "very obviously modelled on Stravinsky's Serenade in A" [GOEHR, 1980, p.10] and he has said in interview [ROWLANDS, 1986] that there is hardly a single piece in his oeuvre which does not have a specific model. Some of these models have been revealed, others have not. Among those which have are the Concerto for Eleven, Op.32 and the Metamorphosis/Dance Op.36 modelled respectively on the Beethoven piano sonatas Op.101 and Op.111.

Given Goehr's Schoenbergian heritage and his fondness for analysis, this predilection for model-based composing is not difficult to understand. Schoenberg's teaching, as witnessed by his didactic works "Models for beginners in Composition" [SCHOENBERG 1942] and "Fundamentals of Musical Composition" [SCHOENBERG 1967] was based on a close analytical study of the music of the Classico-Romantic past, out of which models of musical structure were extracted. In this connection Goehr has commented:
Perhaps because I was not a good instrumentalist (who could go through the literature early on and get tired of it!), studying music, especially of the classical and romantic composers, and trying to understand how it functions - and I think if one composes one has a little insight into such matters - remains very much the other side of composing. Ideally, studying, say a Chopin Mazurka, means learning to write it again in one's own terms.

[GOEHR, 1980, p.104]

In the case of the String Quartet No. 3, the nature of the modelling is so precise that the quartet amounts, like the Chopin Mazurka example above, to a recomposition of the Beethoven. Such a recomposition raises a number of analytical issues which stem from the conjunction of a specifically diatonic model and Goehr's twelve-note method, for the matrix technique is still very much in evidence in the Quartet. Of course, Goehr has, at least since the Little Symphony, worked with a musical language which is diatonically orientated, and so the potential for conflict between form and language is diminished. Yet, on past evidence, the matrix method would not seem to lend itself very easily to compositional extrapolation along the lines of a classical sonata form: the matrix method arose to serve an essentially discontinuous, variational, monotranspositional mode of form and continuity. How then can it be pressed into the service of a continuous musical discourse which relies for its articulation on diatonic tonality? The discussion of that question will be a primary concern of this chapter. However, I also wish to demonstrate how the broadest structural divisions of the
Beethoven, as well as its smaller surface features, inform the Goehr. For in these terms the modelling is very precise indeed. What follows is a comparative analysis of both works in which attention is drawn to similarities of form, proportion, phrase structure, theme, texture, rhythm, etc.
COMPARISON OF BEETHOVEN OP. 90 (1ST MVT) / GOEHR OP. 37 (1ST MVT)

**BEETHOVEN**

**Bars**

**0^3-4^2 Primary Theme**

1st Subject Group

i) 4 Bars (2+2)

ii) Antecedent of Period

iii) \( \frac{3}{4} \) \( \text{...} \) 

iv) Chordal Texture

\( \text{4}^3-8^2 \)

i) 4 bars (2+2)

ii) Consequent of Period

iii) \( \frac{3}{4} \) \( \text{...} \)

\( \text{8}^3-16^2 \) Secondary Theme

1st Subject Group

i) 8 bars (2+2+1+1+2)

ii) \( \text{...} \)

iii) Melody (RH) with chordal accompaniment (LH) - NB Independent 'tenor voice'. Texture thins to two parts at (11)

**GOEHR**

**Bars**

**0^3-4^2 Primary Theme**

1st Subject Group

i) 4 bars (2+2)

ii) Antecedent of Period

iii) \( \frac{3}{4} \) \( \text{...} \)

iv) Chordal Texture

\( \text{4}^3-8^2 \)

i) 4 bars (2+2)

ii) Consequent of Period

iii) \( \frac{3}{4} \) \( \text{...} \)

\( \text{9}^3-16^2 \) Secondary Theme

1st Subject Group

i) 8 bars (1+1+1+1+1+1+1+1)

ii) \( \text{...} \)

iii) Melody (in viola) with chordal accompaniment - full 4 part texture throughout.
BEETHOVEN

Bars 16-24^2

Variant of Primary Theme

i) 8 Bars (4+4)

ii) \[ \begin{array}{c}
\text{Bars 16-24} \\
\text{Variant of Primary Theme}
\end{array} \]

i) 8 bars (4+4)

ii) \[ \begin{array}{c}
\text{i)} 8 \text{ Bars (4+4)} \\
\text{ii)} 4 \text{ bars}
\end{array} \]

TRANSITION

24-28^2

i) 4 bars

ii) Takes rhythmic figure

\[ \begin{array}{c}
\text{ii) Takes rhythmic figure} \\
\text{of Primary theme/1st subject group as basis for following pattern:}
\end{array} \]

iii) Ascending unison octaves

GOEHR

Bars 16-24^2

Variant of Primary Theme

i) 8 Bars (4+4)

ii) \[ \begin{array}{c}
\text{Bars 28-31} \\
\text{Variant of Primary Theme}
\end{array} \]

i) 4 bars

ii) \[ \begin{array}{c}
\text{ii) New 'expressivo' figure} \\
\text{on 1st violin accompanied by chords on lower strings coupled with solo passage (semiquavers) for 1st violin.}
\end{array} \]

iii) Chordal assembly by addition of voices on each accent. (>)
BEETHOVEN

TRANSITION (cont)

Bars
32-36

i) 'Repetition' of bars 28-32, but
ii) Different transpositional level
iii) Same dynamic level (f)
iv) a tempo

Bars
31-35

i) 'Repetition' of bars 28-31, but
ii) Different transpositional level
iii) Same dynamic level (p)
iv) a tempo

Bars
36-39

i) Repetition of bars 32-36, but
ii) Different transpositional level and
iii) Change in dynamic to f
iv) Different rhythmic profile for close of scale passage:

Bars
35-39

i) Repetition of bars 31-35, but
ii) Different transpositional level and
iii) Change in dynamic to pp
iv) Different rhythmic profile for close of semiquaver passage:

Bars
39-44

i) Varied restatement of bars 24-28
ii) Rhythmic profile (J|J) remains but unison octaves replaced by assembly of diminished 7th chord, pitches being added on each third beat of bar.
iii) Bars 43/44 sustain the harmony over which a chromatically inflected melody is placed.

Bars
39-44

i) Restatement of bars 24-28 (but at different transpositional level)
ii) Rhythmic profile (J|J) remains; pitches are added on each third beat of bar, as before.
iii) Bars 43/44 are a varied extension of 1st violin figure at bars 28, 32, 36

Bars
45-54

i) Chordal texture
ii) LH has repeating chords.

Bars
45-54

i) Chordal texture
ii) Lower strings have or repeating chords.
iii) Harmonic changes proceed at rate of one per bar for bars 45/46; thereafter, 2 per bar, the change occurring on the second beat of the bar in bars 47-50, and on the second quaver beat of the bar at 51-54.

iv) First violin proceeds according to following rhythmic pattern:

\[ \begin{align*}
&J. \quad J. \quad J. \\
&J. \quad J. \quad J. \\
&J. \quad J. \quad J. \\
&J. \quad J. \quad J. \\
\end{align*} \]

v) Passage maintains a steady crescendo from \( p \) to \( f \), followed by another steady crescendo from \( f \) to \( ff \) with no rit. at its close.

SECOND SUBJECT

55-60

i) Three-part texture; divided between 1st, 2nd violin and viola.

ii) 'melody' (divided variously between 1st, 2nd violin and viola.) descends to bar 58 then ascends to bar 60.
SECOND SUBJECT (cont)

Bars

61-67

i) Restatement of bars 55-60.
ii) RH descending melody rhythmically varied; additional pitches interpolated into the original melodic line.
iii) All other factors unchanged.

67-81

i) Close, chordal texture
ii) Rhythmic pattern of closing bars is:

\[
\begin{align*}
\text{(i)} & & \text{(ii)} & & \text{(iii) } \\
| & | & | & |
\end{align*}
\]

\[\text{NB } G-F\# \text{ melodic inflection}\]

82-99

i) 18 bars
ii) Commences with an echo of the three preceding B minor chords, in form \(d. \quad d. \quad d.\)
iii) 84-92: Variant of Primary Theme/first subject group.

CODETTA

67-75

i) Close, chordal texture
ii) Rhythmic pattern of closing bars is:

\[
\begin{align*}
\text{(i)} & & \text{(ii)} & & \text{(iii) } \\
| & | & | & |
\end{align*}
\]

\[\text{NB } G-F\# \text{ melodic inflection}\]

DEVELOPMENT

75-92

i) 17 bars
ii) Commences with an echo of two preceeding A\# C# dyads, in form \(d. \quad d. \quad d.\)
iii) 77-83: Partial restatement of Primary Theme/first subject group.
### Development (cont)

<table>
<thead>
<tr>
<th>Bars</th>
<th>iv) 92-99: Change of dynamic and thickening of texture for sequential treatment of figure.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>iv) 84-92: Change of dynamic and thickening of texture to 4 parts by the addition of viola.</td>
</tr>
<tr>
<td></td>
<td>v) Rhythmic figure appears in every bar, mostly in viola.</td>
</tr>
</tbody>
</table>
| 100-103 | i) 4 bars
|      | ii) Dynamic changes to $p$
|      | iii) Rhythm of RH changes from $\frac{1}{4}$ to $\frac{3}{4}$
|      | iv) LH rhythm becomes $\frac{7}{4}$
| 104-108 | i) 5 bars
|      | ii) Texture thins to two components; a chromatically descending scale in RH and a chromatically ascending scale in octaves in LH.
|      | iii) Rhythmic profile:
|      | RH $\frac{7}{4}$ $\frac{7}{4}$ $\frac{7}{4}$ $\frac{7}{4}$
|      | LH $\frac{7}{4}$ $\frac{7}{4}$ $\frac{7}{4}$ $\frac{7}{4}$
|      | Violin/cello $\frac{7}{4}$ $\frac{7}{4}$ $\frac{7}{4}$ $\frac{7}{4}$
|      | Viola $\frac{7}{4}$ $\frac{7}{4}$ $\frac{7}{4}$ $\frac{7}{4}$
| 93-96  | i) 4 bars
|      | ii) Dynamic changes to $p$
|      | iii) First and second violin change predominant rhythm from $\frac{1}{4}$ to $\frac{3}{4}$
|      | iv) Cello has rhythmic figure.
| 97-101 | i) 5 bars
|      | ii) Texture remains as before.
|      | iii) Rhythm has two components: occurrence of viola rhythm between combined rhythms of cello/violins and constant delay of $\frac{7}{4}$ figure by a quaver in every bar. (cf. LH/RH of the Beethoven).
BEETHOVEN

DEVELOPMENT (cont)

Bars

iv) Sustained crescendo but dim. to p at 108 with this figure:

\[ \text{Figure} \]

109-113

i) 4 bars
ii) Partial restatement of Secondary Theme, first subject group.
iii) Texture now reduced to two components: melody and bass.
iv) p throughout.

113-117

i) 4 bars
ii) Repetition of bars 109-113, but
iii) Melody now located in middle register (LH) and RH given over to arpeggionic semiquaver figuration.

117-120

i) 3 bars
ii) Partial repetition of bars 113-117, but
iii) Melody now located in bass.

GOEHR

Bars

iv) Section initiates a 'molto crescendo' but dim. to p at 101 with this figure:

\[ \text{Figure} \]

101-107

i) 6 bars
ii) Partial restatement of Secondary Theme, first subject group.
iii) Texture now reduced to three components: 'Melody' (1st violin) 'Tenor' (viola) 'bass' (cello).
iv) p sostenuto throughout.

107-113

i) 6 bars
ii) Repetition of bars 101-107, but
iii) 'Melody' that was in Middle (viola) register, now in lowest of 'bass' register. Semiquaver figuration appears in 1st violin.

113-116

i) 3 bars
ii) Partial repetition of bars 107-113, but
iii) Much fuller texture
iv) Main melodic formation located in bass.
BEETHOVEN

DEVELOPMENT (cont)

Bars

120-123

i) 4 bars
ii) Sequential extension of last bar of previous section
iii) $s$ on second beat of bar.

