PIERRE BOULEZ

"SONATE, QUE ME VEUX-TU?"

AN INVESTIGATION OF THE MANUSCRIPT SOURCES IN RELATION TO THE THIRD SONATA

VOLUME I

TEXT

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The thesis title, 'Sonate, que me veux-tu?' ("Sonata, what do you want of me?"), is the title of an article by Boulez on the Third Sonata, first published in German in Darmstädter Beiträge zur neuen Musik, Vol. III, 1960, pp 27-40, Mainz, Schott; the composer's source is a question supposedly posed by Bernard Le Bovier de Fontenelle (1657-1757). See Orientations (1986) p 143n.
ABSTRACT

This study is focussed on the Third Sonata of Pierre Boulez, and specifically on the source material in relation to its unfinished state. The sketch material is investigated as an integral part of this analysis because of the light it sheds on the genesis of the music and its serial structures. The progress of the work, as revealed by the sketches, is examined: detailed analysis is presented, which will also interest the performer seeking to understand more fully the compositional process and the issue of performer choice.

In addition, the study includes a survey of the unpublished Formants of the Third Sonata, an examination of this material in the context of Boulez's 1957-58 performances, and an assessment of their relationship to the published Formants.

This study is framed by a consideration of the development of Boulez's style from the early unpublished piano pieces to the Third Sonata, an account of the publication of the work, and an assessment of its importance in the context of his subsequent artistic development.
PREFACE

It is now some fifteen years since my first faltering attempts to become acquainted with Boulez's Third Sonata. My performances of the published Formants, in 1983-84, left me with mixed feelings - a continuing fascination with the music, tinged with a sense of frustration that I was still grappling with the complexities of the score and failing to impart a sense of cohesion to the music. The causes seemed to be rooted both in the incomplete state of the piece and in my lack of a structural grasp of the two completed movements, with their utilisation of the principle of performer choice. Over the next few years, I abandoned attempting to perform the work in its existing form, although I occasionally gave performances of 'Constellation-Miroir' as a free-standing movement.

When I decided to embark on a research project, attempting to relate my performing experience in twentieth-century music to analytical techniques, the unresolved question of the Third Sonata, with its unexplored issue of performer choice, seemed a promising area of investigation. The original intention was to attempt, through analysis, to examine the nature of performer choice in the work, and, in so doing, to suggest a rational basis for the exercise of choice. The earliest sections of the study to be drafted attempt to investigate this issue.

Already, however, problems were presenting themselves, with much of the music defying my attempts at pitch analysis. It was only at this stage that I became aware of the existence of a Boulez archive at the Paul Sacher Stiftung, Basel. Shortly afterwards I was able to obtain a copy of a studio recording which Boulez had made in 1958, consisting of all five Formants of the Third Sonata. From now on, the project took on a greater focus, both in attempting to realise the original intentions, and in expanding its scope as the extent of the sketch material in Basel became apparent.
During an extended three-month stay, early in 1996, I was able to make a detailed study of all the available sketch material in Basel relating to the Third Sonata. It was thus possible to obtain some understanding of the compositional process, and to observe the means by which the musical structure of the published Formants had been evolved from principles which were essentially simple in themselves. The question of the unpublished Formants, and an investigation of their relation both to the two completed movements, and to Boulez's subsequent development, occupied the second part of my time in Basel.

Whilst it is always a temptation to regard the work one is currently studying as being the most important music ever written, the Third Sonata seemed, more and more, as my investigation continued, to occupy a central place in Boulez's output. I therefore embarked on a study of his piano music prior to this work in an attempt to understand the context. Again, I had the advantage that some unpublished material in manuscript form was available in Basel, and this provided a focus for my enquiries. Nonetheless, it cannot be pretended that my first chapter is anything more than an introduction to an enormous subject, the comprehensive treatment of which would require several further in-depth studies. The same must be said concerning the publication history of the Third Sonata which provided a fascinating, although inconclusive, new area of research at a late stage in this study.

Perhaps the most worthwhile outcome of all was that, as a result of my investigations, I was able to obtain permission to give a performance of the Third Sonata, including a section of the unpublished 'Antiphonie', at the Purcell Room, London, in February 1997. The ordering of Formants which I chose - 'Antiphonie' - 'Constellation-Miroir' - 'Trope' - enabled me to address the problem of balance in the incomplete work by flanking the extended central Formant with two shorter movements. This arrangement enabled me to give, for the first time, a performance which went some way to addressing the structural concerns which had
dogged my earlier attempts to perform this great music.

A practical problem in presenting the written results of my research concerned the question of musical examples. One possibility was to restrict them to a few illustrative quotations. However, when copying Boulez's source material, it had been my intention to preserve, as far as possible, the actual layout of the sketches. These enormous sheets, of up to thirty-six staves, frequently give an impression of being an indecipherable series of faded jottings. Gradually, one becomes aware that they are a meticulous record of the compositional process, the stages of which are laid open. Hence my decision to share much of the source material in the form in which I transcribed it. The appearance can seem untidy at times, but, with perseverance, it is possible to identify virtually all of the sketches, and thus to determine the sequence in which individual sections of the work were composed.

The intention of this study is, therefore, to contribute to the continuing debate concerning the structural issues raised by the Third Sonata, and to help to provide a context for future research into Boulez's working methods and his creative achievement.
Grateful acknowledgement is made to Rochampton Institute, London, for its support of this project from its inception.

I am particularly grateful to the Paul Sacher Stiftung, Basel, which generously provided me with a three-month stipend to facilitate my study of the manuscript sources, and to the staff of the Stiftung who gave me help and support to the highest professional standards during the time of my visit. The Stiftung has kindly given me permission to quote extensively from the manuscript sources in its Boulez Archive.

Martin and Ingrid Metzger provided me with a home from home during my stay in Basel.

Among other individuals, I am particularly grateful to Leonard Stein for allowing me access to unpublished correspondence between Boulez and himself, to Charles Rosen, and to Stephen Walsh, who read through a partial draft of this study and made valuable suggestions.

But this study would not have been possible at all without the assistance of two persons. Professor Sebastian Forbes of Surrey University supervised the project from its inception, gently encouraging my early, unfocussed attempts to come to grips with the subject, guiding me both in matters of detail and in finding a suitable structure for my thoughts, and at all times providing sympathetic support, not least in the final stages. M. Robert Piencikowski of the Paul Sacher Stiftung laid at my disposal his unrivalled knowledge of the Boulez Archive, and gave me much practical help with the manuscript sources, especially in transcribing Boulez’s handwriting. Not only that, but in numerous private conversations, he
helped to deepen my understanding of Boulez's music in the context of twentieth century music as a whole.

My wife, Susan, gave me practical help in translating excerpts from the German in Chapters 2 and 8, accepted without complaint the duties of being a single parent to our newly-born son, Simon, during my extended absence in Basel, and was a constant source of moral support.

Eric Marinitsch of Universal Edition facilitated my visit to Vienna, where I was given much practical help in locating material by the Archivists, Frau Ilse Heinisch and Frau Elizabeth Knessel.

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CHAPTER ONE

THE EARLY WORKS

The works of Pierre Boulez chart the course of a compositional career already spanning over half of the century, and unquestionably of major importance in any consideration of the development of musical style during this period. Yet, whilst acknowledging Boulez's stature as a composer and the crucial influence he has exerted, one is struck by the curiously ill-balanced appearance of a catalogue of his music. A radical style appears virtually fully formed in the first published works, beginning with the Flute Sonatina of 1946, already a remarkable achievement from a composer barely out of his teens. A decade of tumultuous activity followed, during which Boulez's position as the leader of the postwar generation was confirmed by a series of works of astonishing boldness and consistency of purpose, culminating in the first performance, in 1955, of 'Le Marteau sans Maître', which set the seal on his international reputation. A series of compositional issues were addressed and brilliantly solved, and the works themselves were accompanied by a regular flow of articles, by turns rigorously analytical and savagely polemical, in which Boulez identified the major aesthetic preoccupations of his generation and articulated his solutions.

By the mid 1950s, the thirty year old composer was embarking on a second series of projects, the range of which is quite remarkable even by his own standards. Whilst exact chronology is a matter for speculation, the evidence suggests that works as diverse as the 'Symphonie mécanique', the Third Piano Sonata, 'Pli selon pli' and 'Poésie pour pouvoir' were all conceived in the immediate aftermath of 'Le Marteau', to say nothing of the
continuing work on 'Structures', and abandoned projects such as the solo flute piece, 'Strophes', and the incidental music for 'Orestie'. Yet it is in the midst of this plethora of activity that the first hints of a creative hiatus become apparent. The 'Symphonie mécanique', with its astonishingly resourceful use of electronic sound, is withdrawn, as is 'Poésie pour pouvoir' after one unsatisfactory performance. Boulez has frequently expressed dissatisfaction with the comparatively crude technology available during this period, but the gradual loss of the creative certainties of the first decade is further evidenced by the protracted gestation of 'Pli selon pli' and 'Structures Book II', both of which were finally released for publication in 1962. The composition of the Third Sonata is more protracted still, the work being withdrawn in 1958 after a series of performances by Boulez of all five movements, and only two movements being eventually published in 1962 and 1963.

From now on, the rate of completion of works is reduced to a trickle: the orchestral piece 'Eclat' of 1965 proved to be only a first stage in the composition of an enormous (still incomplete) 'work in progress', 'Eclat multiples', and whilst both 'Cummings ist der Dichter...' (1970) and 'Rituel' (1973) have apparently reached their final form, Boulez has displayed an increasing, somewhat disconcerting tendency to revisit works which had seemingly been completed decades ago. Thus both the Char cantatas of 1948 have been the subject of such revision, as has the Third Improvisation from 'Pli Selon Pli', and whilst the proportions of the pieces have remained largely untouched, the much greater elaboration of the orchestral writing has to some extent altered the character of the originals. Thus has the concept of 'work in progress' been extended back in time to cover the entire range of Boulez's output, with the tiny 'Notations' for solo piano (1945) still in the process of vast recomposition for orchestral forces.

Various theories have been put forward to account for the marked reduction in the
rate of completed works after 'Le Marteau sans Maître'. Among the least convincing is Boulez's suggestion that it is indicative of a desire to exhaust the creative potential in the material: "As long as my ideas have not exhausted every possibility of proliferation they stay in my mind, and it is only when that has been completely achieved that I can get rid of them" (1), a statement in apparent contradiction of his trenchantly expressed view that choice lies at the heart of the creative process. The more prosaic explanation, that of creative exhaustion, is inconsistent with the evidence of continuing compositional activity, despite the growing demands of an international conducting career since the 1960s. It is certainly the case that he was dismayed by the widespread adoption of aleatoric procedures by many of his most gifted contemporaries during this period, and disillusioned by the intractable problems of harnessing electronic means to his compositional needs. Whatever the truth of the matter - and one suspects that all of these factors played a part - after 1962, Boulez's compositional career went into a decline lasting some two decades, a decline partly arrested by the appearance of 'Répons', the various revisions of which have been punctuated by a number of shorter works.

The Third Sonata stands at the crossroads of this compositional crisis, begun in 1955 in the immediate aftermath of 'Le Marteau sans Maître', and still occupying Boulez in 1963, the year after the completion of 'Pli selon pli' and the second book of 'Structures'. Until the recent appearance of 'Incises', which started its existence as a short solo piano piece before being developed for ensemble into a pièce d'occasion for the ninetieth birthday of Paul Sacher in 1996, the Third Sonata had been Boulez's last work for the instrument which had been central to the establishment of his early reputation. The first two sonatas, written between 1946 and 1948, continue to astonish, in that music of such individuality could have been written by a composer in his early twenties. Here, the most
radical elements of the musical language inherited by Boulez confront one another with uncompromising directness, and with no evidence that the resultant highly individual style was achieved by stages through an apprenticeship. This perspective on Boulez's first published works has been shifted to some extent in the last decade or so, first with the publication by Universal Edition in 1985 of the original piano version of 'Douze Notations', dating from 1945. Then Gerald Bennett's excellent essay, "The Early Works" (2), lifted the veil on some of the unpublished music of the Lyons and early Paris years. Finally, with the acquisition of the Boulez archive by the Paul Sacher Stiftung, and publication of a catalogue in 1988 (3), it was possible to obtain a more comprehensive picture of the origins of Boulez's style, and of his piano music in particular. This chapter attempts to provide a context for the detailed consideration of the Third Sonata which follows, by tracing in general terms his evolution as a composer for the piano. Inevitably the following account relies heavily on secondary sources; however the intention is not to appropriate the researches of others, but to acknowledge them, and where possible to supplement them with observations drawn from the manuscript sources of Boulez's music.

JUVENILIA

The earliest surviving pieces by Boulez were written in 1942-43 when he was studying piano and harmony with Lionel de Pachmann in Lyons at the same time as, in accordance with parental wishes, he was undergoing a course in mathematical theory at the University. Gerald Bennett has drawn attention to a group of songs written during this year, and quotes the end of a 'Berceuse' for violin and piano (4). Contemporary with these pieces must be the earliest complete piano work, an 'Andante and Scherzo', the manuscript of which is in the
Paul Sacher Stiftung. The lack of any strong individuality in this music is, as Gerald Bennett points out, unsurprising, given the limited range of Boulez's musical experiences at that date, although the fledgling composer is already showing a desire to imitate the more stylistically advanced aspects of the music he knew, as shown by the bitonal opening of the 'Andante' (Ex. 1.1). The 'Scherzo' (Ex. 1.2) evokes the Ravelian world of 'Valses Nobles et Sentimentales', although the middle section of its ternary form structure does show some rhythmic individuality, albeit within a rather conventional melodic context (Ex. 1.3).

Boulez left for Paris in the autumn of 1943, but not before he had written another, somewhat more extended piano piece entitled 'Psalmodie'. A draft of this is found in the Basel Archive, and a fair copy in the Bibliothèque Nationale, Paris, which is signed and dated, Lyons, Septembre 1943 with the dedication, "A mon très cher maître L. de Pachmann son élève très respectueux et reconnaissant P. Boulez". Presumably the eighteen-year-old student thought well enough of the piece at the time to present it to his teacher as a farewell homage. Some forty years later, the manuscript resurfaced, and prior to its acquisition by the Bibliothèque Nationale at an auction sale in June 1983, Boulez was given the opportunity to obtain the manuscript. His amusing reply is worth quoting for the unsurprising change of perspective on this rather derivative music:

"Je vous remercie vivement de m'avoir prévenu le premier, par votre lettre du 11 juin, de la future mise en vente d'un de mes manuscrits.

