Inf. Sci. Hum (11e année, n° 45, p 51-76)

JOURNAL OF A COMPOSITION

In the following text I describe as clearly and as honestly as I am able some of the steps in the composition of "Aber die Namen der seltnen Orte und alles Schoene hatt' er behalten", a piece for baritone, five instruments and computer-synthesized tape, on a text by Friedrich Hoelderlin. Nothing I shall report is particularly original, and nothing is posing as the furthest frontier of contemporary compositional technique. Adherents of any of the currently fashionable schools of algorithmic composition will find my techniques appallingly wanting in sophistication; musicians sharing my traditional upbringing will chuckle over my preoccupations with certain intervals and will find my justifications for this or that decision both lame and unnecessary.

In fact, my intention is not to flaunt technological prowess, but rather to document the growth of a piece of music. I speak very little of the actual work with the computer here, for it was quite straightforward*(*The richness and originality of the synthesis system have been described in: Rodet, X. et Bennett, G., "Synthèse de la voix chantée par ordinateur", Conferences des Journées d'études, Festival International du Son - Paris (1980), 73.) However, a principal concern of the piece was to employ only techniques which I, as a fairly experienced but decidedly amateur programmer, could later model on a computer, for I wanted to analyze in retrospect the process of composition, to examine the relationship between my largely intuitive musical judgment and the processes of decision I invented for the piece.

Two points seem to me of particular importance. First, in planning a piece the experienced composer brings to bear an extremely delicate sense for the influence of a decision taken at one moment upon the events both before and after. I have tried to comment on these influences when appropriate. I have generally not commented on the choice of a particular technical solution (and not some other) for a particular situation, but I think there is much material for analysis here.

Second, and more important, this log records a personal but crucial esthetic adventure, that of a composer whose intellectual convictions led him to invent algorithmic techniques potentially antagonistic to his musical convictions. I describe at length my dissatisfaction with certain of these techniques, and I show how I "corrected", not the algorithms, but their results. It is easy to create complicated systems of rules and only a bit more difficult to apply them to music. It is much harder to evaluate these rules by measuring them against the complexity of one's musical experience. This is the task I attempt here.

Before turning to the description of the process of composition, there are three matters I must speak about: my work with the computer in the analysis and synthesis of singing voices, the later poetry of Hoelderlin, and - very briefly - my intellectual and musical preoccupations at the time of writing the piece.

"Aber die Namen . . ." was composed between July and October 1979; the tape was realized during the month of October 1979. In December, 1978, I had begun working, with the scientist Xavier Rodet, on a research project about singing. The project had two parts, the acoustical analysis of certain characteristics of the singing voice, and the development of a computer program to synthesize "artificial" voices. The first three months of our work were spent (with the invaluable assistance of Professor Johan Sundberg of the Royal Institute of Technology, Stockholm) in establishing very basic acoustic parameters (frequency, bandwidth and amplitudes of from three to five formants) for each of the eight vowels a, e, i, o, u, u, o, uh. We constantly checked (and revised) our values using a synthesis program devised by Rodet. By the end of February, 1979, we had found

second half of his life, he produced virtually nothing (an average of a 16-line poem or two a year), apparently never writing on his own incentive and only very occasionally acquiescing to a visitor's demand for a written souvenir. From the entire second half of his life there is no prose, only 47 strange poems and a few fragments, poems almost always having four-line stanzas, rhymed lines, and a detached far-distant tone which has nothing in common with the poetry of the first half of his life.

Although these poems appear to be quite conventional, in fact, there is nothing else like them in all occidental literature. They are strongly eidetic and seem to move from image to (apparently) unrelated image, rather than from idea to idea. Syntactical relations have dissolved almost completely. Phrase is placed alongside phrase in what Adorno speaks of as "paratactic" poetry. Here is an example, not the poem I finally set, but rather the one I intended to set, until just before I actually begin work on the vocal part:

DER KIRCHHOF

Du stiller Ort, der grünt mit jungem Grase,
Da liegen Mann und Frau, und Kreuze stehn,
Wohin hinaus geleitet Freunde gehn,
Wo Fenster sind glänzend mit hellem Glase.

Wenn glänzt an dir des Himmels hohe Leuchte
Des Mittags, wann der Frühling dort oft weilt,
Wenn geistige Wolke dort, die graue, feuchte,
Wenn sanft der Tag vorbei mit Schönheit eilt!

Wie still ist's nicht an jener grauen Mauer,
Wo drüber her ein Baum mit Früchten hängt;
Mit schwarzen tauigen, und Laub voll Trauer,
Die Früchte aber sind sehr schön gedrängt.

Dort in der Kirch ist eine dunkle Stille
Und der Altar ist auch in dieser Nacht geringe,
Noch sind darin einige schöne Dinge,
Im Sommer aber singt auf Feldern manche Grille.

Wenn einer dort Reden des Pfarrherrn hört,
Indes die Schar der Freunde steht daneben,
Die mit dem Toten sind, welch eignes Leben
Und welcher Geist, und fromm sein ungestört.

LE CIMETIÈRE

Ô LIEU paisible où verdit la jeune herbe,
(Là gisent homme et femme et se dressent des croix)
Où des amis s'en vont qu'on accompagne,
Où des fenêtres font briller leurs carreaux clairs.

Quand du ciel de midi luit la haute lumière
Sur toi, quand le printemps s'y attarde à plaisir,
Quand le nuage-esprit là-bas, gris et humide,
Quand le jour doucement passe dans sa beauté!

Oh! quel silence au long de la grise muraille
Par-dessus quoi se penche un arbre avec des fruits,
Des noirs, pleins de rosée, et son feuillage est lourd
De deuil, mais les fruits sont si joliment pressés.

Dans l'église là-bas règne une paix obscure,
Et l'autel dans la nuit semble aussi sans éclat;
Il y a là-dedans encor de belles choses,
Mais aux champs de l'été chante mainte cigale.

Si l'on écoute les paroles du curé
Là-bas, près des amis en groupe qui l'entourent
(Tous les amis du mort) quelle vie singulière,
Et quel esprit, quelle sereine piété!

EXAMPLE 1

This poem creates its effect not by developing one or a series of ideas, but by joining a series of visual images in a more or less haphazard way. There is no argument, no climax, no hierarchical ordering of either idea or language, no attempt to win over the reader by sweeping diction or strong rhythms, but rather still, isolated moments, rendered with greatest clarity, combined in complex and mysterious ways. The reader constructs the sense of the poem himself. The moments - the objects - of the poem are all quite precisely fashioned; only the links between these objects are different from those usually encountered.

good values for these parameters and had decided to represent all the vowels by five formants.* (*The reader can find more details about the synthesis in the article cited above.) By the beginning of March, Rodet had modified his program so that not merely simple notes, but entire phrases using the same vowel could be synthesized, and I began experimenting with what we had learned.

My first synthesis attempts used as texts pieces from the 16th and early 17th centuries, Josquin, Palestrina and Gesualdo. These examples showed very quicky that the conceptual model of the singing voice we used for the synthesis was far too simple for musical purposes. Some of the main faults were lack of distinction between different timbres (most seriously between male and female voices), no way to make a voice sing softly (we could of course control the amplitude of our synthesized voices, but even at low amplitudes they sounded loud), too regular vibrato, unnatural attacks and decays, unnatural transitions between notes, and lack of homogeneous vowel quality outside of a quite small range.

Another three months' work brought improvements in almost all points. We learned a great deal about singing voices and about the complex interrelations between the physical parameters describing their behavior. The research took place at an almost microscopic level, but it was eminently musical in nature and contributed greatly to the improvement of our imitated voices. The most important advances were in the definition of separate synthesis algorithms for male and female voices and in the elaboration of the relationship between amplitude and timbre. (Another very important advance, this time technical, was the definition within the synthesis algorithm of both bandwidth and amplitude of a formant in terms of the center frequency of that formant.) We had concentrated primarily on the single note. Here we understood and controlled subtly for any note: pitch, duration, amplitude, timbre within a specified register for either a male or a female voice, the behavior of vibrato, and the random fundamental deviation of the fundamental pitch.

I go into such detail here because each of these acoustical aspects of singing was integrated into the compositional process. The research gave the limits within which the musical articulation moved more or less freely. The choice to link closely our analytical work with the intimate structural detail of the piece had an important musical consequence: since our research concerned the micro-structure of sound, the musical development would have to take place at the level of this micro-structure; large gestures would be excluded, articulation would take place in a very restricted musical and emotional context, the general tenor of the piece would be contemplative rather than dramatic.