124-132

i) 9 bars
ii) Continuation of sequential treatment of previous section.
iii) Bass gradually ascending in register to climax.
iv) Continuous crescendo throughout to:

133-143

i) 11 bars
ii) Compositional transformation of preceding figure:

iii) Stage one:
Rhythmic Augmentation:

iv) Stage two:
Rhythmic Augmentation and Partial Liquidation:

GOEHR

Bars

116-119

i) 3 bars
ii) Sequential extension of previous section

119-127

i) 8 bars
ii) Continuation of sequential treatment of previous section.
iii) Texture simplified
iv) Bass gradually ascending in register to climax of section.

127-139

i) 12 bars
ii) See page 113.
v) Stage three:
   Rhythmic variation
(ii) Textural and Rhythmic transformation of material of preceding section:

\[
\text{VIOLIN I} \quad \text{VIOLIN II} \quad \text{VIOLA} \quad \text{CELLO}
\]

becomes

\[
\text{VIOLIN I} \quad \text{VIOLIN II} \quad \text{VIOLA} \quad \text{CELLO}
\]
(iii) Stage One
Rhythmic Transformation

Bars 127–131

(iv) Stage Two:
Rests removed and telescoping of rhythm

Bars 131–133

(v) Stage Three:
Partial liquidation

Bars 133–135
(vi) Stage Four: Rhythmic Augmentation

RECAPITULATION

<table>
<thead>
<tr>
<th>Bars</th>
<th>GOEHR: 127–139 (Continued)</th>
</tr>
</thead>
</table>
| 143–151 | i) 8 bars  
|        | ii) Primary Theme/first subject |
| 151–230 | i) Continuation of Recapitulation (cf 8–75) but  
|        | ii) All proportions of exposition preserved — dominant material now presented in tonic. |
| 230–245 | i) 15 bars  
|        | ii) Primary subject, 1st subject Group  
|        | iii) 237–245 refer back to 16–24. |
| 139–155 | i) 16 bars  
|        | ii) Primary Theme/first subject, but  
|        | iii) Theme — doubled in proportion by interpolation of variant form of theme, i.e. AA' BB' CC' DD' |
| 156–220 | i) Continuation of Recapitulation (cf 9–75), but  
|        | ii) All exposition proportions and thematic detail largely preserved. |
| 220–234 | i) 14 bars  
|        | ii) Primary subject, 1st subject Group  
|        | iii) 226–234 refer back to 16–24. |
I have already indicated that the matrix technique is still very much in evidence in the String Quartet. However, the technique is now modified to meet the new compositional demands being made of it. These modifications begin with the matrix itself. The matrix is synonymous with bars 1-8, the primary idea of the first subject group.

Figure 2

As fig. 2 demonstrates the pitch source is hexachordal rather than twelve-note, as no complementary hexachord is assumed. In keeping with Goehr's established method, this
hexachord is segmented into two trichords, a diatonic trichord A and a non-diatonic trichord B. However, the textural/harmonic norm of the movement is four part (tetrachordal) rather than three part (trichordal). Four part texture is established from fig. 1 onwards. But the clearest presentation of the fourth pitch within the context of the matrix takes place shortly into the development section (fig. 10 onwards) at which point the primary idea of the first subject group is restated with the previously vacant viola part now occupied. The viola part adds an additional pitch to each of the trichords as follows:

\[ \text{o = viola pitches.} \]
The fourth pitch is derived from one of two complementary trichords, according to the method of trichordal pairing established in the Little Symphony. As the source of the fourth pitch, these trichords have a recessive role. As dominant trichords they make their first compositional appearance at the start of the transitional section (four before fig. 3).

Figure 4

Fig. 4 demonstrates an association between trichords A/C and trichords B/D of the work's basic set:
In the Little Symphony this trichordal pairing was understood to derive from the combinatorial pairing of pitches 0-5 and 6-11 respectively of the work's basic set. In the Quartet, however, no consistently referential ordering of the basic set is made compositionally apparent. Even so, the trichordal pairing noted above is consistently adhered to.

As in the Little Symphony, the matrix of the Quartet has a sub-compositional, as well as a compositional identity. That is, the individual simultaneities of the matrix and their ordering have a referential significance for the movement as a whole. For example, the secondary idea of the first subject group is based on a transpositional
realignment of the matrix:

This preliminary examination of the matrix and its usage focuses attention on a significant analytical issue; the rationale for the transpositional level of constituent hexachords both in the originating matrix and in subsequent transformations of the matrix. This issue is not so pressing in the Little Symphony. The matrix in that piece is mono-transpositional, all chords being drawn from one transposition of the work's basic set. Further, subsequent alterations to the transpositional levels of the chords are resultant rather than determinant. That is, the
transpositional level of matrix chords is altered by the application of the transformational pedal technique which, in turn, is subject to the authority of the linearly ordered basic set. However, in the Quartet the matrix is polytranspositional and there is no compositionally explicit linear structure, as in the Little Symphony, to give authority to the subsequent transformation of the matrix. So, wherein does the rationale lie? In general terms, the choice of hexachordal levels appears to be motivated by a desire to create a harmony which is analogous in effect to the coherence and sense of progression associated with diatonic music. This is achieved by choosing hexachords whose transpositional levels enable progressions, between compositionally adjacent trichords, to be made through wholetone and semitonal inflection, or by the compositional recognition of pitches in common:

Figure 7

* Sharp omitted in score.
However, given that the Quartet is modelled on a specific diatonic model it would seem reasonable to expect that there might be some attempt by means of hexachordal choice, to reproduce the specific diatonic effect of that model. To a considerable extent this is the case, although other factors, such as the actual compositional presentation of the trichords are also significant. These points can be initially demonstrated by comparing the matrix of the Goehr with its corresponding passage in the Beethoven.

In terms of their surface features, bars 1-8 of both works have a lot in common. They both comprise an antecedent and consequent of 4 bars each, both of which disclose two phrases: an initial questioning phrase and a subsequent answering phrase, the latter being a varied repeat of the former. Rhythmically the two ideas are very similar, except that the Goehr differs because of the syncopated displacement of the first beat of the bar. In both works the rhythm and contour of the first phrase are largely preserved in the second, while the dynamics are sharply contrasted and the harmony changed. In the Beethoven these harmonic changes are not motivated by the establishment of the tonic key, E minor, as they might be expected to be. Rather, the relative major, G, is established. That this is the tonal goal of the music at the close of the second phrase is by no means inevitable at the close of the first phrase. Given that the first phrase begins and continues with the tonic chord of E minor, the chord of D major, with
which the first phrase ends, is likely to be heard as the chord on the flattened 7th of E minor. An answering phrase which then moves unequivocally to E minor along the following suggested lines would not be disruptive in effect:

![Musical notation](https://example.com/image.png)

**Figure 8**

Whatever the aural interpretation of the D major chord, a sense of tonal ambiguity is created at the end of the first phrase, an ambiguity which is only resolved by the second phrase's interpretation of the D major chord as the dominant of G.

In the Goehr, the effect of question and answer between the first and second phrases of the Antecedent is no less apparent. Where the first phrase is variously volatile, dissonant, unresolved, the second phrase is, conversely, calm, consonant, resolved. That this is so is due, in part, to the compositional disposition of the trichords which, at times, invites comparison with the compositional
presentation of triads in tonal music; and this, because it seems so much a part of the music's intentional effect. The first phrase concludes with non-diatonic trichord B (chord 4) - please refer to fig. 2(1110)-whose spacing exposes a 'dissonant' minor second between 1st and 2nd violins, while non-diatonic trichord B (chord 2) exposes a 'dissonant' major seventh between 1st violin and cello. At the same time, diatonic trichord A (chord 3) appears as a 'second inversion' rather than a stable 'root position' chord. By contrast, the second phrase is consonant and resolved in effect. Diatonic trichord A (chord 8) appears in stable root position, while non-diatonic trichord B (chord 5) is adapted to the same pattern as the diatonic trichord A (chord 8) by surrendering its G and borrowing the necessary E from the previous trichord. Also, the 'dissonant' effect of non-diatonic trichord B (chord 7) is ameliorated by a spacing which conceals the 'dissonant' minor ninth within the chord.1

As I have already observed, hexachordal levels also play a part in the effect of the second phrase of the Antecedent. The establishment of key, in the second phrase of the Beethoven, finds its counterpart in the Goehr as a compositional association of trichords of largely invariant pitch content:

1 and also by how closely the passage conforms to Messiaen's Mode 2 on E.
As already stated, non-diatonic trichord B (chord 5) is adapted to the pattern of diatonic trichord A. While this reduces the dissonant effect of the phrase it also causes the harmonic effect of the passage to be extremely stable since the phrase begins and concludes with the same chord: rather akin, perhaps, to a I - V - I progression in diatonic music.

Bars 5-8 of both pieces constitute the consequent or conclusion of the primary idea. In both works also, the consequent is a repeat of the antecedent, any modifications being occasioned by a different harmonic orientation. In the Beethoven the change in harmonic direction is effected by a shift towards B minor, the dominant of the yet-to-be-established tonic. But B minor is established only momentarily, the music immediately moving away to G major again. This contrasts with the conclusion of the antecedent where G major was established and then maintained at the
start of the consequent. So, where the ending of the Antecedent is resolved or closed in effect, that of the consequent is somewhat more unresolved or open.

In the Goehr, the second phrase of the consequent (bars 6-8) has a similar effect. The choice of hexachord for trichord B (chord 13) and trichord A (chord 14) is the same as that for the corresponding chords (5 and 6) in the antecedent. An expectation that the second phrase of the consequent will be a repeat of the second phrase of the antecedent is thereby aroused. However, the choice of hexachord for trichord B (chord 15) and trichord A (chord 16) is different to that for the corresponding chords (7 and 8). Therefore, the music does not achieve the closed effect noted at the close of the antecedent but instead opens out into a new harmonic region.

![Figure 10]

Figure 10
If the relationship, which I have suggested exists between the establishment of key in the Beethoven and the establishment of areas of trichordal invariance in the Goehr, has any validity, then it might be expected to operate most fully at that point in the Beethoven where the establishment of the tonic key is most unequivocal. And indeed, this is the case. In the Beethoven, the move towards the tonic key begins in earnest at bar 16, where the music pauses on the dominant chord, B major. The chords of the next seven bars are all within the E minor constellation and at bars 23/24 a perfect cadence establishes the tonic key for the first time. Significantly, the same passage in the Goehr fig. 2 to bar 24 sounds the most harmonically unified so far and exhibits a correspondingly high degree of pitch invariance to the extent that the passage can be summarised in terms of a single trichordal pair around which other pitch-related trichordal pairs orbit.

![Figure 11](cf. fig. 7)
The singling out of this particular trichordal pair is also justified by the significance that the pair has within the context of the first subject group as a whole. I have already observed that within the second phrase of the antecedent and consequent the pair is given prominence even to the extent of fabricating the diatonic trichord at chord 13. If this seems to point to the trichordal pair as having a function analogous to a tonic in tonal music this is valid providing that the tonic is understood to be localised; for beyond the confines of the first subject group the trichordal pair does not seem to have any referential significance. For example, in the recapitulation section, (bars 139 onwards) the primary subject group is transposed up a semitone so that the following trichordal pair is now referential.

![Figure 12](image)

Figure 12

Clearly then, there is not here an attempt to endow trichordal pairs with the function of a long-range,
referential tonic; no attempt to make a hexachordal analogue for the E minor of the Beethoven.

The Third String Quartet is the last of Goehr's pieces to employ the matrix technique. For some years prior to 1976, the year of the quartet, Goehr had felt that the matrix method, which had served him at least since the Little Symphony of 1963, might have to be rethought. Not that his music of the mid-1970s was showing any sign of strain, any decline into mannerism or self-imitation. Even so, after fifteen years of working within the comparative security of the method, Goehr felt the need to explore new compositional surroundings, new ways of working:

... I think there is a point in not remaining too long with any one way of working, especially if it is such an all embracing one as serialism. Giving up one's props, appearing naked as it were and new can be a good thing in itself. One feels fresh and perhaps the results are fresh.