A vrai dire, je trouve que cette pièce ancienne doit vivre de sa propre existence, elle m'a quitté il y a déjà si longtemps... Ce serait comme essayer de greffer une feuille morte sur un arbre encore vert" (5)

Gerald Bennett quotes the opening of this piece (6) without identifying it, and by implication linking it with the slightly later piano music composed in Paris. In fact, the title anticipates
that of the three pieces written during the time of his studies with Messiaen, but is otherwise unconnected with them. The juxtaposition of the rather sentimental opening, *avec douceur*, with a contrasting *Allegro ma non troppo* central section (Ex.1.4) is not entirely convincing, although the raw percussive style of this music was to resurface in Boulez's music throughout the 1940s, before being transformed in the masterpieces of the next decade. An interesting additional feature of this Paris manuscript is the presence of fingering, suggesting that Boulez may well have performed the piece to his teacher prior to his departure for Paris.

'TROIS PSALMODYES'

The first months of Boulez's studies in Paris seem to have been a largely unproductive period, but in April 1944 he began a period of study lasting over two years with Andrée Vaurabourg-Honegger, and in the autumn of that year began to attend Olivier Messiaen's classes. A further series of piano compositions followed over the next few months, showing the decisive influence which Messiaen exercised on the young composer. In addition to a set of three pieces, 'Prélude, Toccata et Scherzo' and a 'Nocturne', all mentioned by Gerald Bennett, there is also a group of pieces entitled 'Trois Psalmodies'. Boulez was evidently still working on the third of these pieces in late 1945, at a time when his rapidly developing style had moved on, and he had produced two more stylistically advanced piano pieces, the Variations for the Left Hand, completed in June 1945, and the 'Douze Notations'. A surprising feature of the 'Trois Psalmodies' is their conservatism when compared to these surrounding works, suggesting a somewhat earlier date of conception. The chronological evidence is inconclusive, but is as follows. There are no available surviving sketches as such, but undated pencil scores for all three pieces are found in the Paul Sacher
Stiftung. Internal evidence, including the fact that the beginning of 'Psalmodie 3' follows uninterruptedly the end of 'Psalmodie 2' on the same sheet of manuscript, suggests that these drafts were notated around the same time. There is no other material relating to 'Psalmodie 1' and 'Psalmodie 2' in Basel, so attention was switched to the catalogue of the Bibliothèque Nationale in Paris, where 'Trois Psamodies' are listed in the Boulez manuscript collection. It was possible to obtain a photocopy of this manuscript, which disappointingly proved to contain only a fair copy of 'Psalmodie 1', the manuscript consisting of six numbered pages, dated and signed 14th July 1945 - Bastille Day - and with the dedication, "En souvenir de la Saint-Henri", the Saint whose feast day falls the previous day (St. Henry was a medieval Saxon king, later canonised, and an enlightened patron of the arts in the newly established bishopric at Bamberg in Bavaria). The Paris copy of 'Psalmodie 1' is identical to the Basel manuscript except for the addition of dynamic and agogic marks, arguing that Boulez occupied himself on a public holiday by making a fair copy of an already completed piece.

The situation concerning the source material for the final piece is more complex. Among the pencil drafts for 'Notations' at the Paul Sacher Stiftung are three pages containing the end of 'Psalmodie 3', dated Juillet-Août 1945, a year when the student composer spent the summer vacation back at his parents' home in Montbrison. These pages are numbered 9, 10 and 11, suggesting that they are the final section of a missing fair copy of all three pieces. The possibility must be that these pages relate to those of the incomplete Paris manuscript consisting only of 'Psalmodie 1'. In the case of 'Psalmodie 3', as with 'Psalmodie 1', the pen manuscript is not a revision of the pencil score but a copy with some cuts indicated. These are on the whole of a minor nature, apart from the excision of an entire section in the middle of the piece. Complementing this incomplete score is a fair copy of the opening section, also in pen but undated, and titled 'forme sonate': it may well be a slightly later copy, which helps
to specify the extent of the cut, the start of which is marked by * in this manuscript, and the close by ** in the Juillet-Août manuscript. These pen scores taken together enable one to reconstruct the piece in this revised form: in addition to the cuts, they add dynamic and agogic marks, indicative of a final stage in the compositional process, and lending further circumstantial evidence that they relate to the Paris manuscript of 'Psalmodie 1'. However Boulez evidently remained dissatisfied with the shape of the final piece, particularly the closing section, for there exists a further draft on a sheet which also contains the 'Notations' nos. 6 and 7. This consists of a complete re-writing of the final section, abandoning the previous versions and substituting an extended revision of the preceding section. These were evidently Boulez's final thoughts, dated 12.11.45.

Despite the indisputable evidence furnished by the dating of the various revisions of 'Psalmodie 3', one is inclined on stylistic grounds to place the original date of composition of all three pieces as much as a year earlier. There is no indication as yet that Boulez was aware of the serial music of the Second Viennese School: his exposure to the music of first Schoenberg and then Webern during the course of 1945 were to have a profound effect on the development of his style. On the other hand, the (by his later standards) uncharacteristically lush chording and newly gained rhythmic plasticity point to the strong influence exerted initially by Messiaen. Boulez had joined Messiaen's class in October 1944, the month after the completion of 'Vingt Regards sur L'Enfant Jésus', and the 'Trois Psalmodies' show the extent of his indebtedness to the harmonic vocabulary and pianistic style of his teacher. Another influence was acknowledged openly by Boulez:

"De Schoenberg, à l'époque, je connaissais très peu de choses, exactement deux oeuvres, toutes deux de la période atonale, mais non encore sérielle: Pierrot Lunaire et les Trois Pièces Opus 11. Lorsque je composai les Trois
Psalmodies, j'ignorais jusqu'à l'existence de la musique sérielle, mais j'avais le sentiment très net de la nécessité de l'atonalité" (7).

However, other potent influences were at work, subsequently not so readily acknowledged by Boulez. Gerald Bennett has drawn attention to the fact that the Nocturne of 1945 was originally prefaced by the legend, Prière et incantation à la mystérieuse nuit (8). In its turn, the Paris score of 'Psalmodie I' is prefaced by a literary quotation, which was subsequently vigorously crossed through in red pencil. It was evidently a copy of the same five-line quotation which is placed at the bottom of the first page of the earlier Basel manuscript, in which the identity of the author, André Gide, is acknowledged. The lines are taken from the quasi-autobiographical 'Les Nourritures Terrestres' of 1895, written during the course of Gide's third trip to Africa following his recovery from tuberculosis, and at a time of self discovery - the death of his mother and the unconsummated marriage to his cousin Madeleine were to follow within months of his return to Paris. The book was first published in 1897, in 'Mercure de France', but the passage quoted by Boulez, celebrating Gide's discovery of the Algerian town of Blidah, had already appeared separately in 'L'Art Jeune' in 1895, and was then transferred to the seventh book of 'Les Nourritures Terrestres':

*Je sais la source où j'irai refraîcher mes paupières,*

Le bois sacré; je connais le chemin,

Les feuilles, la fraîcheur de cette clairière;

J'irai, le soir, quand tout saura s'y taire

Et que déjà la caresse de l'air

Nous invitera plus au sommeil qu'à l'amour.

*Source froide où toute la nuit va descendre.*

*Eau de glace où le matin transparaîtra*
Grelottant de blancheur. Source de pureté.

N'est ce pas que je vais retrouver dans l'aurore

Lorsqu'elle paraîtra

Le saveur qu'elle avait quand j'y voyais encore

Avec étonnement les clartés et les choses?

Quand j'y viendrai laver mes paupières brûlées. (9)

The italicised lines are those quoted by Boulez, and, placed in the context of the poem and of the passage as a whole, they are indicative of the strong influence exercised by Gide's advocacy of the primacy of personal experience and self discovery on the young composer. It is worth noting in passing the resemblance of the imagery in this poem to the world of Mallarmé, to whom the young Gide had been introduced four years previously, and who exercised an influence which Gide was not entirely successfully endeavouring to expunge from his work at this time. The influence, of course, will continue to resonate over half a century later in the music of Boulez, and will dictate the formal structure of both 'Pli selon Pli' and the Third Sonata, the principal subject of the present study. The closing lines of the 'Lettre à Nathanaël' which follows the above poem are an apologia to artistic discovery and originality:

"...Je crois que la route que je suis est ma route et que je la suis comme il faut. Je garde l'habitude d'une vaste confiance qu'on appellerait de la foi, si elle était assurémentée". (10)

Elsewhere, the evocative impressions of Blidah which open the letter, may well have suggested to Boulez the langorous opening of 'Psalmodie I':

"Tu n'imagines pas, Nathanaël, ce que peut devenir enfin cet abreuvement de lumière;
If the young Boulez was proudly displaying the fruits of his studies in Paris to his family back in Montbrison that summer, he may well have judged it more judicious to evoke the memory of a Saint in the dedication of 'Psalmodie I' rather than the hedonistic world of Gide!

Stylistically, the 'Trois Psalmodies' are the most direct acknowledgement in all Boulez's music of the enormous influence exercised by the dominating musical personality of Messiaen, and they help to explain the subsequent need for the young composer to react against it in order to find his individual voice. The previous year, prior to the composition of the 'Vingt Regards', Messiaen had finished a less well known work, the 'Trois petites Liturgies de la Presence Divine'. All three movements have liturgical connotations - 'Antienne', Sequence and 'Psalmodie' - and it may well be the case that Messiaen's incorporation of the form of responsorial psalmody into this work suggested to Boulez the point of departure for his own pieces. Structurally, all three of the 'Psalmodies' alternate homophonic sections in strict rhythm with more rhapsodic passages, these contrasts being at their most extreme in the first piece. On a directly musical level, the melodic line of 'Psalmodie I' coincidentally begins with the same three notes as had the 'Psalmodie' of 1943, but the context is totally different, its rhapsodic shape, comme une improvisation, recalling the birdsong figurations of Messiaen (Ex.1.5). The harmony (x) of this opening section is based on the chord of fourths, perfect and augmented, derived by Messiaen from his fifth mode of limited transposition (Ex.1.6), and continues with chords (y) derived from mode two (or the octatonic scale, as it is now generally called) (Ex.1.7). The interpolations of the 'psalm chant' become increasingly insistent, and following a climax à toute force in which all twelve chromatic notes are juxtaposed chordally, the tension is gradually dispersed in a
return to a more improvisatory style. Such an outline summary says little about the music, but it is worth noting in passing that already some features which are to become important elements of Boulez's mature style are present. The contrast between rhythmically strict, and freer, more rhapsodic writing, is a constant element in his style, and the components of the chord of fourths - semitones, perfect and augmented fourths - dominate both the linear and vertical elements of his later style, however much he was subsequently to repudiate the harmonic world of Messiaen.

The second 'Psalmodie' is the most difficult one on which to comment, for at the time of writing, the only available version is the pencil draft in Basel, virtually devoid of agogic and dynamic marks. A faint pencil jotting on the top right hand corner of the opening page identifies the form as being ABCBA, a reminder that the 'Psalmodies' are still very much compositional exercises, and cautioning one to respect his wishes that they are not to be performed and published. The austere monotone F-sharp of the opening is punctuated with chords derived from Messiaen's seventh mode of limited transposition, leading eventually to the annihilation of the F-sharp in a vertical clash (x) of all twelve chromatic notes (Ex.1.8). The predominantly two-part writing of the central section is followed by a return of the opening, its severity eventually softened by dissipation into trills, and a cadenza-like coda, reminiscent of the final section of the first piece.

Also problematic, for different reasons, is the final 'Psalmodie'. As indicated in the account of the manuscript sources in the Paul Sacher Stiftung, Boulez evidently continued to revise the piece into the late autumn of 1945, at a time when he was occupied with other compositional projects and absorbed in his discovery of serialism under the guidance of Leibowitz. Perhaps these various revisions are indicative of a special attachment on Boulez's part to this piece, and a realisation that problems of formal balance needed to be addressed.
His editing is in the interests of concision in the opening section, and then an attempt to expand the proportions of the final section in additive rhythms. There is a direct line from the drum-like textures here to those of the 'Theme and Variations for the Left Hand', completed in the middle of 1945, and the pianistic style is much more assured and idiomatic than in either of the two preceding 'Psamodies'. The Basel manuscript of 'Psalmodie 3' is prefaced by the inscription, "phrase mélodique longue accompagnée - Honegger. Hindemith - étude p/piano". The reference to a melodic phrase by Honegger is almost certainly to the 'Lamento' from the Cantata 'La danse des morts', completed in 1938. The piece is rarely heard in England now but had something of a vogue after its first performance under the direction of none other than Paul Sacher. This performance, on 1st March 1940, was broadcast live to many European countries, and it is not impossible that the young Boulez would have become acquainted with the piece at that time. Certainly his continuing studies in counterpoint with Andrée Vaurabourg would have given him ample opportunity to become familiar with her husband's music, and what could be more natural than a desire on Boulez's part to include a homage to his other teacher by means of a citation in a work of his own which he evidently valued? There is an added significance in the choice of quotation, especially given Boulez's frequently expressed reverence for Bach's music, since he would doubtless have been aware that the Honegger piece itself is a homage to Bach, being modelled on the aria 'For love my Saviour now is dying' from the 'St. Matthew Passion'. A comparison of all three openings shows the connections, and the extent to which Boulez transformed his models (Ex. 1.9). The reference to a work for player-piano by Hindemith is more puzzling, since much of Hindemith's output for this medium was in the form of film music, and Dr. G. Schubert of the Hindemith Institute in Frankfurt was able to confirm that none of this material survived the war (12). Still in existence however is a Toccata for
mechanical piano dating from the mid 1920s. It was possible to hear a recording of this short piece at the National Sound Archive, and to sense some links between its perpetual motion organised around a restricted number of pitches and the closing section of 'Psalmodie 3' (Ex.1.10). Indeed, Boulez's later remarks concerning the character of Schoenberg's piano writing might equally apply to Hindemith's piece, albeit in a rather different context: "...a percussive piano which is at the same time remarkably prone to frenzy"(13).