Here I make the choices taken in the acoustical research responsible for certain general characteristics of the later piece. In fact, of course, the situation was much more complex. Many approaches to the analysis and synthesis of singing might have been possible. I chose to analyse closely human models and to synthesize the best imitations to these models possible. I originally made - and later justified - this choice by logical rationale. In fact, from the beginning of the research I had an idea of how my future piece should sound. This aural vision certainly influenced the research, but I cannot list the influences in a simple, orderly way.

The second matter about which it is important to say a word is the later poetry of Friedrich Hoelderlin. Hoelderlin was born in 1770 and died in 1844. Between about 1790 and 1803 he wrote some of the great poetry of the German Romantic Period. His novel "Hyperion" was for 50 years a kind of vademecum of the young, sensitive Romantic. His translations of Greek tragedy, particularly Sophocles, are still today the standard against which any new translation must be measured. From 1803 to 1844 Hoelderlin was considered "mad", and after a short stay in an asylum, complete with strait-jacket and laudanum, he spent 41 years in a rented room in Tuebingen, overlooking the Neckar river, where he was cared for by a carpenter (and after the carpenter's death by his daughter). During the

Before writing "Aber die Namen . . ." I had become concerned by freedom and coercion in music. I was more and more disturbed, both in my own music and in the music of others, by the use of devices which oblige the listener to hear a phrase or an entire piece in one specific manner. An extreme example of this would be a work whose form is given by a single crescendo from beginning to end. In fact, however, all pieces with strongly articulated form, climaxes, strong contrasts used to reach equilibrium, etc., seemed to me shallow and facile. My reaction was in the first place only at a musical level: certain kinds of music made me uneasy or even angry. As I thought about my growing impatience with much music, I understood this specialized reaction to certain situations as the musical reflection of a more general moral question. I felt it necessary to write music which did not force any particular way of listening, music in which - naive idea ! - there should be rather freedom than coercion.

The principle decisions in the piece were taken in the light of these three points of reference: the acoustical research on the singing voice, the non-syntactic nature of Hoelderlin's late poetry, and my own preoccupation with musical structures which would allow the listener to construct his own itinerary about a landscape of finely wrought objects. In my imagination these three points of departure were always simultaneously present, mutually interpenetrating, now the one's becoming more important, now the other.

My notes do not allow me to reconstruct with any precision the delicate balance between these factors as it was at the beginning of the composition. In November and December, 1978, I had written a piece for 16 solo voices using one of the last texts written by Hoelderlin before his internment. In this poem, very expressive, almost intoxicating in its sound and rhythm, syntactic relations are stretched to - and occasionally past - the breaking point. But the tension and relief within the text are achieved by the expectation of syntactical coherence. During the work on the piece I had been fascinated by the later poems, where in place of this tension there was apparent tranquility, no expectation of syntactical coherence. In my first reading of these texts I understood them as another degree of heightening of poetic expression. Only later did I see that this poetry worked quite differently from all other poetry I knew. I do not believe that I understood clearly the importance of these poems for my musical preoccupations until much later.

The first practical decision about the piece was taken long before beginning the composition itself; it concerned the instrumentation. I chose to write for baritone in duet with a clarinet, an instrument with which the baritone shares a bit more than an octave in range and which can extent the bartone's range into a very high register. These two principal voices are accompanied by four instruments of low tessitura: english horn, bass clarinet, viola, and cello. In addition, there would be magnetic tape with synthesized voices.

After working sporadically for several months on the "Kirchhof" poem, quoted above, I abandoned it for another, which I quote below:

x [WENN AUS DER FERNE . . .]

Wenn aus der Ferne, da wir geschieden sind,
Ich dir noch kennbar bin, die Vergangenheit,
O du Teilhaber meiner Leiden!
Einiges Gute bezeichnen dir kann,

So sage, wie erwartet die Freundin dich?
In jenen Gärten, da nach entsetzlicher
Und dunkler Zeit wir uns gefunden?
Hier an den Strömen der heil'gen Urwelt.

Das muß ich sagen, einiges Gutes war
In deinen Blicken, als in den Fernen du
Dich einmal fröhlich umgesehen,
Immer verschlossener Mensch, mit finstrem

Aussehn. Wie flossen Stunden dahin, wie still
War meine Seele über der Wahrheit, daß
Ich so getrennt gewesen wäre?
Ja! ich gestand es, ich war die deine.

Wahrhaftig! wie du alles Bekannte mir
In mein Gedächtnis bringen und schreiben willst,
Mit Briefen, so ergeht es mir auch,
Daß ich Vergangenes alles sage.

War's Frühling? war es Sommer? die Nachtigall
Mit süßem Liede lebte mit Vögeln, die
Nicht ferne waren im Gebüsche
Und mit Gerüchen umgaben Bäum uns.

Die klaren Gänge, niedres Gesträuch und Sand,
Auf dem wir traten, machten erfreulicher
Und lieblicher die Hyazinthe
Oder die Tulpe, Viole, Nelke.

Um Wänd und Mauern grünte der Efeu, grünt'
Ein selig Dunkel hoher Alleen. Oft
Des Abends, Morgens waren dort wir,
Redeten manches und sahn uns froh an.

In meinen Armen lebte der Jüngling auf,
Der, noch verlassen, aus den Gefilden kam,
Die er mir wies, mit einer Schwermut,
Aber die Namen der seltnen Orte

Und alles Schöne hatt er behalten, das
An seligen Gestaden, auch mir sehr wert,
Im heimatlichen Lande blühet
Oder verborgen, aus hoher Aussicht,

Allwo das Meer auch einer beschauen kann,
Doch keiner sein will. Nehme vorlieb, und denk
An die, die noch vergnügt ist, darum,
Weil der entzückende Tag uns anschien,

Der mit Geständnis oder der Hände Druck
Anhub, der uns vereinet. Ach! wehe mir!
Es waren schöne Tage. Aber
Traurige Dämmerung folgte nachher.

Du seiest so allein in der schönen Welt,
Behauptest du mir immer, Geliebter! das
Weißt aber du nicht,

SI DE TRÈS LOIN...

Si de très loin, puisque nous sommes séparés,
Tu me connais encor, si les heures enfuies
Ô toi qui pris ta part de mes souffrances!
Peuvent te rappeler quelque bonheur,

Parle! Dis-moi comment, où t'attend ton amie.
Dans ces jardins là-bas où nous nous rencontrâmes
Après ce temps de nuit et d'épouvante? Ici,
Au bord des fleuves du saint monde originel.

Je dois le dire, il y avait quelque bonheur
Dans tes regards, quand au loin, une fois encore
Tu tournas si joyeusement la tête,
Ô toujours taciturne, avec cet air

Si triste! Ainsi fuirent les heures. Ô sereine
Certitude en mon âme de cet amour, que j'aie
Pu vivre si durement séparée!
Oui, j'en faisais l'aveu, oui, j'étais tienne.

En vérité! Tu voudrais peupler ma mémoire
De tout notre commun trésor et l'y graver
Message par message, et moi, le même
Désir me vient de dire aussi tout le passé.

Était-ce le printemps? L'été? Le rossignol
Au chant si doux vivait dans les bocages
Tout près de nous, avec tous les autres oiseaux,
Et les arbres nous baignaient de leurs baumes.

L'œillet, la violette, la jacinthe
Ou la tulipe rendaient plus attirants
Et plus aimables les arbrisseaux bas, les pâles
Sentiers, le sable où posait notre pas.

Le lierre verdoyait aux murs et l'ombre heureuse
Était verte elle aussi dans les hautes allées,
Et souvent le matin, le soir, nous étions là,
Échangeant maint regard joyeux, mainte parole.

L'adolescent reprenait vie entre mes bras,
L'abandonné venu des vastes plaines
Qu'il me montrait d'un lent geste sans joie;
Mais il savait encor le nom des lieux illustres

Et, si chère à mon cœur, toute cette beauté
Aux rivages heureux de sa terre natale
Épanouie, et cette autre qui se dérobe
Et qu'on découvre de très haut,

De tous ces lieux d'où l'on peut contempler la mer,
— Où nul ne vit. Sache te résigner et songe
À celle qui se sent heureuse encore, à cause
Du jour délicieux qui se leva pour nous,

Qui commença par des aveux, des mains pressées,
Qui nous unit. Hélas, ô malheureuse!
Ce furent de beaux jours. Mais derrière eux
S'en venait un lugubre crépuscule.