[GOEHR, 1980, P.105]

At the same time, Goehr began to take issue with efforts to create a new musical language on the basis of investigations into music's technological bases, something of which I have already mentioned in the Introduction (see pages 13-14). Goehr's 'incontestable evidence' was to be found in the music of the Modern Masters who "achieved what they did by a revaluation of the fundamentals of music, and this is our task too: for our truth, our 'new' must also lie hidden in what others might regard as too simple to be worthy of
serious consideration." [GOEHR, 1977].

This aesthetic position does not represent any kind of volte-face on Goehr's part. His compositional career has been founded on an attitude of creative engagement with the music of the past. In the Poetics he says:

"The problems of language, meaning and form must remain central to the composer and he has constantly to set himself up against the history of his own art".

[GOEHR, 1973, p.176]

In Goehr's work prior to 1976 this often meant the use of past music as a model either in a generalized way, or in a more specific way as with the first movement of the Third String Quartet. Since 1976 Goehr's investigation of the old has brought about a preoccupation with the forms of pre-classical music and not least of all with fugue in works such as the "Fugue on the notes of the Fourth Psalm", Op.36B, "Babylon the Great is fallen" Op.40, "Behold the Sun" Op.44 and " ... a musical offering (J.S.B. 1985)" Op.46. For Goehr fugue represents something of a challenge:

"There's always been a type of person and I'm such a one who feels that fugue, chaconne, and such like are specific challenges to be met and the more conventionally they're done, the more fascinating: it's musical chess if you like".

[GRIFFITHS, 1985, p.19]
At the same time the use of fugues led Goehr to investigate the resources of figured Bass, for in trying to compose fugues, Goehr found that the so-called rules did not help; only through a study of C.P.E. Bach did he arrive at a technique which enabled him to pace, articulate and regulate the textures of the 18th century forms. Many preclassical forms have been pressed into the service of his new opera 'Behold the Sun' Op.44 where the objectivity of such forms was appropriate in order to avoid an expressionalist setting which might glorify the violence of the text. Goehr maintains that despite his involvement with fugue, plainsong and mode, which I have drawn attention to in this chapter and the Introduction, twelve-note method is still a part of his thinking. How significant a part will be a topic for future work.
GOEHR'S TWELVE-NOTE METHOD - A DISCUSSION
GOEHR'S TWELVE-NOTE METHOD - A DISCUSSION

The purpose of this chapter is to consider the conceptual and methodological bases of Goehr's twelve-note method. The primary context for this is 'classical' twelve-note theory and practice, by which I mean to describe the music and thought of Schoenberg and Webern. Such a context is almost inevitable when discussing twelve-note music, but in the case of Goehr it is particularly appropriate since Goehr himself has said that his own methods derive principally "from the work of Schoenberg and Webern" and do consequently "indicate basic agreement with the attitudes of those men to their traditions and their materials" [GOEHR, 1973, p.171].

A secondary context is provided by other composers and theorists, twelve-note and otherwise, including Berg, Boulez, Perle, Krenek and Messiaen, whose work and thought has had a direct influence on Goehr or demonstrates some point of contact with Goehr's work. Finally a tertiary context is provided by post-1945 twelve-note methodology, with which Goehr's work shows little involvement.

In as much as twelve-note methodology has its origins in the thought and work of Schoenberg, it will be useful at this stage to spend some time considering the dynamics and basic tenets of Schoenberg's twelve-note method.

In his lecture "Composition with Twelve Tones" [SCHOENBERG, 1941, pp. 214-249], Schoenberg asserts that the primary assumptions of twelve-note music are located in the music of
the nineteenth century: in the propensity for increased chromaticism that took place during that period resulting in the erosion of distinctions based on the concept of dissonance and consonance and the concomitant decay of tonal functions. He argues that the tendency to chromaticisation (i.e. the tendency to incorporate into the discrete collections of 7 pitches or keys, the remaining 5 pitches of the chromatic scale) produced new harmonic orderings, new chords which questioned "the idea that one basic tone, the root, dominates the construction of chords and regulates their successions" [SCHOENBERG, 1941, p.216]. Schoenberg describes this stage of the process as extended tonality. The process of chromaticisation also had consequences for the structural functions of harmony. If chords now no longer unequivocally related to a given tonic, it was doubtful "whether a tonic appearing at the beginning or the end, or at any other point really had a constructive meaning". This in turn gave rise to the concept of non-functional harmony, harmony without constructive meaning found especially, says Schoenberg, in the music of Debussy "for the colouristic purpose of expressing moods and pictures". Ultimately the process leads to what Schoenberg calls "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's 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.

[SCHOENBERG, 1941, p.216].

This paragraph reveals a fundamental change in the concept of consonance and dissonance. These are no longer to be evaluated in terms of pre-established criteria of beauty, but by reference to the listener's capacity to assimilate or 'comprehend' the consonance/dissonance. What Schoenberg means by 'comprehend' is perhaps best understood by examining the concept as it first appears in the Harmonielehre [SCHOENBERG, 1921]. Taking the natural harmonic series as a model, Schoenberg identifies the tendency to increased chromaticism with movement away from the series' fundamental tone, into the regions of the higher harmonics. According to this model, dissonance and consonance are but regions on a common axis of comprehensibility. Thus, the lower overtones or consonances bear "a close and simple relationship" to their fundamental, a relationship which is therefore more comprehensible than the "more distant and complex relationship that the higher overtones or dissonances have to their fundamental" [SCHOENBERG, 1921, p.14].

Clearly, for Schoenberg, consonance and dissonance do not exist as opposites. Since, however, the opposition is the raison d'être of the terminology, Schoenberg's concept
amounts to a negation of that very terminology. But Schoenberg retains it simply to orientate his concept while introducing the notion of greater or lesser comprehensibility to take the place of greater or lesser dissonance.

In renouncing the concept of dissonance, Schoenberg was giving theoretical acknowledgement to what had become for him a compositional reality. The weakening of tonal functions which he had noted in connection with extended tonality now amounted to a situation in which such functions were altogether absent. Neither could those functions be fulfilled by the new chords "whose constructive values had not as yet been explored" [SCHOENBERG, 1941, p.217]. This produced something of a compositional crisis for Schoenberg, for without the form giving functions of tonality it seemed impossible "to compose pieces of complicated organization or of great length" [SCHOENBERG, 1941, p.217]. Schoenberg does not identify this compositional state of affairs as atonality, but he is nevertheless referring to the music usually so described which he, together with Webern and Berg, began to compose around 1908 beginning in Schoenberg's case with the Second Quartet op.10. It follows from Schoenberg's concept of the emancipation of the dissonance that he did not consider atonality to be the anti-state of tonality. This being so, it would still be possible to compose in a traditional way if other aspects of composition could be made to compensate for the sense of harmonic
movement and structural definition provided by tonality. In his lecture, Schoenberg draws attention to the significance of texts in this respect: in the way that "differences in size and shape of its parts and the change in character and mood" could be "mirrored in the shape and size of the composition, in its dynamics and tempo, figuration and accentuation, instrumentation and orchestration" so that the parts are "differentiated as clearly as they had formerly been by the tonal and structural functions of harmony" [SCHOENBERG, 1941, p.217/218]. But Schoenberg does not mention those features of this atonal music which arise most directly from the crisis of language and form, namely the reinstatement of contrapuntal technique and motivic ramification. Counterpoint had always been an important part of Schoenberg's compositional technique, i.e. counterpoint in the sense of "harmonically inspired polyphony" as Alexander and Walter Goehr have described a situation in which individual lines exist within a context which is harmonically determined, [1961, p.95]. As the rationale for such harmonic determination became ever weaker in Schoenberg's music, the need to invest rationale in the contrapuntal lines themselves became more pressing. Anthony Payne [1968, p.12] has cautioned against diagnosing this situation as resembling some kind of rapprochement with renaissance polyphony; whereas the independent contrapuntal lines of the latter are nevertheless ordered according to a small range of triadic alignments, the vertical ordering of Schoenberg's contrapuntal lines does not refer to pre-
established notions of harmonic propriety. Payne has demonstrated how in certain sections of the Chamber Symphony op.9 the whole-tone derivation of the symphony's main theme informs the vertical organization of the texture, while at others, a theme ostensibly susceptible to diatonic harmonization is cast in a polyphonic texture which owes little in its vertical aspect to diatonic intervention. [PAYNE, 1968, p.14].

What Whittall has described as Schoenberg's radical shifting of "compositional perspectives from hierarchical, harmonic tonal structures to interrelated, constantly evolving foreground motivic structures" [WHITTALL, 1980, P.58] testifies not only to the weakening of those tonal structures but also to the importance of Brahms for Schoenberg's music. In Brahms, the extent to which a motive might influence the total musical texture is considerably extended so that aspects of both foreground and background can be seen to derive from the same source. That Schoenberg was aware of the extensive motivicism of Brahms' music is made abundantly clear in his essay 'Brahms the Progressive' [SCHOENBERG, 1947, pp. 398-441] in which he demonstrates the significance of specific intervals in relation to the Andante from the A minor String Quartet, Op. 51, No. 2, and the Fourth Symphony. In 'Fundamentals of Musical Composition' [1967, p.11] Schoenberg again takes the Fourth Symphony example, but now the pervasive major and minor thirds are identified as part of an extended interval
structure which is subject to retrogradation within the music itself, while Schoenberg supplies the other possible transformations of inversion and retrograde inversion. Such analyses reveal a concept of the motive which stands apart from the usual formulations of that concept, in as much as interval structure is disengaged from other compositional features such as rhythm, contour and harmonic implication, and functions as an independent referential element. The significance of this resides not so much in the disengagement of a single feature; as Schoenberg himself said "each element or feature of the motive must be considered a motive if it is treated as such, i.e. if it is repeated with or without variation" [SCHOENBERG, 1967, p.8] - but in that the single feature should be intervallic rather than the more usual rhythmic identity. Payne [1968, p.39] has suggested that the new perspective in which the absence of tonality placed other aspects of composition could have supported the return to extended instrumental composition which occurred with the adoption of the twelve-note method, and that the method arose out of Schoenberg's psychological need to depersonalize his material and to compose within a pre-established, objective framework. Schoenberg himself confirms this view of the twelve-note method as a rationalization of atonality:

... the desire for 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.

[SCHOENBERG, 1941, p.218].
Schoenberg goes on to say that after many attempts over a number of years he came upon a new compositional method which he called "Method of Composing with Twelve Tones Which are Related Only with One Another". [SCHOENBERG, 1941, p.218].

In his lecture Schoenberg says that the method is based on the "constant and exclusive use of a set of twelve different tones" within which no tone is repeated. The twelve tones correspond to the tones of the chromatic scale, but as Schoenberg is anxious to point out, the set does not correspond to the chromatic scale itself. Whereas the chromatic scale simply represents the total available pitch material, the set presents that material in a particular and unique ordering. But like the chromatic scale the pitch elements of the set are not functionally differentiated. To this extent the set conceptualizes what Perle has called the 'positive' and 'negative' aspects of atonality in as much as the set confirms the availability of all twelve pitches of the chromatic scale and, by stating each one only once in any complete circulation of the twelve, avoids any differentiation between them other than that of relative position [PERLE, 1981, p.1]. Schoenberg explains the proscription against pitch repetition, which is enshrined in the conception of the set as being analogous to the avoidance of octave doublings in atonal music:

to double is to emphasize, and an emphasized tone could be interpreted as a root or even a
tonic. The consequences of such an interpretation must be avoided. Even a slight reminiscence of the formal tonal harmony would be disturbing because it would create expectations of consequence and continuation.

[1941, p.219]

For the same reasons Schoenberg concludes that only one set should be used in a composition:

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.

[1941, p.219].

The avoidance of pitch repetition also points to the significance of that other aspect of the set, namely interval structure. Schoenberg's title 'Method of Composing with Twelve Tones Which are Related Only With One Another' already carries an implication of relative weighting in the pitch/interval dichotomy. If, as the title implies, and Rosen has observed, "each pitch is theoretically as important as any other one and cannot act except through its place in the series " [ROSEN, 1976, p.931], then this necessarily focuses attention on the adjacency relationships of individual pitches. Schoenberg says as much when later in the lecture he speaks of pitch elements of the set which appear "separate and independent to the eye and ear" only revealing their true meaning through their cooperation and "the mutual relationship of tones [regulating] the
succession of intervals" [SCHOENBERG, 1941, p.220].