As well as these links, there are formal connections between 'Psalmody 3' and the first two 'Psalmodies' in the alternation of rhythmically free passages, très libre, puisque improvisant, with those in strict metre which emphasise semitonal clashes between the hands. Furthermore, as in Messiaen's 'Trois petites liturgies', there are demonstrable motivic links between the 'Trois Psalmodies'. The pervasive influence of Messiaen imposes a stylistic unity on all three pieces, with the final piece ending on a transposed form of the chord of fourths which had opened the first 'Psalmody'. If this unity is achieved at the cost of an absence of any strong individuality, it must be said that Boulez has demonstrated a remarkable grasp of the components of Messiaen's musical style, and that there are already glimpses of a world of violent emotional extremes, the expression of which will shortly lead to a repudiation of the harmonic and melodic style of the 'Psalmodies'.

'THÈME ET VARIATIONS POUR LA MAIN GAUCHE'

In the spring of 1945, shortly before the Liberation of Paris, a landmark performance of Schoenberg's Wind Quintet Opus 26 was organised by René Leibowitz on the premises of the German-occupied French Broadcasting Authority, and a recording was subsequently broadcast immediately after the Liberation. Boulez attended this private concert, the first
occasion he was able to hear a piece of Schoenberg's twelve-note music. In the autumn of that year, Boulez was to organise a group of Messiaen's students to work with Leibowitz each Saturday afternoon, sessions in which he was introduced to the music of Webern. In the meantime, the encounter with Schoenberg was to be the catalyst for Boulez's first piece of serial music, the 'Thème et variations pour la main gauche', his boldest and most ambitious work to date, completed in June 1945. The piece consists of a twelve-note theme and thirteen variations. Gerald Bennett quotes the theme in his article, and complements it with an excellent analysis of the rhythmic structure (14). This quotation is presumably taken from the pen manuscript to which Bennett must have had access. It is now housed in the Paul Sacher Stiftung, where an earlier pencil draft can also be examined. An interesting feature of the first draft is that Boulez's original thoughts were apparently to open the work with the unadorned melodic statement of the theme, which, in the pen manuscript, forms the final variation. This theme, the thirteenth variation in the pen manuscript, consists of four overlapping statements of the prime series, P0, P5, P10, and P4, and recalls Schoenberg's technique both in melodic shape and comparatively conservative rhythmic structure (Ex. 1.11).

It is worth noting in passing that Boulez's first twelve-note row is dominated by the minor seconds and tritones which become so characteristic of his later methods, and that the last four notes form a cell of adjacent semitones: permutation of this cell yields the BACH motive, which, in carefully disguised form, as in the final page of the Second Sonata and 'Sigle', is a background presence in much of his later music. Coincidentally, the opening notes of the row have a remarkably similar shape to the opening of 'Psalmodie 1', an indication that, despite his adoption of Schoenberg's technique, the young composer's melodic and harmonic thinking is still very much influenced by Messiaen. Comparison of variation thirteen with the theme quoted by Bennett shows that this theme is in fact a harmonised
version of a more basic thematic shape (Ex.1.12). His implication that the accompaniment is derived from the same twelve-note row as the theme is misleading: the chords are based on an independent four-note cell, D-natural - G-natural - C-sharp - F-sharp, which, together with its two transpositions, forms an independent twelve-note series. The point is only made because Boulez uses the two rows independently and in combination to generate the entire piece. Thus the first variation consists simply of the notes of the accompaniment stated melodically (Ex.1.13), and elsewhere, as in Variations IV and VIII, Boulez combines the two rows to spin linear textures of a moto perpetuo character (Ex.1.14). Indeed, the technical restriction imposed by left hand alone was an artful decision on Boulez's part, enabling him to exploit the full register of the instrument, but limiting the texture in terms of harmonic density. In fact, despite the use of a twelve-note row to generate the theme, the piece is a serial one only in the most rudimentary definition of the term. Virtually throughout, Boulez confines his use of transpositions to those contained in the theme, and there is no use of the series other than in its prime form, apart from the motivic use of inversion. Vertical combinations are similarly restricted, with only an occasional use of dyads, as in Variation V. The exception to these restrictions occurs in the twelfth, and originally final variation, where an ingeniously fugal texture, based on P0 and P6 (the tritonal relationship again), occasionally combines three voices (Ex.1.15). The climax to this variation is a cadenza-like passage, at the close of which the cell of four adjacent semitones is heard fortississimo in the extreme top register of the instrument. Gerald Bennett quite rightly draws attention to Boulez's highly imaginative use of rhythm in the 'Variations': if the influence of Messiaen is clearly present, it must be said that Boulez has absorbed the techniques and applied them in a much more imaginative manner than in the 'Trois Psalmodies'. The rhythmic complexity increases as the variations progress, culminating in the assymetric rhythms of Variation XI,
and the violent textural contrasts of Variation X, whose drum-like patterns provide a link with the closing section of the third 'Psalmodie', and anticipate the eighth of the 'Notations', 'Afrique' (Ex.1.16). Despite the restrictions imposed by Boulez's still rudimentary knowledge of twelve-note technique, the work as a whole is a remarkable achievement, and it is a pity that it has remained unpublished. The young composer must have returned to Montbrison in the summer of 1945 well satisfied with the progress of the last few months, and eager to extend his knowledge of serial technique on his return to Paris, by means of direct contact with Leibowitz.

'DOUZE NOTATIONS'

The 'Douze Notations' have a curious history, being chronologically the first in an increasingly extended list of early works which Boulez has revisited. In 1980, a group of four orchestral pieces entitled 'Notations' received their première in Paris. It was known that these were transformations of a group of unpublished early piano pieces, which were not as yet available. Gerald Bennett drew attention to these, and to the existence of an orchestrated version of eleven of the pieces, completed shortly afterwards (15). His fascinating quotation of the opening of the orchestral version of the ninth 'Notation' shows Boulez freely using the Ondes Martenot, and establishes for the first time the connection between this piece and its use as the basis for one of the instrumental interludes in 'Improvisation 1' from 'Pli Selon Pli'. Robert Piencikowski has subsequently noted (16) that the fifth of the 'Notations' is also quoted in this section. In 1985, shortly before Bennett's study appeared, the 'Douze Notations' in their original solo piano version were finally released for publication. It is possible to date the original piano pieces with a reasonable degree of certainty on both stylistic grounds and
from the internal evidence provided by the pencil drafts in the Paul Sacher Stiftung. These are dispersed on three separate sheafs of manuscript paper. Nos. 8 and 9 are found on the back of a sheet of exercises in sixteenth-century counterpoint, which presumably date from an early stage in Boulez's studies with Andrée Vaurabourg-Honegger. Alone among the 'Notations', no. 8 at this stage has a descriptive title, 'Afrique', which was eliminated from the published score. On the reverse of a double sheet of four-part exercises (with pencilled comments) are found nos. 10, 11 and 12. The first seven 'Notations' form part of a sheaf of eight sides, seven of which are taken up with pencil drafts for the 'Psalmodies', concluding with the final pencil draft for 'Psalmodie 3' dated 12th Novembre 1945. 'Notations 1-6' are found on the remaining sheet, with the end of no. 6 and the whole of no. 7 continued on the bottom of the sheet which contains the conclusion of 'Psalmodie 3'. This argues that the pencil draft of 'Notations' dates from late 1945, a date which fits well with the other evidence.

Boulez must have worked almost simultaneously on an orchestration of these pieces, although he did not attempt to find an orchestral equivalent for the virtuosic sixth piece. The pencil manuscript of the 'Onze Notations', a comparatively recent acquisition of the Paul Sacher Stiftung, is dated Decembre 1945-Janvier 1946, and makes a fascinating comparison both with the original piano versions and the 1980 recomposition.

If the 'Theme and Variations for the Left Hand' can be seen as Boulez's first response to the twelve-note music of Schoenberg, the 'Notations' are the first results of an influence that was to be even more far-reaching in its consequences. As we have seen, in the autumn of 1945, Boulez had commenced studies with René Leibowitz, who introduced him to the music of Webern, beginning with the Symphony Opus 21. The profound effect of this influence may be judged from the stylistic gulf which separates 'Notations' from the preceding works, and the much more comprehensive exploitation of the technical possibilities of twelve-
note technique when compared to the 'Theme and Variations'. In 'Notations', the music is much more terse and concise, the pianistic textures mirroring the musical discourse in their more fragmentary character. The device of using the same twelve-note row for each piece imparts a certain unity despite the abrupt contrasts, especially as the characterising fourth and semitone intervals are constantly present - albeit used in a melodic context in a manner which Boulez was soon to reject. The unity of pitch structure is paralleled by one of proportions, each piece consisting of twelve bars. This rather rigid format was abandoned in the orchestral version of 1945-46: Boulez's adjustments to the barring were presumably dictated by the practical demands of ensemble performance. A comparison of the two versions is of some help in resolving occasional metrical ambiguities in the piano original. The opening of the second piece, for example, is imprecise in its notation of the glissandi as compared with the regrouped orchestral version. Here there is a greater degree of rhythmic precision, and there can also be observed a slight change of mind concerning the length of the first note - a practical adjustment, taking account of the greater resonance of orchestral percussion. A curious pitch discrepancy however remains unresolved in both versions: the B-flat in bar 7 of the piano original should be replaced by a B-natural if the pitch structure of the row is to remain consistent. The orchestral version of this piece retains the error: the arrangement is reproduced here in its entirety, and, as with Gerald Bennett's quotation from the ninth piece, shows the young Boulez making uninhibited use of the Ondes Martenot, an instrument he later came to despise (Ex.1.17).

Despite the sense of unity referred to in the previous paragraph, the 'Notations', more than any previous work, reveal the range of stylistic influences on Boulez during the latter part of 1945, some of which were soon to be violently repudiated, others absorbed into the astonishingly individual style which characterised the first published works. Yet,
strangely, there has been comparatively little critical commentary, even of a purely technical nature, during the decade since publication of the original piano pieces. The following brief discussion cannot claim to be anything more than an outline account, intended primarily to examine the pieces for the light they shed on Boulez's development. (Please refer to the annotated copy, Ex.1.18, in the subsequent discussion). On a formal level, the concept of a cyclical structure generated by serial technique, and articulated in a masterly way in 'Tropes' from the Third Sonata, can be observed in embryonic form in 'Notations'. Here the method consists of commencing each piece with that note in the series which corresponds to its order in the cycle. The only exceptions to this sequence occur in pieces four and five, where the order is reversed, no.4 beginning with A-natural, the fifth note of the series. The cyclical technique is easy to follow in most of the 'Notations', since Boulez commences eight pieces with the original form of the row, P0. However, three pieces start with inverted forms of the row, 12 in the case of nos.9 and 12, and 111 in piece 11. Uniquely, no.5 begins with a melodic statement of the original row in retrograde form, R0, commencing with D-natural, the fourth note of the series. The treatment of serial technique within individual pieces varies considerably, from the rather primitive melodic treatment in no.2 through to the comparatively sophisticated technique of combining overlapping and foreshortening of various transpositions of the row in no.6. An interesting feature of this piece is its use of canon, at the fifteenth in the first half, and at the fifteenth in inversion in the second half. Webern is the obvious model, but the piece recalls 'Der Mondfleck' from 'Pierrot Lunaire' in its fleeting, moto perpetuo character, and its virtuosic figurations. Unlike his predecessors, however, Boulez is forced to modify the strict canon in bar eight, where two notes in the left hand are adjusted, presumably in order to avoid the perfect fifth, G-natural - D-natural on the fifth semiquaver of the bar. Within a year, Boulez would be adopting a more uncompromising stance to the
'chance' occurrence of such intervals. For the present, we can observe the continuing influence of Schoenberg in the comparatively straightforward texture of twelve-note melodic line and complementary harmony found in nos. 3, 5, 7 and 9. These stand alongside pieces such as nos. 1 and 10, where the more angular, cell-like treatment of the row and fragmented textures suggest the influence of Webern, and other movements such as nos. 4 and 8 where, despite intervallic links to the original series, the compositional process owes much more to the exploration of rhythmic patterns than to twelve-note technique. If the influence of Messiaen can be seen clearly in the rhythmic structure of no. 4 with its constant lengthening and foreshortening of rhythmic patterns, and in the harmonic style of nos. 3 and 7, then the quasi-ethnic style of no. 8 ('Afrique') evokes another influence, both in stylistic details and pianistic texture - that of André Jolivet. As Robert Piencikowski has pointed out in a concise but brilliantly perceptive article on Boulez's piano music (17), the specific influence is likely to be Jolivet's six-movement Suite, 'Mana'. Boulez would almost certainly have been acquainted with this set of pieces, which first appeared in 1935 prefaced by an analytical introduction by Messiaen, and there are striking parallels between the quasi-oriental world of 'La Princesse de Bali' from Jolivet's 'Mana' and Boulez's 'Afrique' (Ex. 1.19). The variety of compositional means employed in 'Notations', that index of stylistic influences on the young composer, argues that they may well have been composed over a period of some months in the autumn of 1945, and almost certainly not in the sequence in which the pieces appear.