Tu es si seul au cœur de la beauté du monde,
M'assures-tu sans cesse, ô bien-aimé!
Mais ce que tu ignores

EXAMPLE 2

I can only give vague, unclear reasons for the change of text, although I felt the necessity of the change very strongly. I can remember rereading "Wenn aus der Ferne . . ." , after having worked long on the "Kirchhof", and being profoundly moved by it. Retrospectively, I think that I found the tones we were synthesizing and my aural ideal for those sounds must have seemed closer to the direct diction of "Wenn aus der Ferne . . ." than to the "Kirchhof".

"Wenn aus der Ferne . . ." is the least fragmented of the late Hoelderlin texts. Nonetheless, I decided to present the poem in fragments. I wanted the text's structure to determine the structure, if not of the piece, then at least of the vocal line. I divided the text into 16 phrases of different lengths, each one a syntactical unit. The lengths of the 16 phrases in syllables yielded a list of proportions which was used at many different occasions throughout the piece. The proportions are as follows:

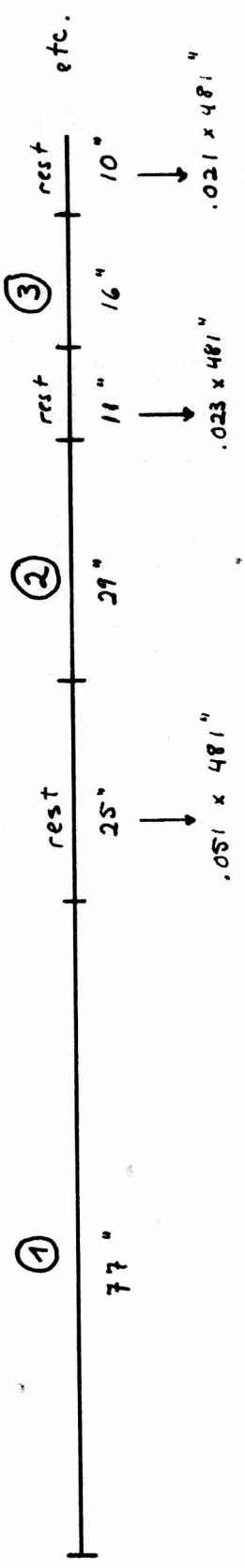
Phrase 1	53 syllables	.099
Phrase 2	19 syllables	.037
Phrase 3	11 syllables	.021
Phrase 4	44 syllables	.086
Phrase 5	29 syllables	.056
Phrase 6	10 syllables	.019
Phrase 7	40 syllables	.079
Phrase 8	40 syllables	.079
Phrase 9	41 syllables	.080
Phrase 10	20 syllables	.039
Phrase 11	20 syllables	.039
Phrase 12	97 syllables	.189
Phrase 13	43 syllables	.084
Phrase 14	11 syllables	.021
Phrase 15	12 syllables	.023
Phrase 16	26 syllables	.051

After this very simple invention of proportions, I began to organize the piece as a whole.

From the very beginning of the compositional work one basic idea had been clear: I would derive as much of the piece as possible from chance operations, for only they ensured sufficient protection from the strongly directed music I wished to avoid. On the one hand, standard constructive techniques (eg. motivic development) tempted one towards too concrete and direct a music, on the other serial techniques insulated against concreteness but at the expense of the multiplicity of entrances and exits I wanted to offer the listener. Here each note, or each two or three note phrase should be independent of the others. Chance operations seeemed to provide me with this independence. I had developed many techniques using chance operations for my previous Hoelderlin piece "Und immer ins Ungebundene gehet eine Sehnsucht"; I would try to use them in a more supple fashion here. Finally, I decided to make as many of the compositional decisions as simple as possible, so that later I could model them in a computer program.

The basic temporal division of the piece was quite straightforward. For some reason which I do not remember, I decided the piece should last 21 minutes. The vocal part would not be active all of this time, but only a proportion corresponding to the golden mean of the total length of the entire piece, or about .618 of the time. There would be 16 phrases, whose lengths would be derived from the 16 proportions applied to the length of about 13 minutes (.618 times 21 minutes), separated by rests whose length would be derived from the same proportions in reverse order applied to the difference between 21 and 13, or 8 minutes. The first three sections would have the following durations:

(see example 3, page 57)


etc.
rest
10"
.021 x 481"
3
16"
rest
11"
.023 x 481"
2
29"
rest
25"
.051 x 481"
1
77"

Example 3

I now turned my attention to the detail of each section. I needed to establish basic values for the following points: number of notes, pitches, note durations, phrasing, placement (and choice) of text, dynamics. For all of these decisions I made use of a set of tables of random numbers which had served me for my previous Hoelderlin piece. This was a set of 64 tables, each listing 1000 numbers chosen at random between 1 and 2, 1 and 3, 1 and 4, etc., up to between 1 and 64. So, to determine the number of notes for each of the 16 sections, I first took a number between 1 and 64; this was the number of the table from which I took the number of notes for this particular setion. I chose this method after a bit of experimentation because it gave me a potentially very broad range of actual values, while keeping the average number of notes from being too large, hence keeping the density from being too great. I checked the density by dividing the duration of the section by the number of notes in that section, and sections varied in density from 2 notes in 49 seconds to 22 notes in 15 seconds. I could of course have chosen the densities and calculated the number of notes from them.

The actual durations were also arrived at by chance procedures. From the table whose number was the same as the number of notes in the respective section, I noted even numbers for note durations, odd numbers for rests (or vice versa). I stopped writing values as soon as I had the proper number of notes. Several odd numbers in a row were counted as one rest, while serveral even numbers counted each as a separate note. This list of numbers then became a table of proportions which was applied to the actual duration of the section to give durations of each note and each rest in seconds.

Thus, as an example, section 4 was to consist of four notes. From my table of random (integer) values between one and four I transcribed the following values (odd numbers indicate rests):

4	(note 1)
1 }	
3 }	(rest)
2	(note 2)
1 }	
1 }	(rest)
1 }	
4	(note 3)
3	(rest)
2	(note 4)

The section is to last 67 seconds; the corresponding durations are:

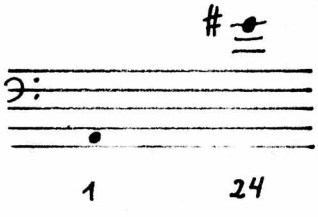
note 1	12.18
rest	12.18
note 2	6.09
rest	9.14
note 3	12.18
rest	9.14
note 4	6.09

or in musical notation:

EXAMPLE 4

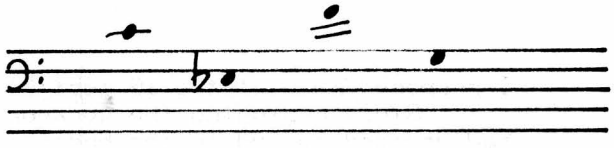
Determining the pitches in each section was rather more complicated. On the one hand, I wanted to make use of random processes, on the other I wanted a suppler and more differentiated method than simply to choose notes at random. Hence, I first determined for each of the 16 sections of the piece both a range and a central note for this range. I let the possible ranges extend from a tritone (7 notes) to two octaves plus a major third (29 notes), or over 23 different ranges. Since the singer's range, through unusually large, was not unlimited, the choice of the central note would clearly be dependent on the size of the range: the larger the range, the smaller the interval from which to take the central note. So if the range were a tritone, I let the central note be chosen over an interval from b-flat3 to b-flat5 (25 notes), if the range were 29 notes, between g3 and b4 (5 notes). Thus, I represented the size of the interval within which to seek the central note by the relation (29 - range) + 5, or 34 - range(*). (*In fact, after determining the range of each section and having obtained 28 as the maximum range, I changed this relation to (28-range) + 5 in order to keep the major third (five notes) as the smallest interval for the central note.) I also used the number of notes in each respective interval as the number of the table from which to choose the number of the note representing the actual central pitch. Thus, as an example, random choice yielded a range of 24 notes for section 4. This meant that the central note was to be chosen from an interval nine notes wide ((28-24)+5), in fact from the interval f3 - d-flat4 (the interval of choice of the central note increased roughly symmetrically starting from g3-b4). Table 9 yielded the value 5, so a4, or the fifth note from the bottom of this nine-note interval, became the central note of the range:

Example 5



From the table 24 I then took the values 16 - 9 - 21 - 11, or the notes:

Example 6



I needed yet to determine dynamics and text for each section. I first chose dynamic ranges for each section. I decided to use a maximum of 16 different dynamic indications in each section, with one of three different median dynamic values: p, mp, f. Section 4 required a choice from among 14 different dynamic indications with a median value of mp. The four chosen at random were:

mf > , mp , p > , pp <

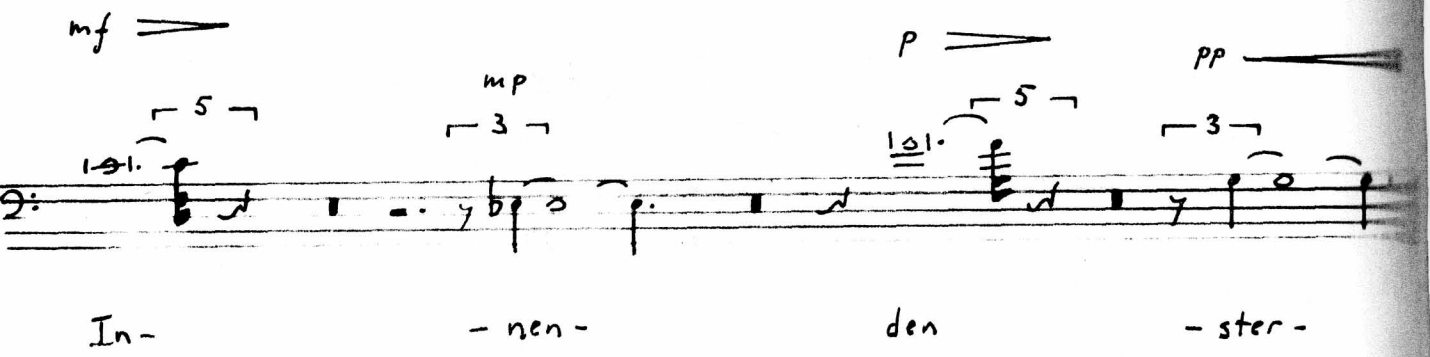
The choice of text was also very straightforward. I decided to use consecutive syllables of text throughout the piece whenever consecutive notes were called for; otherwise I would use syllables chosen from the respective section of text at random. In section 4, each note is isolated, hence I chose from the text:

> Das muss ich sagen, einiges Gute war
> In deinen Blicken, als in den Fernen du
> Dich einmal froehlich umgesehen,
> Immer verschlossener Mensch mit finsterem
> Aussehn,

the four syllables:

> In, -nen, den, -ster-.

Section 4 now had the form:



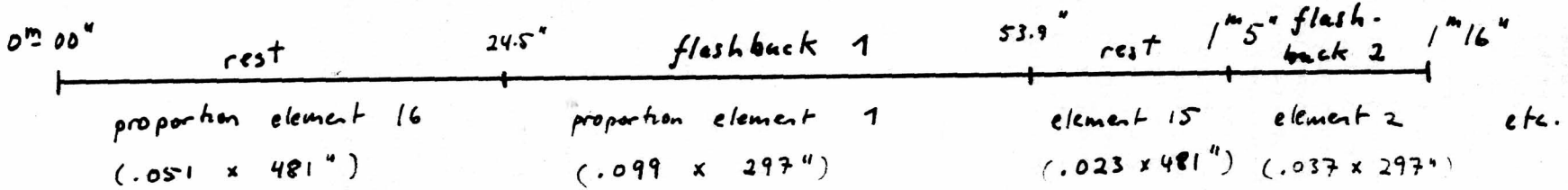
EXAMPLE 7

I prepared each of the 16 sections in a similar way.

Since beginning the work on the vocal part of the piece, I had decided to add to the basic structures then determined what I called "flashbacks", reminiscences or "pre-echos" of another section of the vocal part. Once I had arrived at the basic material for the voice, I began to choose the flashbacks. My first sketch proposed 46 flashbacks, one for each line of the poem. Starting time and duration of each were determined by a complicated set of proportions. A bit of work on this sketch showed me that 46 flashbacks were far too many, and I decided to proceed differently. I combined two appearances of the 16-element chain of proportions, each 13 minutes long, one beginning at at the beginning of the piece, the other at 8 minutes. Using the same procedure as for the section durations described above, I alternated rest (.618 of the total duration) and flashback (.382 of the total duration) as follows:

(see example 8, page 61)

Example 8


0m 00"
rest
24.5"
flashback 1
53.9"
rest
1m 5"
flash-
back 2
1m 16"
proportion element 16
(.051 x 481")
proportion element 1
(.099 x 297")
element 15
(.023 x 481")
element 2
(.037 x 297")
etc.

The pitches and durations appearing in the already sketched vocal part during these times (for example, between 24.5 and 53.9 seconds) were noted. Some of the planned flashbacks fell on rests of the voice part, so that not all those planned could be used. In the end there were 23 flashbacks, just half as many as I had originally sketched. To determine the entrance of each, I chose 23 different numbers at random between 1 and 64. For each flashback the number chosen times 21 seconds yielded the starting time. In addition, I decided whether each flashback would appear in the same direction as its original presentation or in the opposite direction. Its length was to be equal to one of five fractions of the of the original length: .5, .618, 1, 1.618, 2. So, for instance, flashback 1 was to be played at 15 minutes, 24 seconds (the random number chosen was 44, which gave 44 times 21 or 924 seconds), backwards, and at its original duration.

Originally, the flashbacks were to have been of very different expressive character from the main vocal line. I distinguished two families of them. I find in my notes for the first family: "lyric, expressive, rather louder, more legato, more dramatic", and for the second: "damaged, cracking voice, hoarse, nasal, breathy". In fact, in the course of working out the piece, I found myself eliminating more and more strongly dramatic gestures, which I deemed unfitting to the text. In the end, the flashbacks were more closely integrated into the original text than I had imagined at first, and they differed from the original material much less than I had envisioned.

The next example shows part of my sketches to phrase 16.

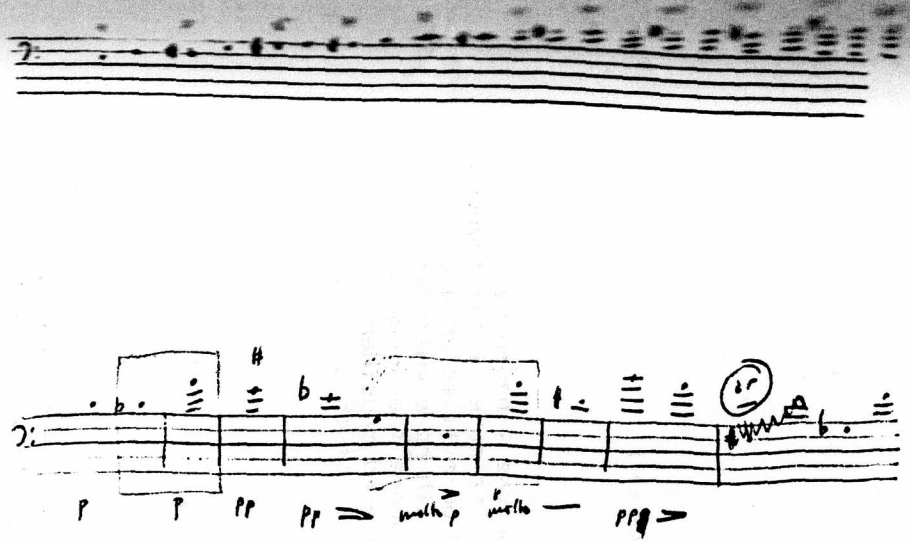
(see example 9, page 63)

On the left page, the left-most column shows the succession of random numbers for duration (taken from 1 to 11). Only the even numbers yield notes, so I chose random numbers until I had 11 even ones. The duration of the phrase was 40 seconds, from which I derived (after calculating wrong once - see the crossed out values) the duration of each note and rest. At the right of the first page are the dynamic indications from which I chose the dynamic value of each note or group of notes. The lightly hatched fields on both pages indicate the extent of the last two flashbacks in the piece (that is, of their material; in fact the first was played at 5 minutes, 15 seconds, the second at 6 minutes, 39 seconds). The second page shows at the top the 21-note range from which the 11 pitches for the section were chosen. The next line shows the pitches actually chosen, together with the dynamic indication chosen for each group and the delimitation of the two flashbacks. I later corrected the fourth note (originally g-natural) to g-sharp to avoid octaves with the g-natural two notes later, and I noted an alternative last group, for I was not certain I wanted to ask the singer to finish so high. In the middle of the second page is the text of the 16th phrase, beneath the text the syllables actually chosen. The difinitive version of this phrase looked like this:

Example 9

Phrase 16

durations		taste 16	dynamics
	8	2.6	1 ppp
II	6	1.95	2 pp
	7	2.28	3 molto p
	2	.65	4 p
	1		5 mp
	7	6.83	6 pp >
	5		7 molto p >
	7		8 p >
	1		9 pp >
	2	.65	
	3	1.95	
	3		
	8	2.6	
	6	1.95	
II	1	.33	
	6	1.95	
	1	4.88	
	9		
	1		
	1		
	3		
	4	1.3	
	5	1.63	
	6	1.95	
	5	1.63	
	6	1.95	
	8	2.6	



Du stehst so allein in der schönen Welt,
Behauptest du immer, leichter das
Weißt du aber nicht,

- leichter!
- liest
- liest -
- [illegible] ge -
- leichter
- du
- schön
- behauptest

(see example 10, page 65)

To combine the sketched vocal line and the flashbacks I began by writing the entire original part on millimeter paper to be sure of the temporal placement. Then I pasted the flashbacks (also notated on millimeter paper) where they belonged in the score. An original phrase with no simultaneous flashback stayed as it was, as did a flashback played where there was no original sounding at the same time. Where the two appeared together, I rewrote the vocal line to include both. A simple example of this rewriting is at the beginning of the piece:

(see example 11, page 65)

In other cases the realization of the flashbacks was less straightforward. At 11 minutes 40 seconds the vocal line (original) was as follows:

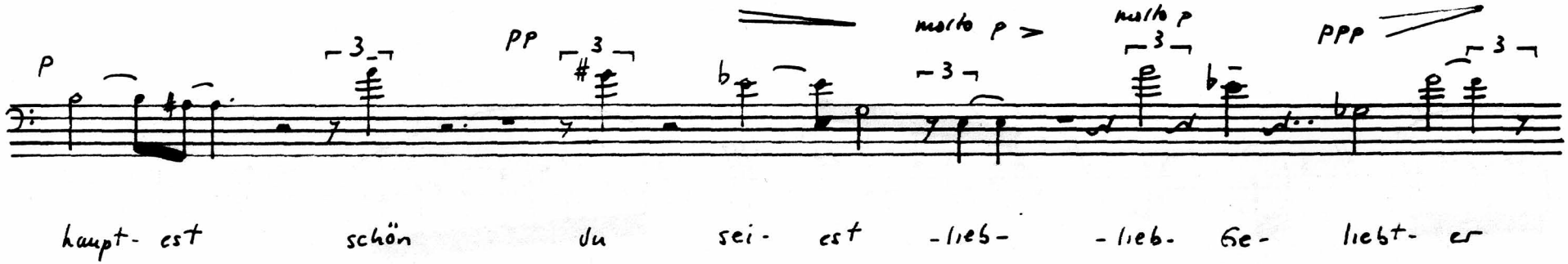
(see example 12, page 66)

At 12 minutes, 36 seconds, a flashback was scheduled to begin consisting of exactly the same text, forwards, with exactly the same durations. Only at the end of the flashback would there have been an overlap with an existing voice. Such direct repetition would have been quite foreign to the spirit of the flashbacks, which sought to render more, not less complex the basic vocal texture. The final version of the vocal line compressed the flashback thus:

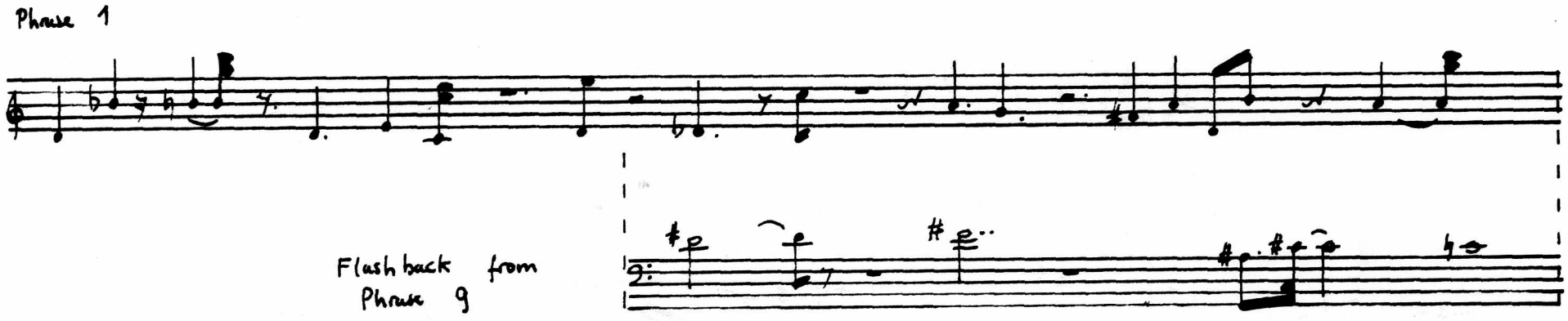
(see example 13, page 66)

(Another reason to disguise the repetition, at the same time leaving the long notes from ca. 12 minutes, 55 seconds, was that the minute 13 was the golden mean of the piece. I knew I wanted to mark this point in some way, although I did not yet know how. Had I left the flashback in the form forseen, this point of articulation would have been covered by what in fact would be the weakest moment in the piece.)

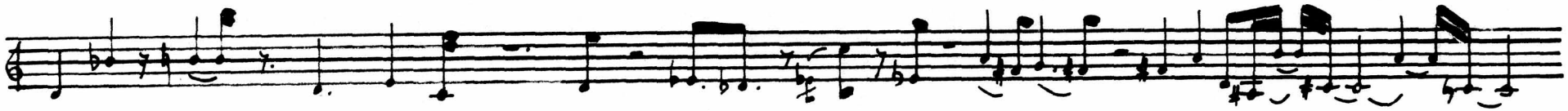
Here is another example:



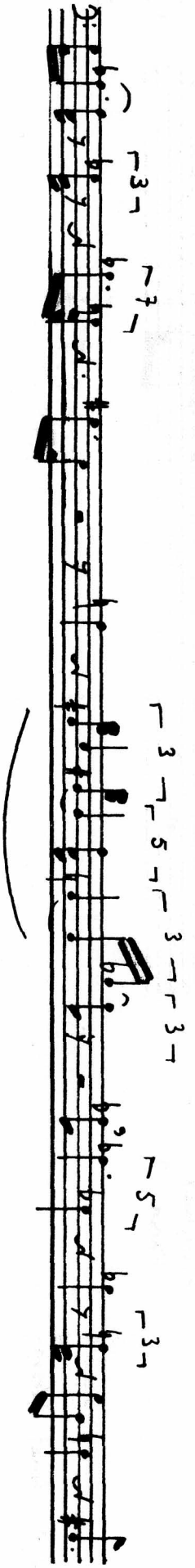
Example 10



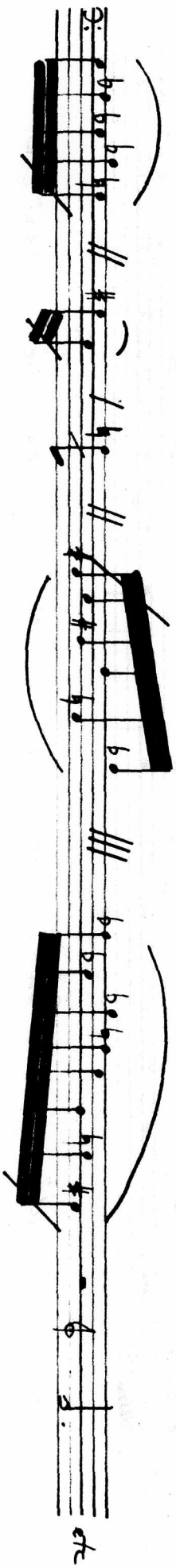
Example 11



Example 12



Example 13



(see example 14, page 68)

(Here again the flashback's original finished only 30" before the flashback began.) This was transformed as follows:

(see example 15, page 68)