The concept of the set as something defined in terms not of pitch succession but of interval succession is contingent upon and contributes to Schoenberg's concept of musical space. In Schoenberg's concept "the two or more dimensional space in which musical ideas are presented is a unit". [SCHOENBERG, 1941, p.220]. What Schoenberg meant by a musical idea is worth investigating at this point since it, and the concept of unitary musical space are intimately linked. Goehr has drawn attention to the fact that Schoenberg was throughout his life preoccupied by the concept of the Musical Idea. In a study of Schoenberg's theoretical writings [GOEHR, 1973, pp. 85-96] Goehr tells how, from 1925, Schoenberg had been occupied with a project called 'The Musical Idea: Its Presentation and Development'. A note attached to the papers of the unfinished project, and dated 1929, reads:

The question as to what a musical idea is has never been answered up till now - if indeed it has ever been asked.

In his essay "New Music, Outmoded Music, Style and Idea" Schoenberg attempts to answer such a question:

In its most common meaning the term idea is used as a synonym for theme, melody, phrase or motif. I myself consider the totality of a piece as the idea; the idea which its creator wanted to present. But because of the lack of better terms I am forced to define the term idea in the following manner: Every tone
which is added to a beginning tone makes the meaning of that tone doubtful. If for instance G follows C, the ear may not be sure whether this expresses C major or G major or even F major or E minor; and the addition of other tones may or may not clarify this problem. In this manner, there is produced a state of unrest, of imbalance which grows throughout most of the piece and is enforced further by similar functions of the rhythm. The method by which balance is restored seems to be the real idea of the composition.

[SCHOENBERG, 1946, PP. 122-123].

Commenting on this passage Goehr has suggested that the musical idea is here either a "synonym for composition or that underlying different manifestations of tone, mood, rhythm and character, there is a general UR-idea of (sic) statement, destabilization and re-establishing of balance" [GOEHR, 1976, P.8]. Goehr's interpretation would seem to be supported by Schoenberg when he says that:

a musical idea ... though consisting of melody, rhythm and harmony is neither the one or the other alone, but all three together.

[SCHOENBERG, 1941, P.220].

In applying this notion directly to twelve-note composition, Schoenberg says:

In Twelve-note composition the matter under discussion is in fact the sequence of tones whose comprehensibility as a musical idea is independent of whether its components are made audible one after the other or more or less simultaneously.

[SCHOENBERG, 1923, P.208].
Something of this interpenetration of linear and harmonic dimensions is already evident in Schoenberg's atonal music, in the way that melodic segments will sometimes appear vertically as chords. Within the context of Schoenberg's twelve-note music verticalization is a basic premise, amounting, theoretically at least, to a dissolution of the dimensions themselves within a single unit of musical space:

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.

[SCHOENBERG, 1941, p.220]

Payne [1968, p.38], has suggested that Schoenberg found analogy and support for his unitary concept of musical space in Balzac's description of heaven as contained in his book Serephita. Here too is to be found the same interpenetration of elements within a context that is non-dimensional:

Light gave birth to melody and melody to light; Colours were both light and melody, motion was numbered by the word; in short, everything was at once sonorous, diaphanous and mobile; so that everything existing in everything else, extension knew no limits, and the angels could traverse it everywhere to the utmost depths of the infinite.

[Quoted in Payne, 1968, p.37]

Schoenberg's corollory to Balzac's concept of heaven is his own concept of the "absolute and unitary perception of musical space":

144
In this space ... 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, or 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 the way in which a mirror might show the mutual relations which remain a given quality.

[SCHOENBERG, 1941, p.223].

Here once again the emphasis is on the mutual relationship of pitches, that is, their intervallic relationship rather than on the pitches themselves, contributing further to the concept of the set as an intervallically defined structure. Accordingly, Schoenberg felt able to project the set in retrograde and inversion since neither transformation revises the essential intervallic identity of the set.

Schoenberg asserted that the set, as defined as an invariant sequence of intervals, functions "in the manner of a motive" [SCHOENBERG, 1941, P.219]. I have already indicated that the concept of the twelve-note set was formulated against the background of a musical tradition in which foreground motivic structures had extended their influence to other aspects of pitch organization. Goehr has suggested that if
Schoenberg had not been a part of that tradition, or if, for example, Bartok or Stravinsky had formulated the concept of the twelve-note set, then "the likelihood is that it would have remained a technique of melodic derivation and not have altered rapidly into a developing system of ordering and partitioning of the total sound space" [GOEHR, 1973, p.176]. That it did so develop has given rise to what might be called the "motivic problem" in twelve-note music. In diatonic music, motives function within a context which they do not determine. In twelve-note music however, the basic set determines both the context and the motives within that context. In the light of this Perle has commented "if the set is understood to be a motive in itself, in terms of the ordered pitch relations which it presents, how is the 'thematic' to be differentiated from the 'non-thematic'? "What is the context within which the 'motive' is manipulated and developed". [PERLE, 1981, p.5]. There is also another aspect to the problem which Perle has described as "the absence of an organic principle of differentiation between the horizontal and vertical planes, such as operates in the diatonic system" [PERLE, 1981, p.61]. This tends to blur the distinction between foreground and background, between melody and accompaniment. These problems, the differentiability of the motivic from the extra-motivic, the foreground from the background, are largely theoretical ones, since in compositional reality Schoenberg compensated by means of other compositional factors, notably rhythm and instrumentation.
Schoenberg made a number of claims concerning the potential of a twelve-note set for harmonic extrapolation. Proceeding from his unitary non-dimensional view of musical space Schoenberg proposed that "the mutual relation of tones (of the basic set) regulates the succession of intervals as well as their association into harmonies". [SCHOENBERG, 1941, p.219]. He further claims that the projection of pitches as harmony and the succession of those harmonies could be achieved "with the regularity and logic of the earlier harmony". [SCHOENBERG, 1941, p.219].

Both these assertions, the harmonic projection of pitches of the set and the appeal to harmonic legitimacy by analogy with the functions of diatonic harmony have produced analytical issues which collectively constitute the so called 'harmonic problem' in twelve-note music. These issues have been most consistently enunciated by the American theorist and composer George Perle. For reasons to be discussed later the problem is usually regarded as being less acute in relation to the work of Webern.

Perle's conception of the Schoenbergian set differs somewhat from Schoenberg's. Where Schoenberg, as I have demonstrated, conceives the set as a succession of intervals, Perle conceives it as a linear pitch sequence, as a 'given permutation of the elements of the chromatic scale'. [PERLE, 1964, p.91]. For Perle, the only harmonic
procedure consistent with this concept is the verticalization of linear adjacencies, that is, linear segments:

To the extent that a consistent principle can be deduced from the practice of Schoenberg and other twelve-note composers, it is as follows: any group of successive elements in the set may be stated as a simultaneity.

[PERLE, 1964, P.92].

However, Perle sees a conflict here, which increases in direct proportion to the size of the linear segment; how asks Perle, can linear succession be unambiguously represented by simultaneity? For, the larger the linear segment, the greater the number of possible linear orderings that the segment could refer to:

The relevance of a verticalized set-segment to a given set is ambiguous; the extent of this ambiguity depending on the number of notes in the segment. A succession of 6 dyads of mutually exclusive pitch content, for example, may, in itself, represent any one of 64 different permutations of the 12 notes, while a simultaneity comprising all 12 notes may represent any one of 479,001,600.

[PERLE, 1964, P.92].

Since the relationship between the verticalized linear segments and the linear segments themselves is ambiguous, Perle concludes that linear segments for harmonic purposes are to be defined in terms of pitch content only rather than
succession:

... verticalization converts the set into ... something analogous to Hauer's trope, in so far as the set is defined, for harmonic purposes, not by the order of its notes but by the pitch content of its segments.

[PERLE, 1964, p.92]

Following on from this, Perle says that because the pitch relationships of most sets are of variegated type (i.e. of varied intervals) there is, therefore, no control of the harmonic material:

The possible verticalizations that may be derived from the general set are unsystematic and largely from a harmonic point of view, fortuitous, and therefore do not lend themselves to any coherent overall control of the harmonic material.

[PERLE, 1964, p.92]

Schoenberg's assertion of the legitimacy of twelve-note harmony by appealing to analogies with diatonic harmony has also been seen as problematic. Perle [1981, p.84 et seq.] has commented that in diatonic music the triad represents a criterion of harmonic propriety; all harmonic formations are identifiable to a greater or lesser extent in terms of the triad. In twelve-note music the only precompositional criterion of harmonic propriety is the adjacency of pitches. But since harmonic relationships may or may not relate to this criterion, the set does not really function analogously
to the triad. Further, in diatonic music it is possible to describe or explain the relationship between a melody pitch and its accompanying harmony; the relationship is unambiguous. In twelve-note music the relationship can only be said to be unambiguous if the melody pitch is contiguous in relation to the linear segment of which the accompanying harmony is a verticalization; otherwise there is no integration of the two elements, linear and harmonic.

Like the motivic problem, the harmonic problem is essentially theoretical since in his twelve-note music Schoenberg was able to achieve a degree of harmonic control as I will demonstrate in due course. Goehr's approach to twelve-note methodology has, to a great extent, been conditioned by these twin problems of Schoenbergian twelve-note method, and his methodology can be discussed in terms of the way he has tried to create distinctions and differentiations typical of diatonic tonality. In all the pieces examined so far there has been a consistently 'harmonic' approach in the handling of the basic set. At the same time, there has been an equal concern for the linear dimension of his music. In his lecture "Poetics of my Music" he describes the motivic problem, as he perceives it in the music of Webern, in the following terms:

Webern (as in some pieces of late Brahms) the musical idea (as pitch) is not genuinely
expressive because, vulgarly put, it is too much like everything else in the piece. The idea is only a combinable segment of the series.

[GOEHR, 1973, p.177]

The concept of the 'musical idea' and how this might be 'genuinely expressive' has been a recurrent factor in Goehr's thinking. One of the prime objectives of the Poetics is to "isolate the portion of the music which results most directly from the creative imagination and which we call the musical idea and give some indication of how such an idea relates to its wider context in the stuff of music". [GOEHR, 1973, P.171]

Already we have some idea of what Goehr means by a 'musical idea'. At the point of conception or birth, the musical idea is not subject to the will or intellectual intervention but arises spontaneously from the composer's imagination or subconscious. However, this initial gesture of the imagination cannot survive on its own. Rather it "must worry the composer enough until he is able to find a continuation for it." [GOEHR, 1973, p.173]. In another lecture, Musical Ideas and Ideas about Music, Goehr has described this part of the compositional process:

A composer's partly subconsciously motivated gesture will stand apart and will define possible continuations of a composition. From the apparently limitless possibilities available at first we narrow down to something
approaching automatic writing as work proceeds. The connecting of subconscious and objective elements creates Little form. For me this is a musical idea and it is not a synonym for phrase, motif or sentence, for all these can exist without this particular origin.

[GOEHR, 1976, p.9]

Goehr's concept of Little form also hints at the relationship of the musical idea to its context: in as much as the musical idea or little form is not a synonym for phrase, motif or sentence it must stand apart from formations that can be so described and must therefore stand apart from the compositional context as a whole. Goehr confirms this in the Poetics when he says that:

the musical idea, like the initial factor of a series is a beginning which has no left hand side or for music more appropriately, no before it. Because it has no before it, it differs essentially from everything else—except another new idea which may happen in the course of a piece.

[GOEHR, 1973, p.173]

and

the musical idea is expressive in as far as it is spontaneous and irregular, in as far as it is itself a form, self-contained rather than an element of a regular series, such as a scale or arpeggio.

[GOEHR, 1973, p.173]
Although, according to Goehr's concept, the musical idea is not a synonym for melody or motif etc., in the Poetics he tends to equate the musical idea with the linear aspect of music:

The spontaneous expression of the imagination, the melodic idea, does not seem to alter its form greatly through the ages.