In the absence of available sketches, any attempt at chronology must remain speculative, but, leaving aside the cyclical treatment of the series, on what basis was the present ordering of the 'Douze Notations' arrived at? The question involves a more detailed examination of the use to which the various technical means are put during the course of the work. The most striking unifying feature within each piece is the principle of the palindrome, which, on first
acquaintance, imparts a hermetic character to the musical structure. If no. 6, standing at the centre of the work, is the most rigorous in its application of strict contrapuntal principles, then all of the other pieces contain palindromic elements, and a majority - nos. 1, 2, 3, 4, 7, 8, 9, and 11 - make a direct reference to the opening statement in their concluding gesture. This device is particularly important in a piece such as the first one, perhaps the most fragmentary in character of the set. Indeed its twelve bars are a microcosm of the work as a whole: two brief motivic statements, an upward legato one followed by a descending staccato phrase, each succeeded by rests: a chord: a rhythm: an accompanied melodic phrase: a short section of two-part counterpoint, followed by a reprise of the opening bar. Certainly one factor in the ordering of the pieces must have been a desire to obtain the maximum degree of contrast from one to the next, yet, despite the fleeting impression conveyed by these juxtapositions of mood and texture, successive pieces are cleverly linked by a series of shared technical devices. Thus the second piece, although a violent contrast to the first in its driving ostinato rhythm, takes the closing note of the previous piece as its starting point, and shares the use of P0 and P11 as the basis for its pitch material. The palindromic structure of the second piece is emphasised not only in the recall of the opening glissandi and clusters at the end, but by the use of retrograde in the final melodic phrase. Boulez repeats this device at the end of the contrasting third piece, where R0 balances the opening statement based on P0. The fourth of the 'Notations' can scarcely be considered a twelve-note piece, being a study in Messiaenic rhythmic figurations. Its pitch content is based on the exploitation of two independent tetrachords, E-natural - A-natural in the left hand, and B-flat - E-flat in the right hand. Nonetheless, its links to the opening of the third piece, and indeed loosely to the original series, are audible in the primacy of semitone, perfect fourth, and augmented fourth intervals. The fifth 'Notation', doux et improvisé, is a throwback to the emotional world of the
'Psalmodies'. Its simple melodic statement of the row in retrograde is followed by a second phrase where the technique derived from Messiaen of intervallic expansion is applied. The texture is evocative of a flute solo with accompaniment, but nonetheless, it is subtly linked with the two preceding pieces by the intervals of its opening phrase, and decorative grace notes (compare the E-natural - E-flat grace notes of piece five with the B-natural - B-flat figurations of the preceding piece). If there are no obvious links between the virtuosic sixth piece and the preceding ones, then its boldly imaginative use of overlapping forms of the series links it with the opening of the next 'Notation', where the 'combinatorial' treatment of the C-sharp - G-natural tritone common to P0 and P6 forms the motivic basis for the entire piece. The harmony of this seventh piece consists simply of two alternating dyads, a device repeated in the eighth 'Notation', where the alternation is between a six-note chord and a four-note chord. The links however are on a more fundamental structural level: the six-note chord not only contains within it the notes of two dyads on which piece seven is based - B-natural - F-sharp, and C-natural - F-natural, but the four-note chord of piece eight is a transposed version of the 'prime' notes of the six-note chord - G-sharp - A-natural - D-natural - E-natural = F-natural - F-sharp - B-natural - C-sharp. The pivotal function of this six-note chord is again emphasised at the start of the ninth piece, the first four notes of which reiterate pitches drawn from the six-note chord. Whilst the ninth piece is a contrast in character to the moto perpetuo of the preceding piece, its solemn drum beats in the bass suggest a link with the ethnically inspired 'Afrique' (no.8). After this rather derivative group of pieces, the last three of the set are perhaps the most individual of all. Their placing on a separate sheet of manuscript indicates that they may well have been composed after the other pieces: certainly the style is more uncompromising, and the use of serial technique more flexible with free use of permutation. No.10 is particularly notable in this respect, and its breaking down of the row
into a series of intervalltic relationships anticipates the seemingly sudden emergence of a radical musical language in the works of the following year. The more rhapsodic manner of no.11 conceals the strictly palindromic organisation of pitch and rhythm, and - in anticipation of an extension of serial technique adopted by Boulez in later works - inversion of registers. One of the few clues provided by the manuscripts in Basel concerning the chronology of the 'Notations' is an erased opening to this piece, beginning in much more conventional twelve-note manner with a melodic statement of the row in the right hand commencing with note 11, and continuing in two-part counterpoint with the left hand entering canonically with P11. The final piece continues Boulez's increasing realisation, albeit still half-formed, of the extent of the possibilities offered by serialism. It is loosely palindromic in its rhythmic gestures, but the pitch content is based on the two chords heard at the opening, and their various transpositions. The closing four bars recapitulate the opening chord sequence (a miniature color against the rhythmic talea), before a final thud on the bass drum recalls the end of the second and ninth pieces, two of the more traditional numbers in the set. Taken as whole, the 'Notations' stand at the crossroads of Boulez's development; we see him experimenting in various ways with a pitch structure affording him possibilities for rigorous organisation much greater than that found in the music of Messiaen, and yet at the same time struggling to reconcile this serial technique with the liberating approach to rhythm derived from his teacher. This struggle, with the first hints of a realisation that serial technique could be used in the linking of larger structures, was to dominate Boulez's thinking over the remainder of the decade.
SONATA NO.1

At this point, Boulez's music enters the public domain, with the appearance of the Flute Sonatina, composed in January and February 1946, immediately after the orchestration of the 'Notations', and followed by the First Piano Sonata completed in June of the same year. A detailed analysis of either this or of the Second Sonata, completed two years later, would be far beyond the modest scope of this chapter, the purpose of which is to sketch a context for a consideration of the Third Sonata. Both works have been the subject of detailed commentaries by eminent Boulezians, so the intention here is simply to review, and occasionally to supplement, the observations of others. Gerald Bennett, having noted that in the Flute Sonatina, "Boulez has chosen to work further on ideas he found in Webern, and it was this that necessarily moved him away from Messiaen's world" (18), comments on the more traditional features of the work, including its use of thematic writing and elements of traditional form. However, the First Sonata "moves decisively away from thematic writing and towards new kinds of relationships between structures" (19). In attempting to articulate the nature of these relationships, Charles Rosen draws attention to another novel aspect of the piece, and indeed of Boulez's music in general, namely the preoccupation with musical space: "The First Sonata treats the series as a nucleus to be exploded, its elements projected outwards; this particular spacial metaphor, indeed, remains present in most of Boulez's later works" (20), and he goes on to note how Boulez uses diffusion of texture as a means of resolution. Both Bennett and Rosen echo, in less precise terms, one of the premises of Boulez's article, 'Propositions', originally published in 1948, in which he attempts to identify rhythm and register as potential generators of musical form. The article, Boulez's first foray
into polemics, was provoked by his disagreement with Leibowitz concerning the necessity of treating rhythm as an independent musical component. In the course of tracing the evolution of rhythmic technique in twentieth century music, Boulez broadens the discussion into a brief consideration of texture before moving on to discuss the importance of register, suggesting that it can be used to replace tonal functions: "Il me paraît impératif que, dans la technique de douze sons, pour obtenir une sorte de valeurs correspondant aux valeurs tonales, telle que la modulation, on doit avoir recours à des procédés totalement différents et fondés sur la mobilité des notes ou leur fixité. C'est à dire que dans la mobilité, chaque fois qu'une note se présentera, ce sera à des registres divers" (21). The point is particularly significant in the context of this, Boulez's first major article, which draws its musical illustrations from the works of the previous two years Robert Piencikowski, that most erudite of Boulez scholars, summarises succinctly the nature of the stylistic advances articulated in the First Sonata: "Les figures thématiques cèdent la place à des cellules mélodico-rhythmiques à caractère motivique: la raréfaction partielle de la texture tend ainsi vers un athématisme plus affirmé, que souligne le refus manifeste de toute répétition littérale" (22).

It was M. Piencikowski who generously drew my attention to the availability of manuscript sources relating to the First Sonata, material which, surprisingly, seem to have had virtually no critical examination. The relevant holding in the Paul Sacher Stiftung consists of a single page containing the opening bars of the first movement, a more extended six-page uncorrected draft of the opening section of the first movement, and most importantly, a copy of the corrected draft of the entire work, the original of which is housed in the Bibliothèque Nationale, Paris. The following discussion offers only an outline consideration of this revelatory material in relation to the critical commentaries in the preceding paragraph. It is entirely based on a comparison between the published score and the Paris manuscript, which
Despite being a corrected copy, contains numerous deviations from the final version, suggesting that there must have been a further stage of revision and pruning prior to publication. This manuscript gives every appearance of being a working copy, with fingerings and divisions of parts between the hands marked, suggesting that it may even have been used for a 'try-out' performance prior to the final revision.

A comparison of the two versions of the first movement is most revealing. All commentators have rightly focussed on the radical elements in the musical style, although Rosen notes more conservative features, drawing attention to the A-B-A-B-A structure of the movement, and perceptively observing: "Denying a generating power to the motives, yet still employing them as basic to his texture, Boulez is forced in this work to use a kind of passive form, a technique of juxtaposition that derives most obviously from Messiaen"(23). It is not clear whether Rosen was aware of the manuscript sources at the time of writing: there is a throwaway remark concerning an earlier version of the opening of the second movement, but no indication that he was acquainted specifically with the Paris manuscript. Under the circumstances therefore, his reference to Messiaen is, in a broader context, remarkable intuition. A comparison of the draft with the final version reveals few discrepancies in the Beaucoup plus allant sections (B), but some quite remarkable changes in the alternating Lent sections (A), which frame the movement. Commentary is almost superfluous when the two versions of the opening Lent are placed side by side. Even on a superficial level, the final version (Ex.1.20), consisting of forty-five bars, is a much more concise statement than the unedited Paris manuscript (Ex.1.21), comprising seventy-six bars: even allowing for the cuts, shown in my example by square brackets, the manuscript version is considerably longer than the published edition. More remarkable still, however, are the details which emerge in an examination of the draft version. The Lent itself was originally to have consisted of two
alternating tempi, crotchet = 58 and quaver = 96, not in themselves greatly divergent, but of contrasting musical character. The work was to have opened with a chromatic ostinato consisting of the three lowest notes on the piano, a stylistic trademark of the earlier Paris piano music, and its recurrences were to have unified the movement. There is virtually no trace of this miniature cluster in the final version, and its excision alters the piece in a fundamental way. If, as an experiment, one restores the cluster repetitions, the movement loses much of the innovatory impact as described by the various commentators. Why should this be so? Perhaps it is the case that the ostinato patterns provide a sense of regular pulse, totally absent from the Lent sections in the published version. Furthermore, although in terms of pitch these are the most neutral, quasi-percussive notes on the instrument, their continual presence in the background provides reference points against which to measure the use of the technique of intervallic displacement applied elsewhere. Remove the clusters, and the sense of diffusion, which Rosen identifies as one of the principal characteristics of the early works, becomes once more a dominant element in our experience of the piece. These drum-like clusters are, of course, a feature of Messiaen's piano writing, as is the opposition of pairs of adjacent semitones which appear in bar four of the Paris manuscript - the layout and intervallic content of this passage is identical to that found in the most Messiaenic of all Boulez's works, the first page of 'Psalmodie 1'. Continuing with the examination of the two versions of the First Sonata, it can be observed that although Boulez made many changes of detail in the crotchet = 58 sections, it is in the alternating quaver = 96 sections that the most drastic changes are found: indeed whole passages are simply excised completely from the final version. An example from near the beginning is the elimination of bars 11-16 of the Paris draft. Examination of this and other similar passages shows that not only are they unified by two-part textures of the type that Boulez had employed at times in the 'Psalmodies',
but that the writing is comparatively conservative, and melodically conceived: indeed the first two such passages lay bare their serial origins in the chromatic scale with a directness which from now on is eliminated from his music. It is thus ironic that the First Sonata has evolved from precisely the kind of traditional references which Boulez is praised for having eliminated. Certainly an elimination has quite literally taken place, but few can have suspected the extent to which this radical work has been forged by a process of ruthless purging of elements which had been accommodated within his style up to this time. The opening page of the Paris version reveals another connection with the student works, which may be just a coincidence (although I think not): the first phrase of two-part texture begins (bar 6) with a four-note motive, G-natural - F-natural - F-sharp - D-natural, which is a transposed version of the opening of 'Psalmodie 3'. As we have seen, this melody is modelled on a Honegger piece which itself is based on an aria from the St. Matthew Passion, and Boulez, although retaining this motive in the final version of the First Sonata (bars 3-4), goes to great pains to disguise its melodic origins by means of octave displacement. The final version, by eliminating the accompanying pedal points of the Paris draft, cuts itself free of the last remaining constraint: now it was possible to exploit register as a compositional device in precisely the manner which Boulez was to advocate in his article two year later.

As Rosen points out, the opening of the second movement provides a striking example of the technique of registral displacement, the more so since the pitches themselves are a straightforward exposition of the series. He goes on to make the puzzling aside, "The fact that in an earlier version the spacing of the first example was not nearly as wide as the published form only confirms the implicit presence of the serried form in the dispersed final version" (24). It is evident that Rosen must have had sight of some material additional to that considered here, and possibly a still earlier draft, since the Paris version, far from reducing
the intervallic displacements, emphasises them by octave reinforcement (Ex.1.22). As in the opening movement, the revisions in the final version of the second movement relate to the slower sections: the *Rapide* passages evidently reached their final form early in the compositional process. One detail is however worthy of comment: the climax of the first such *Rapide* passage is marked by four *sfz* notes. With remarkable intuition, Rosen writes: "Here the *sforzandi* are grandly rhetorical as well as functional, and the barlines try in vain to obscure the fact that there are six regular beats between each note of the motif" (25). What he was (presumably) unaware of is that the Paris manuscript adds the injunction, "faire entendu la thème en *sfz*". The reference to a "theme" is deleted in the final version, thus obscuring the fact that these climactic notes, E-natural - D-natural - E-flat - B-natural, are those of the haunting Bach-Hongger motive from 'Psalmodie 3', already quoted in the Paris version near the opening of the work. That these cross-references exist is no longer surprising given what we now know about the chronology of the works: although the stylistic gulf between the 'Psalmodies' and the First Piano Sonata is an enormous one, Boulez was continuing to revise the 3rd 'Psalmodie' as late as November 1945, whilst the Paris draft of the Sonata dates from as early as February 1946. Bearing in mind that he was also working on both the Flute Sonatina and the 'Notations' at this time, it is entirely natural that there should be such links between the works. The more one is able to deduce about Boulez's working methods in general, it becomes clear that, in common with other great composers, the simultaneous composition of a range of projects has been a continuous creative stimulus. The evident need for this state of creative flux both obscures the chronology of his music whilst at the same time helping to account for his increasing reluctance to release completed works.