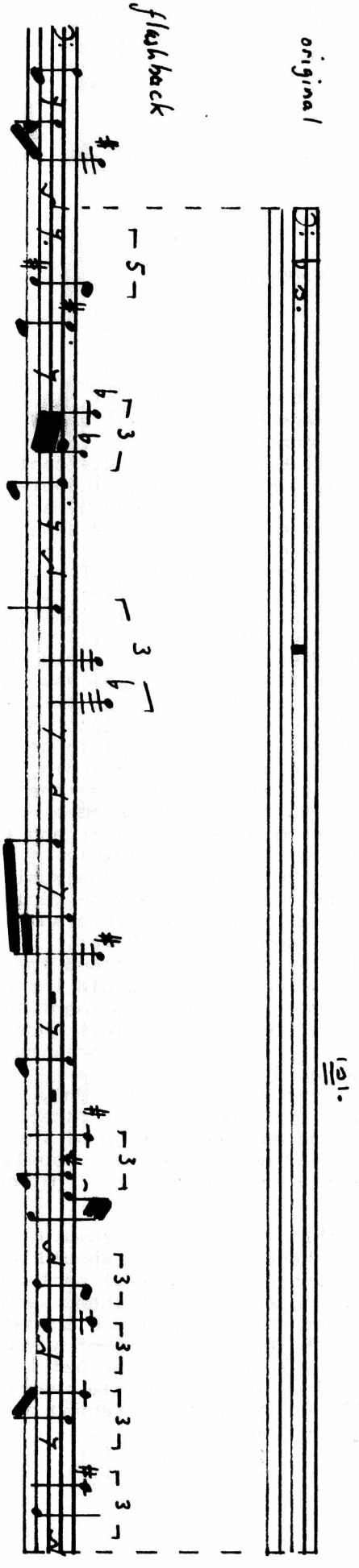
The underlying structure remains clearly visible (and audible).

I did not know at the outset of the piece how closely I would choose to follow the instructions my random numbers gave me. I was particularly anxious about the pitches, for I knew that in this context without a strong metric pulse I could hardly make "mistakes" in note values: a note's duration is its duration; it can be followed by any other duration without there being a sense of dissonance. The same was true for dynamics and text, once I had made the decision to present the text in a disjointed way. But in most of my compositions I have given the most attention - if not in the conscious organization, then in the aural control - to the pitches and to a certain "sufficiently chromatic" texture without tonal centers and without intervallic references to functional harmony. By choosing the pitches at random, I could not be sure of not finding fragments of some familiar melody or of having a phrase with strong functional associations. In many earlier pieces, I had used serial techniques to organize the pitches: there too I had to accept what I got. There, however, I had selected both the material to be transformed and the techniques of transformation, so as to be sure of excluding everything foreign to the context I sought to create. Here, on the other hand, I had excluded nothing* (*This is not quite true; no random number was modulo 12 the number preceding it, to avoid octave steps.), and I was not at all certain that I would like what I got. Intellectually, I knew that the decision to proceed thus was both right for the musical situation at hand and appropriate to the text used. I was also certain that the techniques I had developed presented the material in a sufficiently complex way. But I could not know whether I would be ready to accept the stylistically unacceptible. In the end, I understood the issue as one of courage: I knew my technique was right - would I agree with what it proposed ? Stupid to be afraid of triads or dominant-tonic relationships, but important to record in this report, for this uncertainty was an important companion in my work, until I finished the vocal part and was convinced that what I had done was good.

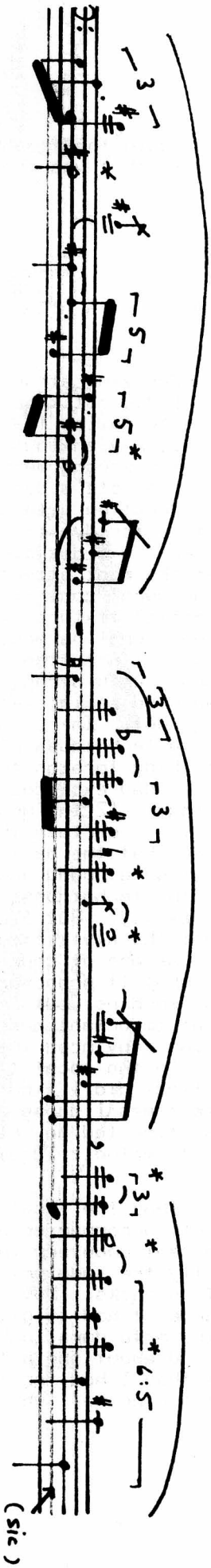
In the vocal line, I accepted almost everything I got. Only five or six times did I find it necessary to invert the order of two notes; two or three times I chose another note than the one demanded. Much of the vocal line led me into stylistic domains I had until then assiduously avoided, but its melodic idiom seemed to me remarkably homogeneous, so I did not interfere.

Thus the vocal part. I had decided that the baritone should be closely accompanied by a clarinet and that these two voices should enter into real counterpoint with each other. I wrote the clarinet part on exactly the same principles as the vocal part, except that there were no flashbacks. However, I was much less free in setting the clarinet part, because it had to give good counterpoint with the baritone part. Here again, note duration and dynamics looked good from the start, but I was worried about the pitches. In some places I allowed myself to rearrange more than I had for the baritone part. So for example the second phrase of the clarinet, which should have been as follows:

Example 14



Example 15



(see example 16, page 70)

was changed to this:

(see example 17, page 70)

The reasons are clear, and for me they overruled whatever urge I had to prefer consistency of method over results. At number 1 above I wanted to avoid that the dissonant (to the c) f-sharp - a-sharp resolve to the consonant fifth g - c. At 2 I wanted to eliminate the e-major triad (with the fourth resolving to g-sharp at the beginning and the clarinet moving on to include the seventh d-natural). At 3 I objected to the fifth f - c between baritone and clarinet, as well as to the octaves c - c at the end of the phrase. Melodic forms which I hardly would have faulted had the clarinet been playing alone had to be changed in the contrapuntal context.

The clarinet part used the same 16 phrase lengths as the voice, but in reverse order, separated by the same 16 rest durations, also in reverse order. Each phrase had 16 notes whose durations were derived from the original succession of proportions. In phrase 1 the succession began with the first and ended with last of the original values, phrase 2 began with the second and end with the first, phrase 16 began with the 16th value and ended with the 15th. I determined the range and the pitches as I had done for the vocal part. I also determined the number of different dynamic values and the predominant dynamic for each phrase, the number of trills (and which notes), as well as the number and placement of rests. I planned the introduction of what I called "multiple durations" in each phrase. These were to be equal divisions of a note, set as arabesques which I found particularly idiomatic for the clarinet. So if my sketches called for a "multiple duration" , this note:

(see example 18, page 70)

might become:

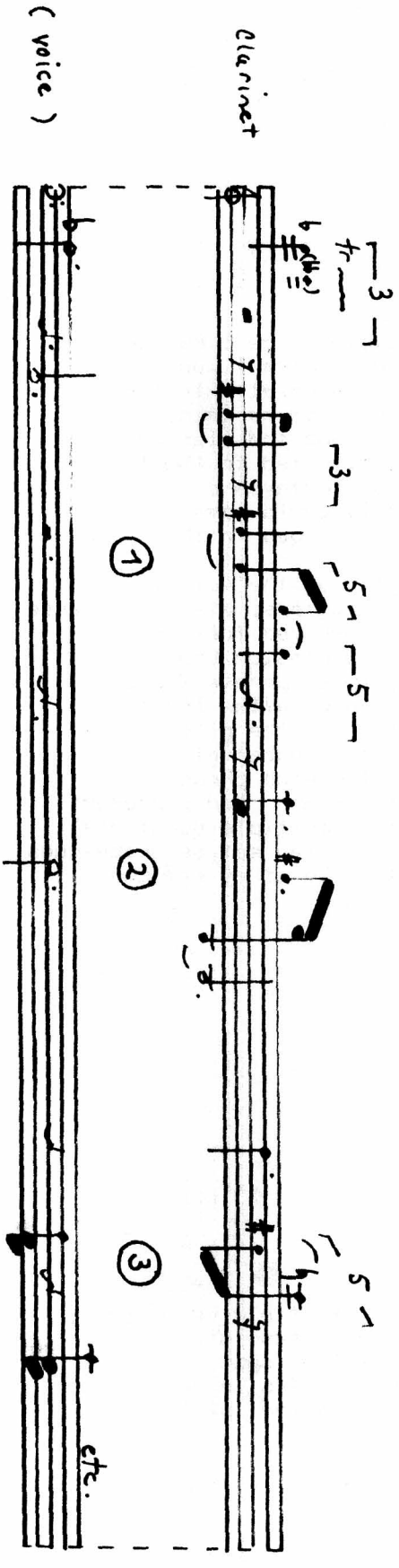
(see example 19, page 70)

if divided by seven. In fact, I made no use of these "multiple durations", for the decorative quality of the figures seemed to me in absolute contradiction to the character of the piece thus far established.