[GOEHR, 1973, p.175]

and

the musical idea in a classical piece is merely a few notes with some internal repetition. It may be a whole melody, but it may be a short signal.

[GOEHR, 1973, p.173]

To summarize, the musical idea for Goehr is not a synonym for melody or theme, although it is bound up with the linear aspect of music. It arises spontaneously from the composer's imagination but is then subject to conscious manipulation, to extension, to produce 'little form'. The musical idea is expressive to the extent that it stands apart from its context and to the extent that it is irregular in relation to the sound-space that it occupies. Since in twelve-note music the sound-space is defined by a twelve-note set, it follows that if Goehr is to achieve 'self-contained', 'expressive', linear musical ideas, then those ideas will have a relationship with the basic set which is oblique rather than direct.
This is not always the case of course. For example, the opening idea of the second movement of the Violin Concerto, Op.13 is wholly identifiable in terms of the interval sequence of the work's basic set.

Even so, there is a tendency, apparent in the earliest of Goehr's compositions, to regard the set as being defined in terms other than interval sequence. In the Piano Sonata, while a number of linear ideas are identifiable in terms of the interval succession of the basic set, others relate to the set's dyadic and tetrachordal pitch content. For example, the Sonata's opening 'Maestoso' chords and the 'wedge', 'mumurando' and 'arpeggio' motives of section 2 are all identifiable in terms of segmental pitch content rather than interval succession. Similarly, the recitative of the first Chorus Op.14 revises the original set ordering, while the Chorale Melody of the Little Symphony derives from the non-linear trichordal segments of the set and only very occasionally is it informed by the set's interval succession. Fewer still are the points of contact between
the interval succession of the set and the violin solos in
the last movement of the symphony.

Another aspect of the oblique relationship between set and
linearity in Goehr's music is the tendency not to equate the
set, in terms of its linear ordering, with the idea of a
theme. For example, many of the motives and themes of the
Piano Sonata are derived from the set, but only one (Bar 25,
lento quasi parlando) unequivocally reveals the linear
ordering of the set and remains referential in terms of its
original compositional presentation. Further, the derived
motives of the Piano Sonata sometimes operate independently
of their originating set. For example, the 'wedge' and
'arpeggio' motives operate without a set context. There are
also passages, as I have observed, where the integrative
function of the set is hard to establish.

The Piano Sonata is something of an exception in being
polythematic. Much of Goehr's music is monothematic and
cast in variation form (e.g. Violin Concerto, 1st movt.; Two
Choruses Op.14 no.1; Little Symphony Op.15, 2nd movt.;
Second String Quartet Op.13, 1st. movt; Symphony is One
Movement Op.29; Metamorphosis/Dance Op.36). In these and
other pieces, the set itself may or may not be made
compositionally explicit. In the Little Symphony, the set
from which the Chorale Melody is derived is made
compositionally explicit, but its appearances are confined
to a few variations of the second movement where its
presentation is devoid of thematic character, rather, as I have said, in the manner of a cantus firmus. In the Violin Concerto, the set makes no appearance whatsoever in the first movement which is, nevertheless, derived from the set. In such circumstances the set can be said to have relinquished its accepted functions. In the Little Symphony for example, it is the Chorale Melody which functions as a motive and not the set; the interval structure of the Chorale Melody is referential for the majority of linear formations within the Symphony, while the interval succession of the Chorale Melody and not that of the set determines the simultaneities within the Symphony.

If Goehr's view of the set as motive discussed so far shows some revision of Schoenbergian twelve-note theory, it nevertheless demonstrates some points of contact with Schoenbergian practice. While it is true that in much of Schoenberg's music the set is assumed to be defined in terms of its interval structure, there is also music in which segmental pitch content plays a significant role. As Jarman and Perle, among others, have observed, both the String Trio and the 'Ode to Napoleon' employ sets which are defined solely in terms of their segmental pitch content. [PERLE, 1981, p.72, JARMAN, 1979, pp.80-81]. In both works, more than one linear ordering of the hexachordal pitch content is employed. If a twelve-note set is defined solely in terms of its interval structure, then both the Trio and the 'Ode' must be said to use more than one set. Although these works
contravene Schoenberg's dictum that "only one set should be used in one composition", [SCHOENBERG, 1941, p.219] their greater importance lies in indicating the significance of segmental pitch content in Schoenberg's twelve-note method. The Trio and the 'Ode' are exceptional. Many of Schoenberg's works take a view of the set in which both interval succession and segmental pitch content are referential. This dual view sometimes gives rise to linear formations whose identities are not defined in terms of either segmental pitch content or interval succession. In this connection Perle has drawn attention to a linear formation in the third of Schoenberg's Three Songs Op.48 [PERLE, 1981, p.71]. The voice part brings into adjacency pitches which are not adjacent in the originating set. Thus a linear element is produced whose interval succession is not directly derived from the set.

Figure 2

The 'justification' for the passage resides in the fact that the remaining pitch content of the hexachord is in the right
hand piano part (though not according to its original order). Another example from Schoenberg of a linear idea which is indirectly derived from the set occurs in the Violin Concerto.

![Figure 3](image)

**Figure 3**

In the above example, the solo violin part reveals a melodic line which does not disclose its originating set although, in conjunction with its accompaniment, the melody can be seen to reveal the dyadic pitch content of the set according to its linear succession.

Schoenberg's indirect derivation of linear material from the set has, in the past, raised doubts concerning the ability of the set, as Schoenberg used it, to function in the manner of a motive. In an article written in 1936 by Richard Hill,
exception was taken to the way Schoenberg sometimes handled the set, "... in the way that he at times twists it about [and] renders it totally meaningless as either harmonic or melodic structure".

In conclusion, Hill remarks:

As Schoenberg himself used the row, he destroyed its functional and motival significance by distributing the notes in too random and complicated a fashion.

[HILL, 1936, p.37]

This line of thought was subsequently taken up by Ernst Krenek who, in 1943, wrote:

It is useful to define music that abides by the motivic function of the series as music whose structures are made up exclusively or predominantly of melodic elements which are extracted immediately from the basic series. Twelve-note music which does not answer this definition may not make use of such a function. In the latter case, the (extra-motival) function may be the result of purposeful manipulation of the series, or it may become manifest on account of operations not immediately concerning the series.

[KRENEK, 1943, pp. 82-83]

In the same article, Krenek quotes from his own unpublished lecture of 1940 in which he said:

Anyone who has studied the origins of the twelve-tone technique knows that the twelve-tone series owes its existence to the desire to establish a common denominator for all the
melodic phenomena of a composition.

[quoted in KRENK, 1943, p.82]

There is here a direct identification of the motivic function of the set with the linear/melodic aspect of music. Yet, as I have already observed, given the tradition to which Schoenberg belonged and the extent to which that tradition had expanded the influence of the motive in determining the total musical texture, it seems likely that Schoenberg thought of the motive as embracing all aspects of pitch organization.

If Schoenberg's practice is sometimes regarded as diminishing the motivic function of the set, that of Webern's is usually seen to stand for the complete identification of set and motive. Thus, in Webern's Symphony, Op.21 it is possible, analytically at least, to trace with relative ease the four forms of the set which are the four-part canon of the first movement. Generally speaking, it would be unusual to find in Webern the kind of formation which Schoenberg explored in which non-contiguous pitches of the set appear as linear adjacencies. Webern also differs from Schoenberg in that some of his later twelve-note sets are conceived as aggrandizations of a basic cell or segment. The sets of the Symphony Op.21, the Concerto op.24, the String Quartet op.28 and the Second Cantata op.31 are all examples of this type of set.
It is not clear if Webern thought of the set as a compositional motive in itself or as a collection of motives. On the one hand, when composing, he fragmented the set according to its constituent cells, yet on the other, his often quoted remark about a performance of the symphony Op. 21 - "a high note, a low note, a note in the middle—like the music of a madman"—seems to indicate that the motivic identity of the complete set was significant for him. This way of composing creates a problem, for listener and performer alike, which focuses on the differentiation of the musical idea from its context. Goehr has described the problem thus:

... motifs, phrases, accompaniments, albeit in a highly fragmented form, may be realized in performance and understood musically as a sequence of ideas and their continuations and developments, despite the fact the pitch level structure of many compositions makes it hard
to distinguish the musical idea and the different types of continuation and development.

[GOEHR, 1973, p.177]

Goehr goes on to suggest that to focus on pitch when discussing Webern is, in fact, to miss the point, for:

Webern is above all, a rhythmic composer. Fragmentation, analytical orchestration and above all, the word heighten his rhythmic invention in a unique and magnificent way.

[GOEHR, 1973, p.177]

In certain of Goehr's pieces, Goehr has used linear formations which arise directly out of his perception of the motivic problem in twelve-note music. In the Poetics he provides a model for the derivation of what he has called 'serial-ideas'. These he sees as being irregular in relation to the "symmetrical sound-space mapped out by a twelve-tone row." [GOEHR, 1973, p.179] Goehr takes as his point of departure an 'arbitrarily constructed ordering or row' and observes that any such linearly ordered set will have "internal relationships". In the first of the following series of examples (taken from the Poetics), the interval sequence formed by pitches 0, 1 and 2 of P-0 is duplicated by pitches 4, 5 and 6. These same interval and pitch sequences will naturally recur at the tritone
transposition of the set P-6.

Figure 5

Goehr also observes that notes 8, 9 and 10 of the set at I-6 reproduce notes 1, 2 and 3 of the set at P-6:

Figure 6

In each of these set forms an invariant formation has variable adjacencies. Goehr creates linear ideas by amalgamating these variant/invariant segments such that the variant formations act as pivots or axes to the variable adjacencies. Taking, as an example, the set segments which incorporate the C-B-A# sequence Goehr creates the following 'serial idea'.
The solo viola melody which occurs towards the centre of the first movement of Goehr's String Quartet No.1 is just such an idea:

It conforms to Goehr's theoretical model as supplied in the Poetics in that it is a compound linear structure in which an invariant pitch and interval formation acts as a pivot to adjacencies which are variable:

The method of derivation from the work's basic set also conforms closely to the Poetics model. The basic set is as follows:
The interval sequence of pitches 2, 3 and 4 of P-0 is repeated a tone higher at 6, 7 and 8. This establishes a relationship between the set at P-0 and P-10 since pitches 6, 7 and 8 of P-10 repeat the F#-G-E interval sequence of pitches 2, 3 and 4 at P-0:

The set segments marked 1 and 3 correspond respectively to sections 1 and 3 of the serial idea. A partial repetition of the F#-G-E sequence occurs at pitches 4, 5 of the set at RI-7 and the segment marked 2 corresponds to section 2 of the serial idea.
This serial idea stands apart from the movement in which it appears in a number of respects. It is not the primary thematic formation of the movement and it is not heard until the 'still centre' of the movement where it appears isolated as the movement's only solo music. It also stands apart from the basic set of the movement, as I have demonstrated, and hence from the other pitch formations of the music which are more directly derived from the set.

Goehr's serial ideas can perhaps be seen as a rationalization of a general, less methodical approach to linearity. For example, the recitative of the first of the Two Choruses is a linear formation in which an invariant pitch and interval sequence (x) has variable adjacencies:

```
\begin{figure}
\centering
\includegraphics{figure13}
\caption{Figure 13}
\end{figure}
```

Similarly the recognition of pitch/interval sequences common to different set forms provides the rationale for some of the linear formations in the fourth movement of the Little Symphony (please see chapter 3, figs. 29 and 31).

In terms of concept and method, the serial idea does not seem to have a precise point of contact with classical twelve-note theory and practice. However, the more general
idea of associating different set forms on the basis of invariant, linearly ordered elements has a precedent in classical twelve-note practice as well as in the work of other twelve-note composers. Perle has demonstrated how, in the fourth of Schoenberg's Five Piano Pieces Op.23 (admittedly a pre-twelve-note piece), two pairs of set forms are compositionally associated on the basis of an invariant linear element, which thereby acts as a pivot or axis between the paired set forms.