After the climax of the first *Rapide* section, the Paris manuscript of the second
movement continues with a passage marked Lent, and consisting of some eighteen bars which are eliminated from the final version (Ex.1.23). The texture here recalls that of the two-part writing in the first movement, with its directly expressive melodic lines, and indeed it commences by quoting in inversion bars 11-12 of the Paris draft of the first movement. A new four-note motive, G-natural - F-sharp - C-natural - C-sharp, assumes great prominence in the ensuing passage. It is tempting to compare the defining semitone and augmented fourth intervals of this motive with those of bar 6 of Honegger's 'Lamento', which is followed by the entry of the baritone soloist with the words, "Remember me, Lord, for I am dust and I will return to dust". Be this as it may, the passage is strikingly expressive, and Boulez allowed only hints of these melodic origins to survive in permutated form in the final version. Much of the remainder of the movement proceeds with only minor discrepancies between the two versions, although the Paris manuscript sheds light on one of the notational problems to which Rosen refers. The metronome mark of quaver = 152 on page 15 of the printed score appears as dotted quaver = 152 in the Paris manuscript, which corresponds to the dotted crotchet metronome mark of the first Rapide section. If we take the Paris metronome mark as being the correct one, then the notation in semiquavers rather than quavers of the Rapide material on its return a few bars later may be inconsistent in notation but is nonetheless accurate in temporal proportions. The other notational problem raised by Rosen concerning the inconsistencies in the last three lines of the piece is more difficult to resolve: as he points out, the direction Rapide apparently applies to fragments of material drawn both from the original Rapide section (now restored to quaver notation) and from the opening Assez large. Common sense on the performer’s part provides the practical solution, but examination of the Paris manuscript sheds interesting light on the reasons for the problem. It turns out that Boulez cut a considerable section of some sixteen bars prior to the final Rapide. This enlarged coda has
much more the character of an epilogue than the final version with its abrupt dispersal of material (Ex.1.24). The Paris version begins, as had the first movement, with the direction Lent, and quotes directly from the opening of the work. It continues, nu, dépouillé, with a resumption of the characteristic two-part texture, in which the 'Lamento' motive appears prominently in prime and freely permuted forms (one is tempted to cite the coda of the Second Sonata with its parallel use of the BACH cipher). After this intensely expressive music, the mark Rapide for the final section was perhaps intended more as an indication of change of mood than of tempo - that is to say it marks the structural division from the Lent reminiscence to a resumption and peremptory dismissal of the principal material of the second movement.

Pertinent to a consideration of the genesis of the First Sonata is the account given by Joan Peyser (26) of an interview with René Leibowitz a few weeks before his death in 1972. It will be recalled that Boulez was still receiving instruction from Leibowitz in twelve-note technique at the time of the composition of the First Sonata. According to Peyser's account, Leibowitz was the intended dedicatee of the Sonata, but, when Boulez presented the score to his teacher, the result was a heated exchange and the withdrawal of the dedication, after Leibowitz attempted to correct the manuscript in red pen. Unfortunately there is no record of the precise date in 1946 of this incident, but it must have taken place before the work reached its final form, since it was eventually published some five years later in 1951. By then, Boulez had left the style of 1946 far behind, and it is perfectly possible that the radical revisions which resulted in the final version were in part a reaction by Boulez to an incident which must have affected him deeply.
SONATA NO. 2

The immediate response to the Leibowitz incident was the commencement of a new piano piece, entitled 'Variations-Rondeau'. Two drafts of this piece are found in the Paul Sacher Stiftung, the earlier one lacking marks of dynamics and articulation. The later draft is dated May 1946, and includes a dedication page "à A. Vaurabourg-Honegger". What could be a more natural reaction on Boulez's part than an attempt to eradicate the memory of the Leibowitz episode by making a fresh start, dedicated to his other teacher? The title indicates that the movement was originally conceived by Boulez as a separate piece, but it was eventually to become in revised form the third movement of the Second Sonata. These early drafts of the 'Variations-Rondeau' are thus a fascinating link in Boulez's stylistic development between the first two sonatas. The May 1946 draft is a copy of the earlier draft with a few minor excisions of material similar to those marked in the Paris manuscript of the First Sonata, and with the addition of marks of dynamics and articulation. The overall form of the piece is essentially fixed at this stage, consisting of three modified returns of the brief opening Scherzo section, marked Moderé, presque vif in the published version, and separated by somewhat more extended episodes. The first draft of the 'Variations-Rondeau' provides labels for this sectional structure: the episodes were conceived as 'Variations' but interestingly, the first return of the opening section is marked, "Deuxième Répons Rondeau Retrograde contraire". This confirms the conscious nature of Boulez's serial thinking with regard to structure as early as 1946. One of the most striking features of the Second Sonata is the way in which the serial processes begin to invade the formal parameters. Thus the four statements of the scherzo material consist of freely interpreted versions of the four basic serial shapes: successively, prime, retrograde inversion, inversion, and retrograde forms of the material.
The drafts for the 'Variations-Rondeau' are almost identical to the final form of the third movement of the Second Sonata except for two details: the close of the third Moderé, presque vif section is extended in the earlier versions to almost double its length by the addition of eight bars in which the material is subject to still greater fragmentation and registral displacement (Ex. 1.25). The confusing reduction to semiquaver values at this point is explained by its function as a transition passage to the semiquaver notation of the ensuing third variation (Ex. 1.26). This is the one section of the 'Variations-Rondeau' that was totally recast in the published version of the sonata. The motoric textures of the original, recalling the sixth 'Notation' and the Rapide sections of the second movement of the First Sonata, are recomposed into a more compressed, polyphonic form in the final version, resulting in a passage of daunting complexity even judged by the standards of this most demanding of works.

Even more than is the case with the First Sonata, a detailed examination of this massive score would be far beyond the scope of the present study. Suffice it therefore to begin by echoing Boulez's acknowledgement of its pivotal position in his development:

"It was probably the attempt of the Second Viennese School to revive older forms that made me try to destroy them completely: I mean I tried to destroy the first-movement sonata form, to disintegrate slow movement form by the use of the trope, and repetitive scherzo form by the use of variation form, and finally in the fourth movement, to demolish fugal and canonic form. Perhaps I am using too many negative terms, but the Second Sonata does have this explosive, disintegrating and dispersive character, and despite its own very restricting form, the destruction of all these classical models was quite deliberate. After the Second Sonata I never again wrote with reference to a
form belonging to the past. I have always found one that came with the idea of the work itself" (27).

Earlier in the same discussion, Boulez is more specific about the means by which he attempted to "destroy" sonata form:

"I was also interested in a form of expression that would establish a contrast between a style based on thematic motifs and an atheomatic one; in other words, I think of a theme as an accumulation of possibilities, but at the same time for the development sections of this sonata movement I wanted gradually to dissolve the rhythmic cells, to draw attention more to the rhythmic elaboration than to the intervals, whose function now is secondary" (28)

The first half of this statement is resonant with parallels concerning the First Sonata, since it is a succinct description of the differences between the Paris version, with its thematic passages, and the published version with its ruthless elimination of such traditional elements. No wonder that the first movement of the Second Sonata conveys an impression of unprecedented violence, as these two diametrically opposed principles, symbolising Boulez's classical heritage and his search for new means of musical expression, are hurled into open conflict. The second half of the statement shows how the conflict with Leibowitz, regarding the independence of rhythm as a musical component, continued to fester in the background to the composition of the Second Sonata. In 1947, whilst Boulez was engaged on the piece, Leibowitz published his influential book, 'Schoenberg et son École', the first detailed technical study of the music of the Second Viennese School, in which he asserts:

"...I should like.... especially to emphasise that the genuine polyphonic tradition does not admit the idea of rhythm for its own sake. Rhythm is merely an element which is produced spontaneously by horizontal and vertical sound-
forms because it articulates the unfoldment of these forms in such a way that
musical speech would be impossible without it" (29)

Boulez's rage was to boil over in the following year, with the publication of the polemical
'Propositions': in the meantime, the emotions are channelled into the Second Sonata.

The nature of the conflict with Leibowitz helps to account for an unlikely
friendship which was struck around this time. In 1949, John Cage visited Paris for the first
time, and his open advocacy of rhythm as a prime means of musical expression must have
been reassuring for Boulez. A direct practical result of their association was that Cage was
able to facilitate the publication of the First and Second Sonatas by introducing Boulez to
Amphion and Heugel. In return, Boulez expressed his gratitude by giving Cage a signed copy
of the Second Sonata "en souvenir de votre visite à Paris... avec beaucoup d'amitié".

The sketches for the Second Sonata, at least for the time being, have been
dispersed, and gradual reassembly of all the source material for this work must be regarded
as an urgent musicological task over the next few years. It has not been possible to inspect
the original of the manuscript dedicated to Cage, which is now in the John Cage Archive,
New York, but a copy (incomplete?) is available in the Paul Sacher Stiftung, consisting of
part of the Scherzo, and a section of the slow movement, dated November 1947. As well as
a further copy of movements 1, 2 and 4, the Boulez archive in Basel also contains five pages
of sketches for the Second Sonata. Some of these photos are all but illegible, but for the first
time in Boulez's output, we have available a complete set of row tables. These reveal some
aspects of his working methods at this stage in his career. Thus the chromatic ordering of
the transpositions suggests that despite Boulez's liberation of rhythm in the Second Sonata,
it had not yet occurred to him to link rhythm and pitch serially by numerical means: this
extension of serial principles, influenced by the appearance of Messiaen's 'Mode de Valeurs
et d'Intensités' in 1948, and the example of Cage's structural use of numerical patterns, was still a few years away. The series relating to the second and fourth movements (Ex. 1.27) is free of annotations, but that for the first and third movements shows the direction of Boulez's thinking in its linking of pitch cells in permutated form by means of horizontal brackets (Ex. 1.28). Various commentators have attempted some analysis of the pitch structure, notably Dominique Jameux (30). Evidently Jameux did not have any access to unpublished material, since his assumptions concerning the basic ordering of pitches are inconsistent with those of the sketches. Nonetheless, his commentary does address the technique of serial permutation, and remains the most detailed consideration of this aspect of Boulez's technique in the Second Sonata. Interestingly, Joan Peyser's identification of the ordering of the two twelve-note rows is consistent with that of the sketches (31), yet contains little detailed analysis to confirm her assertion that, "Underneath the leaping configurations, the work is organised as precisely as a medieval motet". Her identification of the use of the BACH cipher on the final page of the work is identical in its annotations to that of Jameux (32), and again raises the question of serial permutation and its application in the Second Sonata. To do justice even to this aspect of such an enormous work would be a study in itself, and the intention here is certainly not to denigrate the efforts of previous commentators. An examination of Boulez's annotations of Ex. 1.27 does provide some clues as to the serial processes. By coincidence, the segmentation of the row marked by Boulez, consisting of the note groupings 4-1-4-3, is identical to that used in 'Trope' from the Third Sonata, although the exploration of the structural implications of such segmentation in the latter creates a new dimension to his application of serial processes. In the Second Sonata, the first four-note cell, consisting of the notes D-natural - A-natural - D-sharp - G-sharp, is found in permutated form in rows 1, 7, II, and VIII, and identified by him with horizontal brackets (refer to Ex. 1.28). From this,
one may deduce that groups of interlinked rows exist:

1 7 II VIII
2 8 III IX
3 9 IV X
4 10 V XI
5 11 VI XII
6 12 VII I

This in itself creates further possibilities, with the linked rows being at the interval of a tritone. Closer examination of these tritonal transpositions reveals a second pitch convergence involving the other four-note cell, consisting of the notes E-natural - F-sharp - B-flat - C-natural. These are found in permutated form in rows 1, 7, I and VII, and are again clearly identified by Boulez with brackets. Turning to the opening of the first movement, it is possible to demonstrate how the huge opening gesture, with its direct reference to both the 'Hammerklavier' Sonata and to BACH, is based on the exploitation of these tritonal transpositions (Ex.1.29). Rosen draws attention to this direct quotation from the 'Hammerklavier' Fugue, and the parallel with Beethoven's attempt to break free of the boundaries of classical form: "Boulez's Second Sonata aims both to conquer and transcend the Academy" (33). Having discussed the retrogressive tendencies in the work, he goes on to note the innovations with regard to rhythm: "There is a dramatic use of certain rhythmic conflicts which temporarily annihilate a sense of metre" (34). Paul Griffiths supplies an example of such rhythmic conflicts in the context of the pitch cells of the first movement (35). He rightly emphasises the use of cellular rhythmic techniques derived from Messiaen, Jolivet, and Stravinsky, and the way in which their use provides a parallel with Boulez's cellular treatment of twelve-note technique, and goes on to assert that, in the Finale, "Boulez
would appear to be working his way towards a treatment of duration which can be assimilated to serial organisation" (36). Confirmation of such hypotheses must await the reassembly of the detailed sketches for the work: for the present, one can only express astonishment that such a comprehensive mastery of serial principles has been achieved by Boulez within a space of three years.

Whilst a number of commentators, echoing Boulez, emphasise the aesthetic of annihilation which is present in his music at this time, it is equally important to note that the Second Sonata contains many of the elements which shape his thinking over the next decade. Thus an increasing awareness of the structure of individual components of sound is revealed in the second movement with its "use of the rhythm of release of notes as well as of their attack" (37), an anticipation of techniques more fully explored in 'Constellation', the central movement of the Third Sonata. The structural deployment of the concept of the trope is a further link between the two works, although its use in the earlier work is still on a one-dimensional level as a series of insertions: Boulez was to extend the technique to encompass the serial processes themselves in the Third Sonata. It is well known that the Second Sonata closes with references to the BACH motive, but less known is the recurrence of the same motive in the Third Sonata, albeit in more disguised form.