One more short example may serve to illustrate the ways in which I did not follow my "non-deterministic" model for the clarinet part.

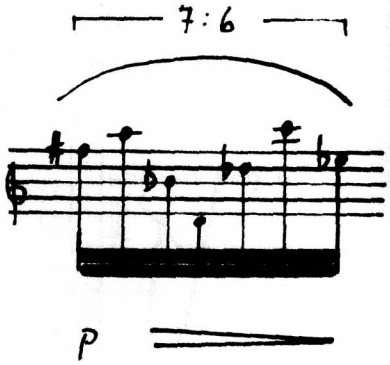
(see example 20, page 71)

Example 16

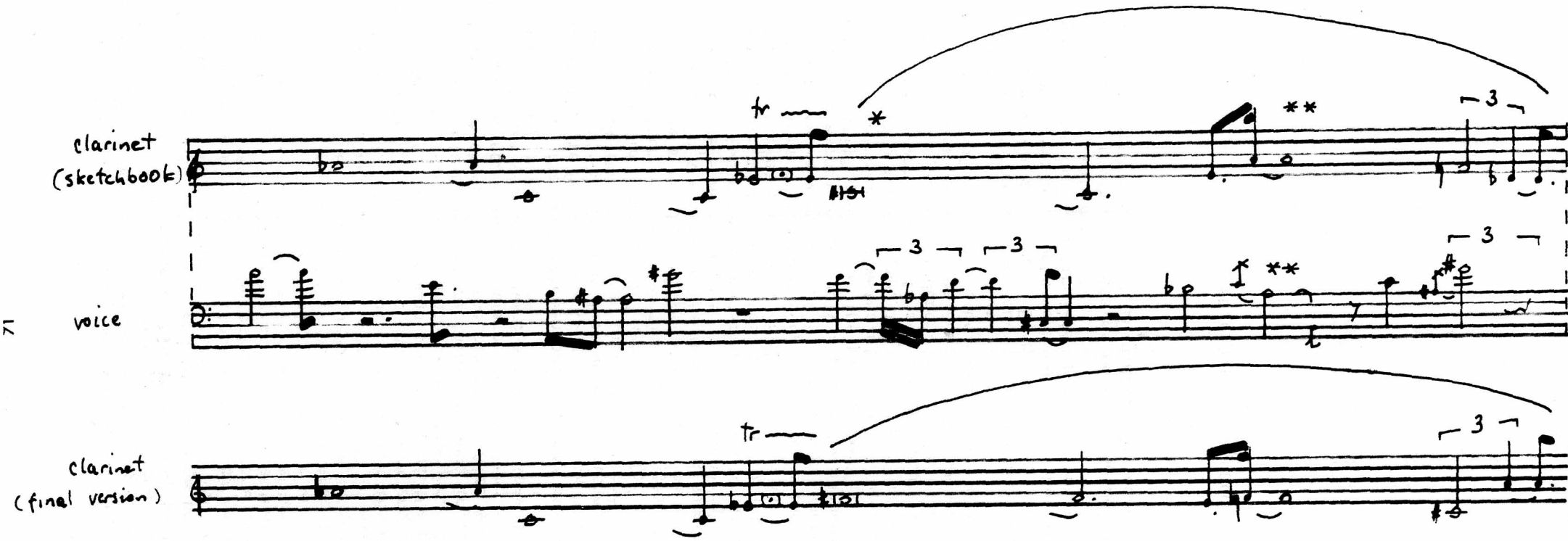


Example 17

Example 18



Example 19


clarinet
(sketchbook)
voice
clarinet
(final version)
tr
*
**
3
3
3
3
tr
3

Example 20

Here again, it was quite simply octaves between the voice and the clarinet which necessitated the change (marked by * and ** in the example). The predetermined range of the clarinet was more important to me than the actual choice of pitches within this range, so I was forced both to choose one new pitch (f-sharp) and to rearrange some of the others. The hierarchy of preoccupations is very clear (voice part given, harmonic concerns primordial, or rather the avoidance of certain intervals, articulation or range over the entire piece more important than particular pitches chosen on a local scale), nor is the actual decision - in this case - all too difficult to explain.*(* I needed a replacement for the c-sharp which made octaves with the voice. Although the clarinet in A can play the baritone's c-sharp, this note is outside the specified register. The new note should not be one that is used elsewhere in this phrase. Of the remaining pitches: d, f-sharp, g, b-flat, the b-flat would make octaves with the baritone's b-flat and the d would both disturb the harmonic movement of the phrase with the unison and give the rather wan and diatonic melodic progression d - e - f. Although the choice of the g would result in no "mistakes", the f-sharp is harmonically stronger. This "being stronger" is harder to explain, but it certainly depends in part on the leading-tone effect of the f-sharp - f in the clarinet. Also the intervals f - g, b-flat - g, and especially c-sharp - g resulting from the choice of g in the clarinet seem weaker and more anonymous, less defined than those resulting from the f-sharp.)

My work on the duet between baritone and clarinet went very slowly: it took me 6 weeks, working four to six hours a day, to finish. I was well satisfied with the duet when I finished, but I had no idea what to do about the other four instruments I had promised to include in the piece, nor did I know what I would write for the synthesized tape. The principal technical problem was the infringement of the "non-deterministic" character of the piece by considerations such as those illustrated by the last example. In the work on the duet I had discovered that octaves between two voices of the same structure still (Schoenberg's twelve-tone rules and all of Webern's music had sensitized the ears of at least two generations against octaves - my discovery was that I could not escape this conditioning by will-power alone) sounded "wrong". I could not imagine adding four more independent voices of the same suppleness as in the first duet without writing, finally, a very "deterministic" music, where both duration and pitch would be almost exclusively dictated by harmonic concerns. But the "non-deterministic" quality of the piece, that is, that the piece be free of harmonic and contrapuntal constraints, was of such great expressive and technical importance to me, that I finally decided on a disposition I had not envisioned at all: to set the remaining four instruments in two further duets, both independent of each other and independent of the original. In this context, the duets' independence would be clearly perceived, and "forbidden" intervals would be heard in their true nature, namely as accidental.