Similarly, in the first movement of Webern's Symphony Op.21, successive set forms of the four canonic parts of that movement are associated on the basis of commonly held, linearly ordered, terminal dyads. The successive set forms for each part, from the beginning of the movement to the first time bar are given below:
In Berg's music, the association of set forms based on common segmental pitch content is a technique which informs much of his twelve-note music. However, because Berg often regards the contour of a set form as being one of its defining characteristics, this necessarily focuses attention on the linear ordering of the set. This in turn provides another basis for the compositional association of different set forms. Both Perle and Jarman [1981, pp. 143-144 and 1979 p.91 respectively] have demonstrated the significance of linearly ordered invariance in Berg's opera, LULU. In the following example [which is an expansion of Ex. 176, PERLE, 1981, p. 143], linear elements in common between the basic series of Lulu and those of DR. SCHOEN, ALWA and the ATHLETE are identified:
Goehr's perception of the 'harmonic problem' in twelve-note music goes somewhat further than the Perle-based one outlined above. Goehr acknowledges in the Poetics that there is little rationale for the harmonic projection of a structure conceived in terms of a linear succession of intervals. At the same time he expresses a concern, not expressed by Perle, for the absence of a harmonic 'system' in twelve-note music, analogous to that which exists in the manifold hierarchy of diatonic tonality:

The thorniest problems of dodecaphonic composition have to do with the vertical combination of sound ... harmony ... In classical 12-tone technique, the vertical combination of sound is considered as horizontal sequencing with the time distance of zero. If two notes which follow each other in the row are performed simultaneously they
become a chord. Strictly, a harmonic dimension, with all its important traditional attributes, no longer exists ... only where vertical sound combinations actively affect what goes on around them (as in the tonal system) can we properly talk of harmony. Less than that, it is just a question of accompaniments, doublings and settings.

[GOEHR, 1973, pp. 179-180]

In the music up to but not including the first of the Two Choruses, Goehr adopts a fairly consistent approach to the generation of twelve-note harmony. Harmonies are derived from trichordal segments of the basic set. These segments are usually non-linear and contingent upon Goehr's view of the set in which segmental pitch content is held to be the set's primary attribute. Segments so derived are non-diatonic and invariant; that is, the simultaneities of a piece do not revise the initial segmentation. Of course there are exceptions to this rather exclusive summary. Both the Variations for Flute and Piano Op.8 and the Four Songs from the Japanese Op.9 adopt a somewhat freer approach to harmony in their use of linear segments of different sizes, which are subject to revision within the bar to bar continuity of the piece. The following example is from the Flute Variations:
The extent to which harmony is projected as a distinct component of the texture also varies in these early pieces. Texturally, the Piano Sonata displays a fairly traditional observance of melodic and harmonic differentiation. For the most part, this distinction is less a matter of pitch than one of compositional projection. For example, the melody of the Sonata's opening 'Maestoso' chords (Eb -Bb-G-G#) - please see chapter 2, fig.10 - is simply the uppermost layer of pitches in the compositional unfolding of the set at P-0. At the beginning of section 2 (bars 36 et seq.) the differentiation of the right hand melody and left hand accompaniment is also a matter of compositional projection, but the use of different forms of the set for each component reinforces the distinction.
In the pieces which immediately follow the Piano Sonata, Goehr's music approaches a Webern-like conception of musical texture in which melodic and harmonic distinctions are replaced by what Goehr has called a "dissolved polyphonic idiom" [GOEHR, 1973, p.179]. Typical in this respect are Capriccio Op.6 and The Deluge Op.7.

Goehr's harmonic method as shown in the Piano Sonata has a number of points in common with that of Schoenberg's. The Sonata shares with Schoenberg's music a concern for the preservation of harmony and melody as differentiable elements of the musical texture, although the chordalism of the Sonata is not a common feature of Schoenberg's harmonic texture. However, the opening 'Maestoso' chords of the Sonata correspond to Schoenberg's harmonic method when using a single set form by assigning melodic function to some pitches and harmonic function to others. (An example of Schoenberg's usage of this technique has already been cited at fig.2). In the Piano Sonata the 'Maestoso' chords assume a segmentation of the set which is largely invariant throughout the piece. This gives the composer a degree of harmonic control and imparts to the sonata a distinct harmonic identity. Although recent research by Martha Hyde suggests that Schoenberg did not identify twelve-note harmony solely with simultaneity and that the set itself was conceived as "a group of harmonies ... identified by their total intervallic content" [HYDE, 1982, p.5 et seq.], Schoenberg's approach to harmonic identity appears to have
been largely pragmatic. In his Wind Quintet Op.26, Schoenberg uses an ordered set which consists predominantly of whole tones thereby ensuring a consistent identity among harmonic formations through the verticalization of adjacent pitches. In other pieces, Schoenberg's harmony results from the association of different set forms according to the principles of either segmental invariance or combinatoriality. The choice of set forms is sometimes motivated by the desire to promote a specific harmonic type. Perle has demonstrated how different forms of the set of Schoenberg's 'A Survivor from Warsaw' maintains an invariant three-note segment (C-A♭-E) which is then promoted as a harmonic component of the music:

![Figure 18](image)

The association of set forms through invariant segmental pitch content or combinatorial relationships, plays no part
in the harmonic language of Goehr's Piano Sonata or indeed in any of Goehr's music prior to the Two Choruses. The Piano Sonata further deviates from Schoenberg's harmonic method in the way that motives derived from the set operate independently of it. In Schoenberg, derived ideas invariably operate within a compositional unfolding of the remaining pitch elements of the set.

Goehr's approach to harmony in the post-Sonata pieces resembles that of Webern rather than Schoenberg. As I have already indicated, Webern conceives some of his later sets as aggrandizations of a basic cell. In the works such as the Concerto Op.24, the adjacent pitches of the set form only two intervals: a minor second and a major third. The verticalization of these adjacencies produces an invariant criterion for the harmonic alignment of pitches throughout the Concerto and this in turn imparts a harmonic identity to the piece. When Webern uses two set forms simultaneously, as he does in the first movement starting at bar 11 of the Concerto, the alignment of pitches will often be determined by the desire to maintain the simultaneities of the basic set.
Perle and Rochberg have also observed that when employing simultaneous statement of different set forms, Webern achieved a consistent harmonic identity by maintaining a constant transpositional sum between set forms related as Prime to Inversion [PERLE, 1971, PP.12-16; Rochberg, 1962, pp.109-122].

Goehr's approach to twelve-note harmony in his later music beginning with the first of the Two Choruses was outlined in theoretical form in the Poetics. [GOEHR, 1973, pp.180-182]. Taking the same linearly ordered set that Goehr used in the theoretical derivation of his serial idea, Goehr superposes pitches 6-11 and 0-5 of the set in the following manner:
Goehr describes this association of pitches as an 'arbitrary combination'. One possible rationalization might be advanced if pitches 0-5 and 6-11 are regarded as independent linear orderings whose superpositioning in the manner described by Goehr is a combinatorial operation (since it produces a twelve-note aggregate) analogous to the combinatorial pairing of prime set forms with their own retrogrades. Goehr regards the sequence of intervals at fig. 20 as "a matrix which, with certain redundancies in the superposition of members of each hexachord above their matrices, creates two to twelve part vertical structures which replace single pitch levels in the row i.e. pitch level \( x \) is replaced by a vertical complex \( (x + n) \) pitch levels." Goehr goes on to observe that if the vertical interval sequence is transposed or inverted, the pitches of the original sequence are redistributed. For example, if
the original sequence is compared with its transposition, it will be noticed that while the contour and ordering of intervals of the one is reproduced in the other, the pairing of pitches has changed. Thus, where pitch $g$ is paired with pitch $c$ in the original sequence, in the transposed sequence it is paired with pitch $b$ and so on.

![Figure 21](image)

Goehr regards this new pairing of pitches as a kind of 'alternative harmonization'. Conflating the three 'limbs' of the serial idea, formulated earlier in the Poetics, with the prime, transposed and inverted forms of the vertical interval sequence, Goehr demonstrates the alternative harmonization of the recurrent pitches of the serial idea, something which Goehr regards as analogous to "varying harmonization resulting from change of mode in earlier music."

![Figure 22](image)
This method of generating vertical sound complexes from a twelve-note set as a basis for harmonic extrapolation represents, as Goehr points out, something of a cross-pollination of twelve-note technique with the tradition of music based on unordered and functionally undifferentiated collections of pitches. To this tradition belongs Skryabin's 'Mystic Chord', Schoenberg's chord of fourths in the Chamber Symphony No.1 as well as Debussy's so-called 'acoustic scale' and Messiaen's 'Modes of limited transposition'. Pre-dating Schoenberg's formulation of the concept of the twelve-note set, J.M. Hauer combined the concept of the unordered pitch collection with the notion that all twelve pitches are equally available in the formulation of 80 hexachordal pitch collections of mutually exclusive pitch content which, when paired, form twelve-note 'tropes'. [PERLE, 1981, p. 287] Working in the late-1930s, Ernst Krenek attempted the formulation of a 'serial modality', an attempt which was also taken up by his pupil George Perle whose work I will discuss later in the chapter. [KRENEK, 1943, pp.81-97] However, Goehr says in the Poetics that it is in Boulez's formulation of the 'bloc sonore' that his matrix concept has its origin. These sound-blocks or 'superimposition of frequencies' as Boulez also describes them [BOULEZ, 1966, pp.167-169; BOULEZ, 1975, pp.39-41, 107-109] are vertical pitch structures of variable density derived from a twelve-note source. Boulez's starting point is a sequence of five vertical segments which together use all twelve pitches.
By reconstructing or 'transposing' one sonority in terms of another, Boulez generates another series of sonorities or 'blocs':

... if one transposes a superimposition of three sounds by a superimposition of four sounds one obtains in principle a superimposition of twelve sounds. But because of notes in common ... the new sound-bloc will have only ten tones.

[BOULEZ, 1966, p.167]

The process of intervallic transposition is demonstrated as follows:

Boulez is anxious that his blocs should not be in any way linked with the concept of the chord or harmony:

There may be surprise at my labelling as "complexes of sounds" what usually are called "chords". Without speaking of the historic heritage to which the word 'chord' is linked, I am not according any harmonic function,
properly speaking, to such a vertical coagulation. I mean by it nothing more than the superimposition of frequencies as a sound-bloc.

[BOULEZ, 1966, p.167]

There are close correspondences between Boulez's explanation of the bloc sonore and Goehr's explanation of his matrix structure. They have as a common starting point a sequence of vertical interval structures derived from a twelve-note source. These interval structures are subject to intervallic thickening. In the case of Boulez this is achieved by a process of intervallic transposition or multiplication. In the case of Goehr, one presumes that a similar process applies since, like Boulez, Goehr notes that the matrix produces 'redundancies' among the products of multiplication.

However, Goehr's theoretical model for the construction of the matrix is at variance with the construction of the matrix as I have observed it in relation to the Two Choruses, the Little Symphony and the String Quartet No.3. I have suggested that the matrix derives from trichordal segments of the basic set. These are associated by means of a combinatorial pairing of pitches 0-5 and 6-11 respectively. The projection of trichordally-paired simultaneities as chords assumes one trichord to be Dominant and one Recessive, producing harmonies whose normative density is four pitches. If the technique of intervallic transposition derived from Boulez, to which Goehr refers in
the Poetics, is applied to the superimposed version of the set of the Little Symphony for example, the resultant simultaneities do not correspond to those of the Little Symphony in any way:

![Diagram of musical notation]

**Figure 25**

There are other deviations between theory and practice. In the Poetics, Goehr proposes vertical pitch structures whose density ranges from two to twelve pitches. Northcott has commented that "the variable density of the harmonic matrix also restores the possibility of the 'tutti' as the harmonic frame of a piece" suggesting that in some pieces Goehr has in fact deployed vertical structures of maximum twelve-note density [NORTHCOTT, 1980, p.90]. This is never the case since the matrix allows for a maximum density of six pitches only.

One final point of deviation between theory and practice needs to be mentioned. As I have indicated, Boulez does not regard his bloc sonore as being in any way synonymous with chords or harmony. However, the simultaneities of Goehr's matrix are conceived from the start in harmonic terms and consistently projected as chords in his music.
The harmonic orientation of Goehr's matrices frequently suggests diatonic allusions and the desire to promote such allusions is possibly more germane to an understanding of matrix structure than intervallic multiplication. The major, minor, diminished and augmented trichords of the Little Symphony matrix are non-linear, selected segments. Linear segments would have produced two minor trichords, and two trichords not susceptible to diatonic/chromatic interpretation.