This necessarily inconclusive survey of the early piano works at least provides a context in which to consider Boulez's subsequent stylistic development. His mastery of twelve-note technique is already beyond question, and his quest is for a means of integrating the various musical parameters. Messiaen's 'Mode de Valeurs' suggests a way forward, and the serial integration of pitch and rhythm is finally achieved in 'Structures la' in 1951, with its adoption of a 'chromatic' duration series derived from the pitch series. The mechanistic aspect of this piece, following Ligeti's painstaking analysis (38), has been the focus of most
critical commentary, although as Griffiths points out, Boulez allows himself some creative freedom in employing, "...a palindromic arrangement of tempos, an increasing and increasingly stable density, and a variation in the fixing of pitch classes to particular registers" (39). The piece is a preliminary essay in the techniques of serial integration, and as such provides a challenge which was to occupy Boulez throughout the 1950s: to rediscover the creative freedom of the works of the previous decade in the context of a unified serial world.
REFERENCES

(4) Glock, p.42
(5) "I thank you kindly for having given me first refusal, by your letter of 11th June, concerning the future auction of one of my manuscripts. 'Truth to tell, I find that this old piece must live its own existence; it has already been left me a long time... It would have been like trying to graft a dead leaf on to a still living tree!". (6) Glock, p.52
"Of Schoenberg, at that time, I knew very little, precisely two works, both from the atonal period, not yet serial: 'Pierrot Lunaire' and the Three Pieces opus 11. When I composed the 'Three Psalmodies' I wa ignorant as to the existence of serial music, but I had the very clear sentiment of the necessity of atonality". (8) Glock, p.46
(9) I know the spring where I shall go
To cool my burning eyes.
The sacred wood; I know the way,
The leaves, the cool of its green glade;
I shall go there at night when all is still,
And the soft air invites us more to sleep than love.
Cold spring, into whose depths
The whole night will sink!
Iced water where the transparent moon
Will re-appear, shivering and white! Fountain of purity!
Shall I not find once more in the coming dawn
The charm it had when I could still behold with wonder
Daylight and all the world of things?
When I go there to cool my burning eyes.
(10) "...I believe the path I follow is my path and that I follow it as I should. A vast confidence has become habitual to me which would be called faith, if I had subscribed to any vows".
(11) "You cannot imagine, Nathaniel, the effect produced by this saturation of light, and the sensual ecstasy that comes from this persistent heat... An olive branch in the sky; the sky above the hills; the song of a flute at a café door".
(12) Telephone conversation, July, 1996.
(13) 'Conversations with Célestin Deliège', p.30
(14) Glock, pp.45-48
(15) Ibid, pp.54-56
(17) Ibid, p.48
(18) Glock, p.57
"In order to obtain with twelve-note technique a value that corresponds to tonal values such as modulation, it seems to me imperative to resort to quite different procedures based on the mobility or fixity of the pitches. Mobility means that each time a note occurs it will be in a different register."

"Thematic shapes give place to melodic-rhythmic cells of a motivic character: the partial rarefaction of the texture thus adds to the tendency to athematicism, which the manifest rejection of all literal repetition underlines."

"Conversations with Célestin Deliège", p.42


"Die Reihe", no.4 (1958) Vienna, Universal Edition

"Modern Music", p.58
CHAPTER TWO

THIRD SONATA: A REVIEW OF PERFORMANCE AND RECEPTION HISTORY

For the fourth season of the concerts of the Domaine Musical in Paris, Boulez announced his intention of writing a new piece for flute and instrumental ensemble to be entitled 'Strophes'. The première was to take place on the 30th March 1957, the week of Boulez's thirty-second birthday. However, by the time the programmes were printed, the flute piece had been replaced by a new sonata for piano, his third. In the event, neither piece was finished, and the Flute Sonatina of 1946 was played instead. It may be noted in passing that it would have been unprecedented for Boulez to use the forum of the Domaine Musical as a platform for the première of one of his own pieces. Despite his growing international reputation following the success of 'Le Marteau sans Maitre', Boulez steadfastly refused to promote his own music in this way, and whilst his music did feature in the programmes of the Domaine Musicale (fifteen performances during the fourteen seasons of Boulez's direction), these performances invariably took place after a work had been premiered elsewhere. The projected flute piece was eventually revised and incorporated in the first movement, 'Don', of 'Pli Selon Pli', although a twelve page sketch of the original score survives.

The sonata, however, has had a much more complex history of both composition and performance. Within a few months of the Paris announcement, Boulez himself gave the first performance of the piece as Darmstadt on 26th September 1957, and a further performance was planned for Berlin later in the year. Boulez introduced the work to Paris the following year in the last concert of the Domaine Musical season on 1st March 1968, in
which he also directed Varèse's 'Intégrales' and 'Octandre' for the first time. This Paris performance was a useful preparation for an event of greater international significance: the Cologne concert on the 28th March which included the première of Stockhausen's 'Gruppen'. It is from this point that we can begin to trace in more detail the performance history of the Sonata, since a studio recording has survived. Boulez presented all five movements of the piece on these occasions, and the recording shows him to be adopting the order Constellation-Strophe-Séquence-Antiphonie-Trope. As we will see, this ordering was probably seen by Boulez as a temporary expedient, forced on him by the still fragmentary state of three of the movements. It is clear from the extent of the surviving sketches that he had every intention of finishing the piece. Despite the rather unbalanced shape of the work in this form, with three miniatures placed in between the two completed Formants, the critical reception was nonetheless favourable, to judge from a review of the Paris performance by Claude Rostand, published in 'Melos', December 1958. He described the piece as being among the most "interesting and arresting works of contemporary literature", and continued: "It seized the listener above all by its unusual abundance of sonorities and new use of extraordinary piano possibilities. Striking and - measured against earlier pieces by the composer - unusual, is the strong dramatic and dynamic momentum of the work".

Despite the positive tone of these comments, the work was withdrawn after these early performances in order to revise 'Antiphonie', 'Strophe', and 'Séquence'. The two movements which had already been completed, 'Trope' and 'Constellation', were published by Universal Edition in 1961 and 1963 respectively, although 'Constellation' was printed in its alternative version, 'Constellation-Miroir', in which the order of the six sections is reversed. Since then, only one short section, 'Sigle', itself an excerpt from 'Antiphonie' has appeared in print as part of an anthology, 'Styles in Twentieth Century Piano Music' (U.E.12050, 1968).
Even this is not a performing version, since the necessary page divisions are not indicated.

Among the critical responses to the publication of 'Trope' was a sympathetic and perceptive article by Nicholas Maw, 'Boulez and Tradition' (Musical Times, March 1962). Noting that the piece shows "a renewal of the brilliance of the two earlier piano sonatas, with more concentration on the material and less striving for effect", he proceeds to a discussion of the ordering of the four sections. Likening the movement to a sonata structure in which 'Texte' is the exposition, 'Commentaire' and 'Parenthèse' developments, and 'Glose' "the break-up or coda of the material", he draws an illuminating comparison with the four 'Bourreaux de Solitude' movements in 'Le Marteau sans Maître': "Elements are introduced, mingled and built-up until finally a statement is made. Then the whole edifice is taken down again". Maw goes on to express reservations about the elements of choice in 'Trope': "At a guess I would say that Boulez started with the 'Texte' section and through-composed the whole movement from there. He does not, however, wish the audience to listen to it that way". This is debatable, since, as we will see, the sketches make it clear that the concept of choice informs the structure on a number of levels. Nonetheless, the article is an important contribution to the initial responses to the sonata, and its positive tone is a sharp contrast to the reaction which greeted the publication of 'Constellation-Miroir'. This took the form of an editorial in 'Music and Letters', July 1963, castigating the layout of the printed edition, and complaining that, "Throughout the entire piece no instruction is given as to the order in which the fragments are to be played, what the arrows mean, or why the music is printed in two colours". The anonymous author continues, disingenuously: "I hope the more fiery members of the avant-garde will not hastily assume that I am expressing any judgment about the music. I am unable to do so, as I cannot read it".

Nevertheless, performers were not slow to respond to the challenges
presented by the already notorious score. Among the first was the distinguished Belgian pianist Marcelle Mercenier, who performed the Constellation-Miroir at a Domaine Musical concert on 24th April, 1963. The programme also included Xenakis's 'Herma', which was given a dazzling performance by the eighteen-year-old Georges Pludemacher. It was perhaps as well that Boulez was unable to attend the concert because of a three month absence at Harvard University during the spring of that year. Given his unsuppressed antipathy towards the music of Xenakis, the account he received of the event from Suzanne Tézenas in a letter of 4th May must have been particularly galling - the "mediocre" performance by Mercenier of his own piece was in sharp contrast to the success enjoyed by Pludemacher, about whose engagement Boulez had expressed reservations (letter of 16th April to Suzanne Tézenas).

The first performance in the United States was given in Los Angeles at the Philharmonic Hall on 5th February 1962 by Leonard Stein, the pianist/musicologist who was later to become President of the Arnold Schoenberg Society and Editor of sections of the Complete Edition. A curious feature of this performance, according to a review by Albert Golding in 'Musical America', April 1962, was that Stein apparently performed "the first three movements, or 'formats' [sic] as the composer calls them". Since the performance predated the publication of 'Constellation-Miroir' it was likely that Professor Stein had been in direct contact with Boulez, and conceivable that he was able to obtain from the composer permission to perform one of the unfinished formants. My preconception was that it was unlikely that more than two movements were performed at the American première, given that such close associates of the composer as Mercenier and Rosen performed only the two published movements during the 1960s. A more plausible explanation seemed to be that Constellation-Miroir was assumed by an unsympathetic
reviewer to be two separate movements. Hence my surprise when Leonard Stein was able to confirm in a letter to the author, dated December 19th, 1995, that he had indeed performed 'Antiphonie' during his tour of 1962 in addition to the two published Formants. He related in a subsequent telephone conversation (3.1.96) that he had written to Boulez expressing an interest in the piece, and had received photocopies of three movements. He had delayed performing the piece until after Boulez's performance in Cologne, partly because of various textual uncertainties. It was his belief that Boulez had made some subsequent adjustments to tempo marks in 'Antiphonie', but he was not certain of the details. After his own first performance of the piece, he apparently gave approximately six performances, all in the USA, including one at Harvard University, where he was coached by Boulez. This must have taken place in Spring 1963, during Boulez's three month residency at Harvard, and at a time when he was engaged on the third stage of work on 'Antiphonie'. Leonard Stein's comment that, "He seemed more interested in the piano harmonics...than in the tempi", anticipates the approach in Boulez's introduction to Charles Rosen's performance at the Queen Elizabeth Hall, London, where he is at pains to draw attention to the sonorous aspects of the score, and away from the issue of formal mobility. Generously, Leonard Stein looked up other details concerning the première in answer to my subsequent enquiry, and confirmed that he was able to work from a photo of the original manuscript of 'Constellation' before going to Europe in 1961, and that he possessed a pasted-up proof of the first edition, marked 'Miroir' (1). It was this copy that he was likely to have used for the première in 1962. In any event, the impression left by the sonata on this occasion, at least on Albert Golding, was "much like Webern with a bit more meat on the bones".

The New York première followed later the same year on November 13th at the
Town Hall, the pianist being Charles Rosen who was to become more associated with the piece than any other interpreter, being responsible for the first commercial recording made in 1972 "under the composer's supervision". A curious feature of Carl Sigmon's review in 'Musical America', January 1963, was his failure to respond to the novel sonorities of the piano writing: "In one hearing I could not understand the 'disintegrated' rhythms and melodies, the groggy and scratchy sounds interspersed with silence: but I was definitely unhappy at Boulez's tendency to reject sound as sound".

It was Rosen who gave the first U.K. performances of the two published Formants in separate broadcasts, 'Trope' being heard in May 1963, and 'Constellation-Miroir' the following year in a live concert performance given on 31st March 1964. This performance predated by less than two months the first public performance in London of 'Constellation-Miroir', given at the Wigmore Hall on 25th May by Robert Sherlaw Johnson. In a sympathetic review in 'Music and Musicians', August 1964, Bernard Jacobson attempted to define the stylistic roots of the music: "Beside the fertile exuberance of Messiaen, Boulez, himself a richly imaginative and expressive composer, emerged as a paragon of restraint, intellectual distinction, and the kind of sensibility usually, with little justification, called Gallic".

Both Rosen and Mercenier gave further BBC performances, Rosen's broadcast on 17th June 1970 of both published formants being a recording of a concert at the Queen Elizabeth Hall at which the performance was introduced by the composer, and Mercenier's consisting of a studio recording of 'Constellation-Miroir', broadcast on 14th December 1971.

It is instructive to compare these various broadcasts with one another, with Rosen's commercial recording of 1972, and with Boulez's own 1958 recording. A
prominent typographical error in the printed edition of 'Constellation-Miroir' is the erroneously notated final note: B-double flat instead of the correct B-flat, an error which found its way into many performances (including my own) until the revised edition, edited by Robert Piencikowski, corrected this and a few other less prominent misprints. Boulez himself plays the correct B-flat, but since he alone of these early interpreters plays the unpublished forward version of 'Constellation', the note is much less prominently positioned near the beginning of the movement (It should be noted in passing that the mirror version simply reverses the order of the six sections, and does not affect the internal ordering within individual sections). Both Mercenier and Rosen (twice) in their BBC broadcasts play the erroneous final note, a particularly remarkable fact in the case of Rosen's 1970 performance, given in the presence of the composer: the error was only corrected in the 1972 recording.

Despite the generally ignorant tone of the 'Music and Letters' editorial cited above, it does raise the important issue of the practicalities of reading the score and realising a performance. Boulez, Mercenier and Rosen (1964) all omit accidentally at least one section, presumably a result of attempting to use the score in its original format under performance conditions. At no point do the playing instructions stipulate that the choices have to be left to the moment of performance, and it has been my own practice in performing the piece to make the decisions in advance and order the sections accordingly. In his introduction to the 1970 Rosen performance, Boulez implicitly forbids this approach. His normal fluency deserts him as he embarks on an explanation of the controlled use of aleatoric procedures in the movement and the performer's role: "That's...I called, er...that's one of the examples of what I called a kind of...work...you decide at the last moment how you are playing, because you see that the movement is not written normally...I mean,
er...with a succession...you must not read the page from top to bottom but you have the choice of succession to yourself. The performer decides himself what...for...way...he will find, so (sic) the structure of the music"(2). Should one take Boulez at his word on this matter? The issue is a complex one, given the controversy surrounding the whole question of chance procedures and Boulez's attempts to distance himself from all but the most tightly controlled element of performer choice. One of the questions which will be addressed in this study is the nature of performer choice in the published Formants, in the context of Boulez's tendency to revise works and in so doing to fix rigorously the sequence of performance. A case in point is the Third Improvisation from 'Pli Selon Pli' which was only released for publication after the elements of choice had been eliminated. Could it be that Boulez's comments need to be considered in the context of a time, more than twenty-five years ago, when aleatoric procedures seemed to represent the most important compositional innovation of the previous decade, and Boulez himself, from being the central figure of the European avant-garde of the 1950s, was now in danger of being cast as a rather conservative figure in relation to such extreme manifestations of 'intuitive' music as Stockhausen's 'Aus den sieben Tagen' (1968)?