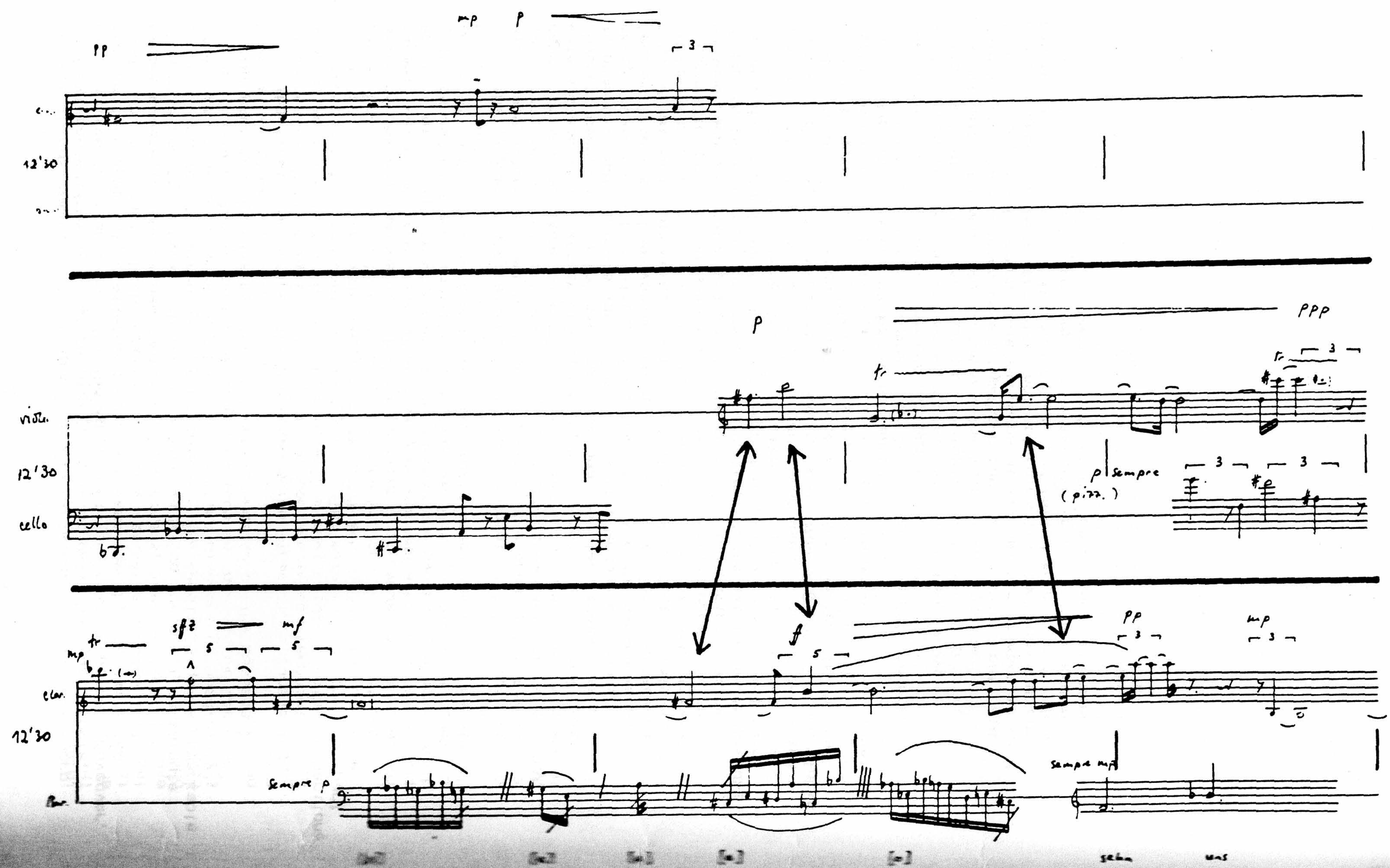
Thus I composed two more duets, one for english horn and bass clarinet, the other for viola and cello. Both the general intention and the specific techniques employed were the same here as for the first duet (the baritone remained the most richly articulated part). I only made a score when the three duets were finished.

Of course, there were octaves between the duets. The most dramatic (and flagrant) occurred between 12 minutes 30 seconds and 13 minutes:

(see example 21, page 73)

12'30

Example 21



Several things make this moment particularly striking. The lower f-sharp is first passed from the english horn to the clarinet. Not just a note, but a motive is in octaves. The two instruments are quite exposed. Moveover, the baritone immediately afterward sings the same fourth, one half-step lower, in an extremely high register. Finally, all this happens just before minute 13, when a new synthetic voice enters, for the first time singing a phrase of more than two notes and imitating the baritone (minute 13 is of course the golden mean of the piece). The result is quite remarkable (the more so as this positively Mahlerian gesture disappears immediately), the poignancy of the instant depending very much on the "non-willed-ness" of the gesture. Despite my permanent ambivalence about the passage I have let it stand.

The final component of the piece was a four-track tape consisting of voices synthesized by computer. Four voices are in counterpoint singing mostly long held notes. At minute 13 a duet between synthetic baritone and soprano enters and continues to the end. The material for the four-part counterpoint is taken exclusively from the 23 flashbacks of the baritone part. Each voice used 16 of these 23 flashbacks, scaled to durations given by the original series of 16 proportions. The vowel to be sung, dynamic values and their evolution (every phrase had a changing dynamic, eg. p mf ppp, to which was tied, through the synthesis algorithm, a corresponding change in timbre), and vibrato rate and amplitude were chosen at random, within limits very carefully specified by the results of our research.

The synthesis program written by Xavier Rodet at IRCAM, with the assistance of Conrad Cummings, required values for about 100 different parameters to synthesize a note. Many of these parameters (eg. frequency, bandwidth and amplitude of each of five formants for one vowel, vibrato rate and amplitude, attack and decay times of a note, etc.) have clear physical correlates in the singing voice and thus lent themselves well to compositional manipulation. Others were more arcane and hence changed value much less often. The preparation for the synthesis was tedious, for every time-variant change during a note (eg. a crescendo) required at least one so-called function, that is, a list of values versus times, describing the change. I wrote a group of (most trivial) programs to generate much of this data (some functions were written by hand) and particularly to write the score for the entire synthesis, which was then carried on virtually automatically.*(*That the synthesis was largely done automatically does not mean it did not need to be followed at every step. There were about 2200 seconds of sound synthesized at a sampling rate of 25 kHz, or in the format IRCAM uses to code sound - two 16-bit samples in one 36-bit PDP-10 word - more than 220,000 128-word blocks of data to be stored, requiring four disk packs (of the type IRCAM uses) on a multi-user (typically 15 to 25 users at a time) timeshared system which only supports six disk packs. This important control function during the synthesis was performed by Conrad Cummings.)

We did a preliminary synthesis at 16 kHz sampling rate to check the score. This synthesis yielded two quite startling results. We made each of the four voices separately and mixed them using analog techniques onto one four-channel tape. Listening to this mix I was extremely disappointed by the way the voices went together: intervallic relationships were bad, there were many octaves, but also there was a general harmonic incomprehensibility which disturbed me very much. I began to think that the "non-deterministic" techniques which had served me so well in the three duets had failed there where I found them most appropriate: for computer-synthesized sound. I checked the score and was startled to find that not one phrase of the four voices was in the proper order. Through a notational misunderstanding in my score for the computer voices the mix contained all the right phrases in absolutely the wrong order. We hurriedly made a new mix. I was flabbergasted at the difference: the movement in time was good,

intervallic relationships were good, the harmonic movement was right. This discovery disturbed me greatly, for the order my score called for was arrived at in an entirely random way. But the mistaken mix seemed to me to present all the elements in just as haphazard a way. Why was there such a difference between the two versions ? I have no explanation to offer. I have long believed that the structuring techniques one uses in a particular domain of a composition reverberate in complex and mysterious ways in other domains of the same piece; I have never received so striking confirmation of this belief as here.

The other remarkable result was that all the synthesized phrases having more than one note sounded bad. They seemed to take on connotations of functional harmony which I had not heard in the voice part and which disturbed me very much. Occasionally they sounded quite silly (for instance, this strongly functional phrase:)

(see example 22, page 76)

My reaction was harsh: I eliminated from the synthesized voices all phrases of more than one note (not quite all: I left in the entire piece three two-note phrases; as Conrad Cummings said: "the sparkle in the priest's eye"). Finally, I transposed three or four notes up or down to avoid all-too-obvious octaves with another voice.

Now the piece was all but finished. I derived the durations, dynamics, etc. of the synthetic baritone - soprano duet from minute 13 to the end by techniques the reader can imagine for himself. I chose the pitches for the soprano by random processes, although I "corrected" rather more than usual, in order to link more closely - by harmonic means - soprano and baritone in their duet. The synthetic baritone had as function the progressively less clear imitation of the real baritone, and his pitches were chosen accordingly (hence not at random). The soprano voice alludes to the fact that it is a woman speaking the text of the poem (the Diotima of Hoelderlin's interior mythology). Nonetheless, a man sings the piece because there can be no doubt that in fact it is Hoelderlin himself speaking in the text.

The final task of composition - or realization - was to record each phrase of each of the four voices at its proper time in the piece onto one of 12 channels of tape. These 12 channels were played through 12 loudspeakers scattered about IRCAM's Espace de Projection and rerecorded through a Calrec microphone system designed to analyze the sounds it receives into the components necessary for an exact recreation of the sound's spatial placement. The 12 loudspeakers were arranged in three congruent quadrangles (near, middle, distant), whose sides were in the proportion 11,9,11,10, which is the number of syllables in each of the four-line strophes of the poem.

"Aber die Namen . . ." was performed for the first time at Metz in November, 1979, sung by David Wilson Johnson, who had also participated generously in the preparatory research for the piece. The rehearsals duet by duet were very satisfactory; the musicians seemed to enjoy playing this quiet music and listening to each other. The tutti rehearsals were more difficult, because the musicians lost the sense for the independence of their duets in the ensemble. I placed the three duets as far apart on the stage as I could to render more audible the independence of each, but the ear seems to work very hard to perceive as a whole structurally different musical events taking place at the same time. In the various performances to date I have not succeeded in making the duets sound as independent as they were conceived and composed.

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