![Figure 26](image)

The fact that Goehr chose the non-linear segments rather than the linear ones suggests that the projection of diatonic allusions was a deliberate motivation. In this respect the Little Symphony is not an isolated case. The trichordal segments on which the matrices of the Three Piano Pieces, The Second String Quartet and the Third String Quartet are based all show some affinity with the patterns of diatonic/chromatic harmony.
The incorporation of diatonic elements within an otherwise twelve-note context is preceded in classical twelve-note music. Both Rufer and Perle have shown how Schoenberg extracted diatonic triads from the unordered set of 'Ode to Napoleon' Op.41 and projected these as chords. [RUFER, 1954, pp.130-131, PERLE, 1981, p.94] Rufer has also demonstrated that the triad of Eb major assumes ever greater importance during the course of the piece, though the piece is not in any sense in the key of Eb. It is in the work of Berg, however, that the most extensive use of diatonic elements is to be found. In the Violin Concerto, the distinctly diatonic orientation of the harmony derives from a set which incorporates, as linear adjacencies, major and minor triads:
Perle has also demonstrated that where contiguous pitches of the set do not give rise to triadic patterns, as is the case with the set of 'Der Wein', Berg will extract such patterns by selecting the necessary pitches and projecting them accordingly. [PERLE, 1981, p.89] Berg's penchant for diatonically patterned segments and chordal textures is a clear point of contact with Goehr's method. However, there is no parallel in Goehr for the incorporation of actual diatonic music within an otherwise twelve-note piece, such as takes place in Berg's 'Lulu' or the Violin Concerto. Nor does Goehr promote what Jarman has described as "primary tonal centres" such as the D major centre associated with Dr. Schoen in Lulu [JARMAN, 1979, pp.94-97].

If the points of contact between the theoretical structures of Goehr's matrix and its structure as revealed by an analysis of the music are few, the potential of the matrix for alternative harmonization, which the theoretical model suggests, is amply fulfilled in the music. In the Little Symphony, I have cited many examples of the way in which pitches of the Chorale Melody are harmonized by locating them at different levels within the matrix texture. As well as effecting reharmonization itself, the technique also helps to maintain the differentiation of melody and harmony, something which, as I have indicated, has been perceived as problematic in twelve-note music. At the same time, a by-product of reharmonization has been the generation of new linear formations as in the last movement of the Little
Another means of achieving new linear orderings, to which Goehr refers in the Poetics, is the 'transformational pedal' which Goehr makes extensive use of in the Little Symphony. Other examples of its use are to be found throughout the Three Piano Pieces and in Metamorphosis/Dance Op.36 (bars 355-365). In the Poetics, Goehr observes that:

Principles of systematic distortion have been well known to painters at various times, but are only known to musicians in the techniques of rhythmic augmentation and diminution. But there are not really any forms of systematic intervallic procedures of this kind other than those found marginally in the tonal answers of fugue and the like. There are a great variety of decorative and variational devices, but there exists little formal interest in the comparison of approximate shapes and their regular and irregular distortion.

[GOEHR, 1973, p.181]

The reference to fugal answers touches on a point of differentiation between diatonic and twelve-note music. As I have observed, in diatonic music, motives, intervals, etc., function within a context which they do not determine. In twelve-note music, the set determines both context and the musical ideas within that context. Babbitt has explained the problem which this creates in the following way:

The functionality of a twelve-note composition is defined by the specific twelve-note set. A functional norm is stated and deviations from this norm appear; but there is no degree of deviation, no hierarchy of deviation such as is present in tonal music, to make possible
progress and growth - stated in terms of functional context - through various stages of compositional expansion.

[BABBITT, 1950, p.59]

Goehr points to one solution of this problem in the theoretical work of Boulez. In his article "Eventuellement" [1952] Boulez proposes a method of enlarging the sound space within which intervals function, thereby enlarging and contracting the intervals themselves. Boulez enlarged on this idea in his book 'Boulez on Music Today' [1975 pp.81-82]. By altering the module or ambit of a twelve-note set, the pitches of the set are 'filtered', resulting in the disappearance of some pitches altogether. Boulez supplies the following example. The module of the set at fig.29 is a major seventh. If the module is divided into two, to become two perfect fourths and reapplied to the same set as a new module, filtration of pitches takes place as follows:

Figure 29

The means by which Goehr achieves a similar filtration, i.e. the transformational pedal, has been described on page 76.
This device has more in common with Boulez's technique of intervallic multiplication, in the way that dyads are reconstructed in terms of each other, than with the device of altering the set module. Even so, the pedal device results in the same filtration of pitches. In this connection, Goehr has commented:

Observe that functional note repetitions result from this operation. This causes it to act as a bridge between regular dodecaphonic rotation and more limited, filtered, tonal areas.

[GOEHR, 1973, p.183]

Since 1939, George Perle has been developing a method of serial modality which has a number of features in common with Goehr's matrix method. Articles relating to Perle's method appear from 1941 onwards with 'Evolution of the tone row - The Twelve-tone Modal System' [PERLE, 1941, pp.273-287], but all the following quotations are drawn from Perle 1964 (pp.91-101). Perle has adopted two concepts on which to base his theory of serial modality: the verticalization of adjacencies as the sole basis for simultaneity, and the concept of a special or fundamental twelve-note set - the twelve-note set in fact. In evolving the latter, Perle sought out a number of uni-intervallic sequences "whose linear adjacencies would present a coherent pattern likely to suggest consistent harmonic procedures". Sequences of fifths, fourths, semitones and whole-tones will all fulfil such criteria while at the same time generating all twelve
pitches. But as compositionally explicit sets they are of limited value. However, Perle went on to observe that each of these sequences could be made to generate an all-interval set without sacrificing the uniform pattern of adjacencies. In the following example, diverging cycles of fifths, whole-tones and semitones are conflated:

![Figure 30](image)

By reading off in turn the successive pitches of the two cycles, Perle obtains his all-interval sets. He has found only the all-interval set based on fifths to be of compositional interest and it is this set which he regards as the special or fundamental twelve-note set:
Perle has observed that each three note segment, while not being identical as would be the case with a uni-intervallic set, shows a degree of uniformity in as much as any given pitch of the set has adjacent pitches which are always a fifth apart from each other. By treating each pitch in turn as an 'axis' to a pair of 'neighbouring' pitches Perle arrives at the first of his serial modes, at least in embryo form:

![Figure 31](image)

Perle extends this procedure by using the prime version of the special set in conjunction with its own inversion at the same transpositional level: a given pitch or axis tone is located in both prime and inversion and the two sets of neighbour notes combined thus.

(F) C F G B\# D E A G# E C# B F# (B) - Po.

(G) C G F D B\# A D# E G# B C# F# (C) - Io.

F, C
G C G, C G F, G F D, etc.
F B\# G

![Figure 32](image)

Figure 33
Perle further extends this procedure by combining the stationary prime with the remaining eleven transpositions of the inversion to produce a complex of twelve axis/neighbour note sequences or tables. Perle draws his rationale for these procedures from his observations of twelve-note theory and practice. A given pitch within a twelve-note set has no function which sets it above any other pitch. Its sole function is to proceed to the next pitch. So in a sense, says Perle, every pitch within a twelve-note set fulfils a function analogous to a leading-note in a diatonic scale. If a given pitch, then, is located in each transformation of a set, it has in theory a choice of four pitches to which it might 'lead'. Here Perle is mindful of the fact that "according to the strictest application of (serial) technique each pitch tends to move to only one of these at a time". [PERLE, 1941, p.274]. Proceeding from this first observation, Perle notes that it is not uncommon in twelve-note music for a given pitch to move back to the preceding pitch before continuing with the pitches of the set in order. Further, Perle has observed that it is also common practice for the Prime and Inverted forms of the set to be used simultaneously as a combinatorial pair.

Because the twelve tables, which are generated by combining the neighbour notes of a stationary Prime and a transposing Inversion around a common axis note, are defined in terms of pitch content, the pairing of Prime and
Retrograde forms has no real significance. Also, because hexachord (6-11) of the fundamental set is a tritone transposition of hexachord (0-5) in retrograde, the tables produced by pairing the non-transposing Prime form of the set with forms of the set at I-6 to I-11 will duplicate in retrograde the tables produced by pairing the non-transposing Prime with I-0 to I-5. Hence only six non-equivalent tables are produced. A comparative examination of tables 1 and 6 (see fig. 34) shows that parallel constellations share the same neighbour notes but have a different axis note. Thus, the conflation of Tables 1 and 6 produces a series of neighbour note groupings of identical intervallic structure, each grouping having two axis tones. Perle regards the combination of axis and neighbour tones as forming a chord and the entire complex of such chords he has called a Mode. Tables 1 and 6 produce Mode 1. When the neighbour notes revolve around axis tones of Table 1 he has designated the mode 'FIRST MODE W', and those that revolve around axis tones of Table 6 he has called 'FIRST MODE X'. A conflation of Tables 2 and 5 (i.e. P-0 and I-1/I-4) produces a further sequence of identically patterned neighbour notes, but ones which are quite distinct from those of Mode 1. This sequence Perle has called Mode 2. Finally, a conflation of Tables 3 and 4 (i.e. P-0 and I-2/I-3) produces Mode 3. Both of these modes possess modal forms W and X. When Tables produced by relating a static Inversion to a transposing Prime are generated the same characteristic modal patternings are produced, only this
Table 1 [P-0 with I-0]  
<table>
<thead>
<tr>
<th></th>
<th>F</th>
<th>F</th>
<th>C</th>
<th>B♭</th>
<th>G</th>
<th>E</th>
<th>D</th>
<th>G#</th>
<th>A</th>
<th>C#</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>GCG</td>
<td>CGC</td>
<td>GFD</td>
<td>FDB</td>
<td>DB</td>
<td>A</td>
<td>B♭</td>
<td>AD#</td>
<td>ADE</td>
<td>DE</td>
<td>E G#</td>
<td>EGB</td>
</tr>
<tr>
<td>F</td>
<td>B♭</td>
<td>G</td>
<td>E</td>
<td>D</td>
<td>G#</td>
<td>A</td>
<td>C#</td>
<td>E</td>
<td>G#</td>
<td>B</td>
<td>C#</td>
</tr>
</tbody>
</table>

Table 1 [P-0 with I-1]  
<table>
<thead>
<tr>
<th></th>
<th>E</th>
<th>A</th>
<th>B</th>
<th>D</th>
<th>C#</th>
<th>G</th>
<th>G#</th>
<th>C</th>
<th>E♭</th>
<th>F</th>
<th>FAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>G♭</td>
<td>C</td>
<td>G#</td>
<td>F</td>
<td>F</td>
<td>D♭</td>
<td>B♭</td>
<td>B♭</td>
<td>B♭</td>
<td>E♭</td>
<td>E♭</td>
<td>FAC</td>
</tr>
<tr>
<td>B</td>
<td>E</td>
<td>B</td>
<td>A</td>
<td>F#</td>
<td>D</td>
<td>C#</td>
<td>G</td>
<td>G#</td>
<td>F</td>
<td>G#</td>
<td></td>
</tr>
</tbody>
</table>

Table 3 [P-0 with I-2]  
<table>
<thead>
<tr>
<th></th>
<th>B♭</th>
<th>E♭</th>
<th>F</th>
<th>G#</th>
<th>F</th>
<th>C#</th>
<th>C</th>
<th>B</th>
<th>G</th>
<th>B</th>
<th>D</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADA</td>
<td>DAG</td>
<td>AGE</td>
<td>GEC</td>
<td>ECB</td>
<td>CBF</td>
<td>BFP</td>
<td>F</td>
<td>F</td>
<td>B♭</td>
<td>B♭</td>
<td>C</td>
<td>B♭</td>
</tr>
</tbody>
</table>