Concerning the question of performer choice, it is instructive to examine the three Rosen performances. In the 1964 performance, there is an audible swish of pages being turned, and the somewhat tentative performance has a feel of being realised on the spur of the moment. A comparison of the ordering of sections shows that there are some differences from the later performances: the 1970 broadcast and 1972 commercial recording are identical as to order. It is surely straining credibility to suggest that this correspondence was coincidental even given the very limited room for manoeuvre allowed by the composer. I would suggest that Rosen had fixed an
appropriate sequence in advance and used this as his "performing version" of the movement. There is a considerable gain in continuity and overall cohesion as a result, partly a consequence of the ordering adopted in 1970 and 1972, one which emphasises a sense of flow between the fragments. The 1972 version is clearer in articulation than that of 1970, and more spacious in conception than either of the earlier versions. In this respect it comes closest to Boulez's own performance, which, with its ear for keyboard sonority and rhythmic precision, makes it in many ways the most musically satisfying.

Mercenier's 1971 performance, with its highly individual approach to ordering the sections, emphasises the essential cohesion of the movement but at some sacrifice of detail of articulation and tonal range. She revisited London some six years afterwards, and in a recital at the Purcell Room performed the two published formants and preceded them with 'Antiphonie'. Nicholas Kenyon, writing in the 'Financial Times', described 'Antiphonie' as "a short, powerful up-beat to the two following Formants". The description would fit the one-minute long movement which Boulez performed in 1957 rather than the enormously expanded and still unfinished movement into which 'Antiphonie' has evolved. Nonetheless, apart from Leonard Stein's performances in the early 1960s, this is the only record of a performance of this formant since its withdrawal in the late 1950s. The redoubtable Mme. Mercenier apparently performed the entire work from memory, a feat which provides an additional dimension to the issue of performer choice raised in the preceding paragraph.

Of the first generation of pianists associated with Boulez's piano music, it remains to discuss the contribution of Claude Helffer, who became associated with the Ensemble du Domaine Musical, and made the first commercial recording of the notoriously difficult Second Sonata in 1971. A decade later, Helffer recorded all three
Boulez Sonatas - the first artist to do so, since Rosen's projected cycle has never been completed. This recording of the Third Sonata is the first since the Boulez performances to present 'Constellation' in its unpublished non-mirror version, and as in Boulez's 1958 studio performance, it precedes 'Trope'. In this Formant, Helffer boldly takes Boulez at his word regarding the optional sections in 'Parenthèse' (where P5 is omitted) and 'Commentaire' (where C3 and C8 are omitted). The logic of these omissions will be addressed in the light of my analysis of the Formant and study of the sketches, but it is worth noting at this stage that both Rosen and Boulez himself perform all the optional material.

Helffer took part in a Forum on the music of Boulez, held in Paris in 1974, and his contribution took the form of a conversation with Dominique Jameux, extracts from which were printed in 'Musique en jeu', November 1974. In reply to a question concerning performer choice in the Sonata, he answered:

"Théoriquement, je devais jouer chaque fois différemment. En fait, je ne le fais pas je crois qu'il s'établit une certaine correspondance entre ma personnalité et les possibilités de l'oeuvre.... Comment en suis-je arrivé à jouer comme je le fais aujourd'hui?... La première chose à faire, c'est de trouver les parcours possibles, en tâtonnant; au fond, il faut d'abord travailler chaque séquence séparément pour ensuite les enchaîner. Petit à petit l'on est amené à enchaîner deux ou trois séquences où vous sentez de de façon subjective que cet enchaînement est logique alors qu'un autre ne vous plaît pas. Vous arrivez ainsi à un certain parcours qui vous permet d'aller du début à la fin de la partition. Au bout de trois ou quatre essais, je n'ai plus en envie de continuer, satisfait du parcours que
This honest and revealing statement, upholding as it does the role of intuition in performance, enables Helffer to reconcile the aleatoric principles of the work with the need for the pianist to commence a performance with a concept of an integrated structure. As he points out in another reply, this approach also enables him to take account of the qualities of a particular piano or of the acoustic in which the performance is to take place. Well aware of the new pianistic sonorities explored in the Sonata, he asserts: "Boulez has succeeded in a manner at the same time intuitive and rational, of utilising the harmonics of the piano to create a sort of general theory which was only implicit at the end of Schumann's 'Papillons' or Schoenberg's Opus 11 and 'Pierrot'". In the light of these statements it is not surprising that Helffer's performance is among the most sensitive and musically aware, with a particularly wide range of pianistic colour at the softer dynamic levels.

By the time that Helffer's complete recording appeared, a new generation of pianists had taken up the challenge of the still incomplete Sonata, and among British pianists, both John Barstow, at the Royal College of Music, and Ronald Lumsden, at the Purcell Room on 10th April 1973, gave London performances. Lumsden was particularly associated with the work, which he also broadcast for the BBC. After praising Lumsden's performance, Max Loppert, writing in the 'Financial Times' observed: "The music itself was to me, as ever, a mystery...an alchemical delusion of self-regarding self-absorption". Nicholas Kenyon, writing in the 'Daily Telegraph' was less negative in response, but drew attention to the problem of performer choice: "The real task is to bring these ever-changing combinations into a relationship that is convincing, at least in retrospect".

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That the issue of performer choice remains intractable is evident from the solutions adopted in more recent performances. Bernard Wambach's account is authoritative, but in two performances separated by four years - South West German Radio in 1985, and BBC in 1989 - his ordering of the sections in 'Constellation-Miroir' is virtually identical, suggesting a fixed and pre-determined plan. By contrast, Jeffrey Swann, in a 1994 commercial recording, performs the Sonata twice, exploring some of the possible permutations available, and thereby suggesting that the piece becomes in effect a new experience - "a self-renewing kind of mobile complexity", in Boulez's phrase - as a result of these variations. His two performances of 'Trope' are complementary, in that the second is a virtual reversal of the order of the four sections adopted in the first performance. Taking his cue from Helffer, Swann subjects the optional sections in 'Parenthèse' and 'Commentaire' to some rather drastic editing, although again the performances are complementary. Thus the first performance omits C2, C4, and C7, whilst the second performance reinstates these sections but omits C3, C6, and C9. Even more drastic is the treatment of 'Parenthèse', the first performance omitting the central P3, the second reinstating this section, but omitting the other four optional sections. His performances throughout lack the articulation and clarity of detail found in the best accounts of the work, but his two accounts of 'Constellation-Miroir' show a particularly resourceful ordering of the "Star" arrangement (fragments 8-12) of Blocs II, and he shapes the ending of this section imaginatively, characterising the sustained single bass notes in a manner suggesting a loss of energy and direction.

The other available commercial recording of the work is that by Herbert Henck, originally issued in 1985 as part of a complete recording of the Boulez sonatas. A noteworthy feature of this account is its duration: 'Trope' alone lasts some nine minutes as compared to the six minutes forty-eight seconds of the Helffer recording. A leisurely approach could have
much to commend it, given the tendency of some performers to gloss over details of articulation, but Henck’s is a ponderous account, marred by textual misreadings surprising in a musician of his undoubted intellect and experience. Among the most obvious of these are the misread clef signs in the middle staves of ‘Trope’: thus the quintuplet in the second system of ‘Glose’ is read as in the treble clef rather than the bass: in C9 of ‘Commentaire’, the G-flat - F-natural major seventh interval is incorrectly read in the bass clef as B-flat - A-natural: and in ‘Parenthèse’, P4, the low B-natural in the bass clef is misread as a G-natural in the treble clef. His account of ‘Constellation-Miroir’ is much more textually accurate despite perpetuating the B-double-flat typographical error of the final note onto compact disc. Again the performance is remarkable for its slowness: an unprecedented fifteen minutes, nearly four minutes longer than in Helffer’s recording, and testing the resonance of his piano beyond its capacity, at least in this recording.

It is pertinent to consider anew the issue of performer choice in the context of the range of approaches to the work. Certainly it is the case that the second generation of performers have been freer in their willingness to exercise this choice than the generation first associated with the piece - performers working directly under the influence of composer and presumably with some knowledge of his insights as an interpreter. Whilst conceding the truth of Helffer’s observation that the possibilities are infinite as each performer’s personality interacts with the musical material and attempts to articulate the structure, it is nonetheless of relevance to raise the question of performance tradition. As I have suggested, the first generation of performers seem closest to the composer’s approach to the work: with later performers one has the impression that something of this developing tradition has been lost in the enthusiastic exercise of performer choice. Could it be that the very concept of choice militates against the establishment of performance tradition? Or might it be the case that
such a concept is irrelevant to interpretation of a work characterised by "a self renewing kind of mobile complexity"? And, above all, can any interpretation of the two published Formants be other than provisional, pending completion of the entire work?

These questions, and the issues raised by them, form a starting point for the present study. One concern of this is to examine the aesthetic of performer choice in the context of a reassessment of the published Formants and the available sketch material relating to them. By an examination of the material relating to the genesis of these movements, it is hoped to shed some light on the composer's attitude to performer choice, and the consistency of this in relation to his expressed views. Furthermore, given the absence of detailed commentaries on the unpublished Formants, it is intended to examine the available sketches, not only for the light they shed on Boulez's compositional methods, but as a means of placing the published Formants in their proper context. First, however, it is necessary to examine the various commentaries on the Third Sonata in the light of the foregoing review of the work's performance history.

The starting point for a survey of commentaries on Boulez's music must be the composer's own writings. These are now readily available in translation, and a new complete French edition is in preparation, Volume I having appeared in 1995. The commentaries most directly relevant to the Third Sonata are those found in the chapter, 'Technique Musicale' in 'Penser la musique aujourd'hui' (4), a transcription of a series of lectures given at Darmstadt in 1960, in which the compositional basis of 'Trope' is expounded, and the subsequent article, 'Sonate, que me veux-tu?'; which gives a tantalising glimpse of the overall design, with its open structure and allusions to literary models.
These articles will be examined in detail elsewhere in the study, but it is interesting to observe at this point in the context of Boulez's writings that he had been familiar with syntactical experiments in literature and their accompanying structural implications over a period of many years prior to 1957. References to the poetry of Mallarmé are a constant refrain, and as early as the article, 'Moment de Jean-Sébastien Bach' (1951), he concludes a diatribe against neo-classicism with an exhortation which, in its dismissal of academicism masquerading as tradition and authenticity, has at least as many resonances for the modern reader as it must have had at the time: "Au milieu des semblants de logique dont nous pourrions, d'aphorismes dépourvus de tout esprit critique, d'une 'tradition' tirée à hue et à dia pour le besoin de toutes les causes plus ou moins honteuses, au milieu de ces activités méprisables de besogneux en quête d'authenticité, redonnons enfin son potentiel à ce que Mallarme appelait le 'Hasard'" (5).

The article ends with a direct quotation from 'Un coup de dés', the literary model for the pivotal central formant of the Third Sonata: "Toute pensée émet un coup de dés"(6).

The article 'Alea' which appeared in 1957, the year of the sonata's first performance, develops these philosophical issues in more polemical form. The questions it addresses, particularly the role of the performer in articulating mobile structures, will form a part of this study, but it is worth remembering at this stage that the plan of an open musical form was not a concept which suddenly emerged in the Third Sonata. With the benefit of hindsight we can see it as a logical extension of the structural processes of his earlier works. Thus the title of the 'Livre pour Quatuor' (1948) in itself suggests the idea of an open form, and the piece has remained incomplete, the fourth movement never having been published. Even a rare recording of movements one and
three, by the Parrenin Quartet apparently under the composer's supervision, is puzzling, deviating from the published score at many points and sadly suggestive of yet another magnificent "work in progress". Boulez was to apply this principle of an open form again in the work preceding the Sonata, 'Le Marteau sans Maître'. Here, the three 'books' are interleaved in a fixed order, but in a way which is but one step removed from the more flexible structures of the Sonata. Boulez makes explicit reference to this connection during the 'Conversations with Célestin Deliège': "The fact that there is not one continuity but several, that the cycles interpenetrate one another and that, in the last piece, they do so within a single piece (which is a microcosm of the entire work) marks an important stage in my progress towards what was effectively the breaking-up of musical continuity"(7). The book also contains some interesting observations on the Third Sonata itself - particularly so as they are Boulez's most recent published thoughts on the progress of the composition. These will be considered in the context of a study of the available source material.

The various reviews, cited above, which accompanied the publication of the two completed Formants of the Third Sonata, are supplemented by critical commentaries, to be found in chapters in books on Boulez, as well as passing references in commentaries of a more general nature on postwar music. There is a monograph by Manfred Stahnke entirely devoted to an analysis of 'Trope', and this major study is supplemented by a series of articles, the most relevant of which are listed in the bibliography. As a prelude to any survey of this material and its relationship to Boulez's own writings, one must consider Robert Piencikowski's brilliantly argued introduction to Stephen Walsh's translation of Boulez's early writings, 'Stocktakings from an Apprenticeship'. After a discussion of the chronology of essays and their
impact on Boulez's contemporaries, Piencikowski goes on to assess their influence on future commentators on the music. He notes that "if one compares them with the works whose course they plot, the writings turn out to be extremely stingy, and yield only a tiny part of their musical matter". And yet, "If one consults certain analyses published today, one sees the extent to which they are dependent on the Boulez articles, merely confirming the examples given by the composer by relating them to the scores from which they were extracted - in which respect their authors have allowed themselves to be caught in the snares of what can only be called a tautology" (8).