Table 4 [P-0 with I-3]  
<table>
<thead>
<tr>
<th></th>
<th>D</th>
<th>G</th>
<th>A</th>
<th>C</th>
<th>E</th>
<th>C</th>
<th>B♭</th>
<th>F</th>
<th>G</th>
<th>B♭</th>
<th>D</th>
<th>E</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>B♭</td>
<td>B♭</td>
<td>B♭</td>
<td>A♭</td>
<td>A♭</td>
<td>F</td>
<td>F</td>
<td>C#</td>
<td>F</td>
<td>C#</td>
<td>C</td>
<td>B♭</td>
<td>B♭</td>
<td>G#</td>
</tr>
<tr>
<td>A</td>
<td>D</td>
<td>E</td>
<td>G</td>
<td>B</td>
<td>F</td>
<td>G</td>
<td>B♭</td>
<td>D</td>
<td>B♭</td>
<td>E</td>
<td>C#</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5 [P-0 with I-4]  
<table>
<thead>
<tr>
<th></th>
<th>G#</th>
<th>C#</th>
<th>E♭</th>
<th>B</th>
<th>A</th>
<th>F</th>
<th>D</th>
<th>C#</th>
<th>G#</th>
<th>G</th>
<th>C</th>
<th>B♭</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>E</td>
<td>B</td>
<td>B</td>
<td>A</td>
<td>A</td>
<td>F</td>
<td>D</td>
<td>C#</td>
<td>D</td>
<td>C</td>
<td>G</td>
<td>G#</td>
</tr>
<tr>
<td>C#</td>
<td>F#</td>
<td>G♭</td>
<td>B</td>
<td>E♭</td>
<td>B</td>
<td>B♭</td>
<td>E</td>
<td>B♭</td>
<td>E</td>
<td>C</td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td>G</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6 [P-0 with I-5]  
<table>
<thead>
<tr>
<th></th>
<th>C</th>
<th>F</th>
<th>G</th>
<th>F</th>
<th>D</th>
<th>B♭</th>
<th>A</th>
<th>E♭</th>
<th>E</th>
<th>G</th>
<th>B</th>
<th>C#</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>F</td>
<td>C</td>
<td>F</td>
<td>B♭</td>
<td>C</td>
<td>B♭</td>
<td>G</td>
<td>E♭</td>
<td>G</td>
<td>E♭</td>
<td>D</td>
<td>G#</td>
</tr>
<tr>
<td>G</td>
<td>F</td>
<td>D</td>
<td>B♭</td>
<td>A</td>
<td>E♭</td>
<td>E</td>
<td>G</td>
<td>B</td>
<td>C#</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 34
time the contour of adjacent neighbour and axis notes is inverted. These modes are similarly labelled 1,2 and 3 while the modal forms are called Y and Z.

Transposition of a Mode in its entirety (i.e. relating a transposing Prime to a transposing Inversion) Perle regards as a change of 'key'. Because the stationary Prime on which Modes 1, 2 and 3, forms W and X are based, and the stationary Inversion on which Modes 1, 2 and 3, forms Y and Z are based, both begin on C and finish on F♯, Perle refers to these Modes as being in the 'key' CF♯. Since each Mode can be stated in one of 6 keys, and since there are 12 Modal forms then simple multiplication generates a total of 72 possibilities or 'key forms'. But Perle has discovered that each Modal form in any given key has a duplicate, thus reducing the number of possible alternatives to 36. Within each Mode are chords which are common to a number of forms and keys and these have been codified by Perle, thus:

<table>
<thead>
<tr>
<th>Chord</th>
<th>Key</th>
<th>Mode</th>
<th>Form</th>
<th>Chord</th>
<th>Mode</th>
<th>Forms</th>
</tr>
</thead>
<tbody>
<tr>
<td>I,1</td>
<td>C F#</td>
<td>First Mode</td>
<td>W =</td>
<td>I, 1</td>
<td>C F#</td>
<td>First Mode</td>
</tr>
<tr>
<td>II,2</td>
<td>C F#</td>
<td>First Mode</td>
<td>X =</td>
<td>I, 1</td>
<td>F B</td>
<td>First Mode</td>
</tr>
<tr>
<td>III,3</td>
<td>C F#</td>
<td>Second Mode</td>
<td>W =</td>
<td>I, 1</td>
<td>G C#</td>
<td>Second Mode</td>
</tr>
<tr>
<td>IV,4</td>
<td>C F#</td>
<td>Second Mode</td>
<td>X =</td>
<td>I, 1</td>
<td>B♯E</td>
<td>Second Mode</td>
</tr>
<tr>
<td>V,5</td>
<td>C F#</td>
<td>Third Mode</td>
<td>W =</td>
<td>I, 1</td>
<td>D G#</td>
<td>Third Mode</td>
</tr>
<tr>
<td>VI,6</td>
<td>C F#</td>
<td>Third Mode</td>
<td>X =</td>
<td>I, 1</td>
<td>B♯ A</td>
<td>Third Mode</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chord</th>
<th>Key</th>
<th>Mode</th>
<th>Form</th>
<th>Chord</th>
<th>Mode</th>
<th>Forms</th>
</tr>
</thead>
<tbody>
<tr>
<td>I,1</td>
<td>C F#</td>
<td>First Mode</td>
<td>Y =</td>
<td>I, 1</td>
<td>C F#</td>
<td>First Mode</td>
</tr>
<tr>
<td>II,2</td>
<td>C F#</td>
<td>First Mode</td>
<td>Z =</td>
<td>I, 1</td>
<td>G C#</td>
<td>First Mode</td>
</tr>
<tr>
<td>III,3</td>
<td>C F#</td>
<td>Second Mode</td>
<td>Y =</td>
<td>I, 1</td>
<td>F B</td>
<td>Second Mode</td>
</tr>
<tr>
<td>IV,4</td>
<td>C F#</td>
<td>Second Mode</td>
<td>Z =</td>
<td>I, 1</td>
<td>D G#</td>
<td>Second Mode</td>
</tr>
<tr>
<td>V,5</td>
<td>C F#</td>
<td>Third Mode</td>
<td>Y =</td>
<td>I, 1</td>
<td>B♯ E</td>
<td>Third Mode</td>
</tr>
<tr>
<td>VI,6</td>
<td>C F#</td>
<td>Third Mode</td>
<td>Z =</td>
<td>I, 1</td>
<td>A D#</td>
<td>Third Mode</td>
</tr>
</tbody>
</table>

Figure 35
Perle's dual numbering system for the chords reflects the fact that pitches 6-11 are a Retrograde Inversion, at the tritone transposition, of pitches 0-5. Therefore the chords on pitches 0 and 11 of the set will in terms of their intervallic structure be identical. Hence the need for the dual numbering system. Obviously, such 'Pivotal chords' suggest the possibility and the means of 'modulating' from one key to another.

The following is an extract from the first of Perle's Six Preludes for Piano Op.20B, analysed in terms of Mode 2, Key CF#, form X.

The Modes so far discussed are all based on the verticalization of 3 note segments. Because of the regular construction of the special set, the extension of the verticalized segment to embrace the next adjacent element will increase the density of the resultant Mode without compromising its intervallic identity.
As Paul Lansky has commented, Perle's Modes "do not define explicit procedures for composition but rather outline a large and highly structured network of pitch class and formal relations which can serve as points of reference for compositional development" [LANSKY, 1980, P.536]. Certain of these compositional possibilities are inherent in the structure of the modes themselves. For example, Chords I and I are identical in both Prime and Inversion based Modes suggesting their use as 'finals' - as points of departure and return. Within each Mode certain chords are more mobile than others by virtue of notes in common. Thus in Mode 1 form W chord I may progress to chord I II III IV or V while chord VI may progress to chords II IV V VI 6 5 4 or 3. Such differentiations based on the degree of pitch valency suggest to Perle the possibility for the development of harmonic functions analogous to those of the diatonic system.

Both Perle and Goehr have been similarly motivated by the harmonic problems of twelve-note music in general, as well as by the problems thrown up by twelve-note theory. Perle has developed something which is systematic in its approach to the problems of twelve-note harmony. Taking concepts from dodecaphony such as set, inversion and simultaneity and pressing these into the service of other non-dodecaphonic concepts such as mode and key, Perle has attempted to construct a precompositional framework of material, a fixed system of intervallic relationships which, as in diatonic
tonality, limit the range of harmonic possibilities open to a composer and thus (to quote Paul Lansky) act as a "general guide to the musical language, each composition constructing a unique interpretation of that language [LANSKY, 1980, p.536]. Goehr's approach, on the other hand, is more personal and, hence, more intimately bound up with the composition of individual pieces and less amenable to general application. There is no counterpart in Goehr to Perle's Fundamental Set, neither do Goehr's Chorale Matrices correspond precisely in either concept or function to Perle's Modes: the former are generated afresh for each composition and are compositionally explicit, the latter are precompositional formations which may or may not be compositionally explicit. Also, it is not clear to what extent Goehr regards his Chorale Matrices as defining a 'key' as Perle's modes do.

Goehr's attitude to European developments in twelve-note methodology in the post-1945 era has already been described in the Introduction, and I have cited examples in this chapter of the way in which Boulez's twelve-note method has relevance to Goehr's. As far as American twelve-note methodology is concerned, I have discussed the work of Perle and only that of Babbitt remains to be mentioned. Babbitt's principal contribution to twelve-note methodology, the formulation of the principles of Combinatoriality, is acknowledged as significant in the Poetics [GOEHR, 1973, p.177]. However, apart from the possible relevance of
combinatorial relationships in the formulation of the matrix, combinatoriality plays no part in Goehr's method.
BIBLIOGRAPHY

BABBIT Milton


BOULEZ Pierre


Technology and the composer, Times Literary Supplement, 6 May 1977.

GOEHR Alexander

Is there only one way?, The Score, No. 26, 1960.


An answer to Pierre Boulez, Times Literary Supplement, 10 June 1977.

Modern Music and Society, BBC Radio 3, No. 4 of Four Talks, 22 December 1979.


<table>
<thead>
<tr>
<th>Name</th>
<th>Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOEHR Walter and</td>
<td>Arnold Schoenberg's Development Towards the Twelve-Note System, in</td>
</tr>
<tr>
<td>Alexander</td>
<td>European Music in the Twentieth Century, ed, H. Hartog, London,</td>
</tr>
<tr>
<td>GRIFFITHS Paul</td>
<td>Alexander Goehr in New sounds, new personalities: British composers</td>
</tr>
<tr>
<td>HILL Richard S</td>
<td>Schoenberg's Tone Rows and the Tonal System of the Future, Musical</td>
</tr>
<tr>
<td></td>
<td>Quarterly, Vol XXII, 1936.</td>
</tr>
<tr>
<td>HOLLOWAY Robin</td>
<td>Towards a Critique, The Music of Alexander Goehr, ed. Northcott B,</td>
</tr>
<tr>
<td>HYDE Martha</td>
<td>Schoenberg's Twelve-tone Harmony - The Suite Op.29 and the</td>
</tr>
<tr>
<td></td>
<td>Compositional Sketches, Studies in Musicology No. 49, U.M.I. Research</td>
</tr>
<tr>
<td>KRENEK Ernst</td>
<td>New Developments of the Twelve Tone Technique, Music Review, Vol. 4,</td>
</tr>
<tr>
<td></td>
<td>1943.</td>
</tr>
<tr>
<td>LANSKY Paul</td>
<td>Perle, George, Grove 6, 1980.</td>
</tr>
<tr>
<td>NORTHCOTT Bayan</td>
<td>Opening up: British Concert Music Since the War, Musical Newsletter,</td>
</tr>
<tr>
<td></td>
<td>Vol. 5 part 3, pp.7-9, 1975.</td>
</tr>
<tr>
<td></td>
<td>The Recent Music, The Music of Alexander Goehr, ed. Northcott B,</td>
</tr>
<tr>
<td>PERLE George</td>
<td>Evolution of the Tone-Row: The Twelve-Tone Modal System, Music Review,</td>
</tr>
</tbody>
</table>


SCHOENBERG Arnold Harmonielehre, 3rd rev, edn., Vienna, 1921 (Eng. trans. 1948).


WOOD Hugh