If one examines the chronology of commentaries on the Third Sonata it is striking that virtually nothing was published until after the references in 'Penser la Musique aujourd'hui', the English translation of which appeared in 1971, a decade after the printing of 'Trope'. Apart from a brief descriptive article by Gyorgy Ligeti (9), the two exceptions are Ernst Thomas's article 'Was ist Aleatorik?' (10), which considers the concept of aleatoricism in relation to recent works by Boulez and Stockhausen, and Nicholas Maw's brief but sympathetic 'Boulez and Tradition' (11), written shortly after the publication of 'Trope', and discussed earlier in the chapter. It was to be over a decade before more detailed commentaries on the nature of this challenge began to appear, and it is interesting to confirm the acuteness of Piencikowski's observations, quoted above, when considering analyses of the work.

Thus both Paul Griffiths (12) and Dominique Jameux (13) confine themselves to descriptions which derive from Boulez's own, both in pitch analysis and commentary on the work's overall shape. They thus fail to take account of a most interesting article by Iwanka Stoianowa, 'La Troisième Sonate de Boulez et le projet mallarméen du Livre' (14) which, taking 'Sonate, que me veux-tu?' as its premise, develops the parallels
between the creative processes of Mallarmé and Boulez. This section of the article is on rather dangerous ground since, if Boulez is to be taken at his word, the Sonata had been completed at least in its initial form prior to the publication of Mallarmé's sketches for 'Le Livre'. Ms. Stoianowa proceeds to a survey of the sonata as a whole, again based on Boulez's commentaries, and then attempts a detailed pitch analysis of a section of 'Trope'. Whilst Boulez's exposition forms the starting point, her analysis of 'Texte', with its exposition of a tritonal structure, is both detailed and perceptive.

Most interesting of all is Ms. Stoianowa's commentary on the unpublished 'Antiphonie'. Boulez's description of this Formant in 'Sonate, que me veux-tu?', of a movement consisting of five fragments each with a variant on the reverse of the page, and four possible performance routes, corresponds closely with the form of the published fragment, 'Sigle' (UE12050). A note to the printed edition adds the information, "In the original version the pages are cut through horizontally, so that by simply turning over different sections of the pages alternative musical continuities may be achieved. For technical reasons this method of preparing the pages has not been possible here" [It is a simple matter to restore the arrangement by dividing each page into groups of two plus three fragments, as found in the autograph in the Paul Sacher Stiftung]. Ms. Stoianowa's description likewise corresponds to the form of 'Sigle', but her metronome marks (\( \cdot = 60 \) and \( \cdot = 72/80/96 \)) differ slightly from those published in 'Sigle' (\( \cdot = 48 \) and \( \cdot = 72/80/96 \)). This could be passed over as a minor discrepancy were it not for the fact that her metronome marks are identical to those found in the original version of 'Antiphonie' performed by Boulez in 1957. This movement, although in five sections, is a separate piece from 'Sigle', and lacks the element of performer choice described by Boulez and Ms. Stoianowa. To compound the puzzle, Ms.
Stoianowa quotes an unpublished excerpt from 'Antiphonie' which corresponds to none of the available sources - that is, the published 'Sigle'; the version of 'Antiphonie' performed by Boulez in 1957; and the re-composed and vastly expanded version of the Formant described by Allen Edwards (15). These articles are the only ones which venture on the uncharted area of the three unpublished formants, and yet, as Edwards points out, a knowledge of all the material has a significant bearing on how, as performers and listeners, we perceive the published movements.

Other commentators, following Boulez's seductive lead, have concentrated on analysing the serial methods employed in the published formants and pursuing the parallels with literary models. Foremost among these is the monograph by Manfred Stahnke devoted to 'Trope' (16). A chapter is devoted to a consideration of Boulez in relation to Joyce and Mallarmé, but by far the largest section of the book consists of an analysis of the pitch cells, followed by a detailed consideration of the rhythmic organisation of the Formant. This breaks new ground in that rhythm in Boulez's music is virtually never discussed by commentators despite the continual, although usually unspecific references in the composer's writings. Stahnke's analysis of the pitch structure is a painstaking piece of work, and remarkable in many ways especially as he evidently did not have access to the sketches - the four squelettes ('skeletons') unlock the musical structure, as we will see. A deficiency of Stahnke's analysis is that, although formidably detailed, it is largely descriptive. Thus there is no attempt to integrate the components of pitch and rhythm into a higher unity which would shed light on the musical discourse as a whole. Nonetheless, the book is a considerable contribution to the subject, especially bearing in mind the absence of comparably detailed analyses, and the tendency of other commentators to make general and
unsubstantiated observations.

There is no study of 'Constellation-Miroir' of comparable detail, although Anne Trenkamp's article, 'The concept of "Alca" in Boulez's "Constellation-Miroir"' (17), is an attempt to grasp some of the performance issues raised by the score. She makes the valid point that Boulez's use of variable tempo indications helps to smooth the transitions between sections and therefore helps "to control the rate of musical events". After a discussion of the role of performer choice in Mélange, whose six segments she divides into four units, she then proceeds to list in tabular form the segments of the Formant and their grouping into larger units. The process by which this is obtained is not explained, and there is evident illogicality in the fact that Mélange, one of the shortest and simplest sections, has four units, whilst the longest and most complex section, Blocs II, has twenty-four segments reduced to only three units. Her perfunctory discussion of the pitch organisation of the Formant is fundamentally flawed since she bases it on the segmentation employed by Boulez in 'Trope'. As the sketches make clear, and as pointed out by Rosangela Periera (18), in a short but brilliantly incisive article, an identical pitch series is subject to different segmentations and treatment in the two published Formants. It is unsurprising in view of this false premise that Ms. Trenkamp concludes that "lack of definitive, hierarchical pitch organisation results in a bland uniformity of pitch structures". It is precisely such a unity of the horizontal and vertical elements which Boulez was striving for in the Sonata, and the thrust of Boulez's approach to serialism throughout the work is precisely to create the pitch hierarchies which Ms. Trenkamp claims to be absent. In answer to a question by Deliège concerning the technique of 'frequency multiplication' in the Third Sonata, Boulez's reply includes the following: "I believe it is impossible to write in two
different dimensions following two different sets of rules, and that one must in fact follow laws that apply reciprocally to the horizontal and the vertical" (19) (One might add the thought that these comments resonate with meaning for any student of nineteenth-century music, and that they were made at a time when Boulez was studying 'The Ring' in preparation for the centenary production at Bayreuth in 1976). In Ms. Trenkamp's view, the structure of 'Constellation-Miroir' depends upon "juxtapositions of texture", and therefore "the basic six-part structure remains primary". This is unexceptionable; but it is surely overstating the case to claim that "Boulez has loaded the dice of chance - he has only conceded to the performer the things that do not matter". One conclusion to be drawn from a survey of the work's performance history is that the choices made by the performer are of great importance in articulating the structure, and that different performers reflect their own personalities in relation to the score by exploring the available options.

The literature dealing directly with performer choice in the work is comparatively small. Robert Black (20) opts for a philosophical rather than a musically analytical approach to the subject, and his commentary is accordingly couched in non-specific and at times impenetrable prose:

"The performer's rejection of a single linear, temporal dimension may finally loom as a mostly private entertainment. But, if he can bestow upon these recondite strains of music the intensely defining characterizations of premonitory or retrospective reference, he may, through a relentless pursuance of this tactic of polyvalent transaction, elude a fixed temporal center and manage at least to suggest the provisional, indeterminate radiations of time which are mirrored in the
work's syntactical strategies”.

Of much more direct relevance are Charles Rosen's thoughts (21) on the Sonata and the nature of its originality, although it would be fascinating to have heard this great musician discussing in detail the logic of his exercise of choice in relation to the score. Alone among commentators, William Harbinson raises this issue (22). His analysis of 'Parenthèse' is an attempt to articulate the structure in order that the performer may exercise choice in an informed manner. However, having raised the issue, he proceeds to side-step it: "The performer must choose to include or omit the various optional passages. This decision should be made from one of two interpretations of the relationship which exists between the mandatory and optional materials: one either regards the optional passages as isolated developments which interrupt, yet comment on, the sequential discourse of the mandatory passages (as in the process of 'troping'), or one regards the optional passages as forming a complete and continuous entity that exists parallel to the fixed progression of the movement". Quite so, and the author has identified the issues with commendable clarity. One might add that it is now the task of the performer/analyst to investigate the music in yet more detail so as to able to make such a decision on an informed rather than purely intuitive basis.

This survey of the available literature on the Third Sonata and the compositional issues arising from the unfinished Formants, together with a review of the reception history, provides the context for my research into the work. Whilst some detailed analyses of the serial structure have been undertaken, there has been as yet little direct attempt to relate analytical conclusions to the specific issue of performer choice in the Third Sonata. With one exception, there has been no examination of the unfinished Formants and therefore of the extent to which they might affect our
perception of the two published sections of the work. The extensive sketches have not yet been the subject of a detailed survey in relation to the formal shape of the published formants and the operation of performer choice. The present study approaches the material essentially from a performer's standpoint, and is an attempt to understand the compositional process for the light it sheds on performance. To this end, a thorough examination of all the available material is undertaken, beginning with the genesis of the work in the context of Boulez's writings, and the artistic climate of the 1950s.
REFERENCES

(1) Private letter, March 1996, cited by kind permission of Leonard Stein

(2) Transcribed from a BBC broadcast, 1970, held in the National Sound Archive

(3) "Theoretically, I should play the work differently each time. In fact, I cannot do so because I
believe that a certain correspondence has been established between my personality and the
possibilities of the work....How have I come to play it as I play it today?.... The
first thing to do is to find the possible routes, whilst feeling one's way: basically, it is necessary
to work each sequence separately at first in order to join them together later. Little by little one
is led to connect two or three sequences where you sense in a subjective manner that this
connection is logical or that another does not please you. Thus you arrive at a certain route which
permits you to go from the beginning to the end of the score. After three or four tries I did not
wish to continue, satisfied with the routes that I had. Before playing 'Constellation-Miroir', I have
three routes in my head, prepared, which do not prevent me from sometimes being abruptly led,
on stage, to take a route that I have not foreseen".

(4) Boulez, P. 'Penser la musique aujourd'hui' 1963 tr. S. Bradshaw and R. R. Bennett, London, Faber
and Faber (1971) as 'Boulez on Music Today'


"Amid these corrupting appearances of logic, these apriorisms devoid of all critical spirit, this
'tradition' dragged hither and thither in every more or less shameful cause, amid all these
contemptible activities of the needy in search of 'authenticity', let us finally restore its potential to
what Mallarmé called 'chance'".

(6) Ibid. P. 79

"Every thought expresses a throw of the dice"


Press, p. xxiii

(9) Ligeti, G. 'Some remarks on Boulez's Third Piano Sonata' (1959) die Reihe, 5, pp. 38-40

(10) Thomas, M. 'Was ist Aleatorik' (1961) Melos, 7/8, pp. 213-19


(14) Stoianowa, I. 'La Troisième Sonate de Boulez et le projet mallarméen du Livre' (1974)
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4-15

(16) Stahnke, M. 'Struktur und Aesthetik bei Boulez' (1979) Hamburg, K. D. Wagner

(17) Trenkamp, A. 'The concept of "Alea" in Boulez's "Constellation-Miroir"' (1976) Music and
Letters, LVII/1, pp. 1-11

(18) Periera, R. 'La troisième sonate de Pierre Boulez' (1993) "La nouvelle revue musicale suisse",
no. 36, mai, 1993

(19) 'Conversations with Célestin Deliège", pp. 90-91

(20) Black, R. 'Boulez's Third Piano Sonata: Surface and Sensibility' (1991) Perspectives of New
Music, 20, pp. 182-98


15-20

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A surprising feature of our investigation so far has been the realisation that a wide range of influences were absorbed into Boulez's musical personality during his early Paris years, and, that despite all his efforts to obliterate the past, his early music is steeped in tradition. His interest in literature, the writings of Gide, for example, forms a background to these musical influences, but it is not until the appearance of the cantatas of 1948, both to poems by René Char, 'Le Visage Nuptial', and 'Le Soleil des Eaux', that we find the first direct evidence of the influence of the French literary tradition on Boulez's musical thinking. The expressive demands of the poetry force Boulez to expand his musical technique in response, and we observe his experimentation in the use of quarter-tones in the choral writing of 'Le Visage Nuptial'.

It is in the letters to Cage that we find the first explicit reference to an even more ambitious project, a setting for choir and large orchestra of Mallarmé's poem, 'Un Coup de Dés'. Boulez makes passing reference to the new work in a letter of June 1950, remarking that, by way of preparation, he had bought all of Bach's vocal works. Contemporary with this letter is the article, 'Moment de Jean-Sébastien Bach', which, as noted in the previous chapter, concludes by quoting the final line of Mallarmé's poem. From now on, Boulez's articles are punctuated with references to Mallarmé, but no traces of the musical sketches for 'Un Coup de Dés' seem to have survived. A final
reference to the piece is found in a letter of December 1950 to Cage, and it suggests that microtones were to be exploited to the extent that a specially tuned instrument would need to be constructed in order to perform it. Whether or not the impracticality of such demands caused the abandonment of the work, it is the case that other projects assumed more importance for the time being, and it was not until 1957 that 'Un Coup de Dés' re-emerged in a quite different form - as the structural model for 'Constellation', the central movement of the Third Sonata.

In the meantime, Boulez returned to the poetry of Char for his next vocal work. The première of 'Le Marteau sans Maitre' was scheduled for the 1954 Donaueschingen Festival. The cancellation of this performance because of the illness of one of the instrumentalists gave Boulez the opportunity to make some minor revisions and to compose a ninth movement, the Double of 'Bel Édifice' - which was completed in March 1955. The complete work received a triumphant first performance on 18th June of that year, a date which marks the consolidation of the composer's international reputation.

The intervening months were also occupied by an article 'Recherches Maintenant' which first appeared in 'La Nouvelle Revue Française' in November 1954. In it, Boulez acknowledges the necessity for the more flexible technique of 'Le Marteau': "Webern n'avait organisé que la hauteur; on organise le rythme, le timbre, la dynamique; tout est pature à cette monstreuse organisation polyvalente dont il faudra rapidement déchanter si l'on ne se condamne pas à la surdité"(1). In its way, the piece occupies a similar position in Boulez's output to the many vocal works which Schoenberg composed in the decade following the abandonment of fixed tonal centres and before the development of twelve-note technique. In Boulez's case, the Char poems, however
fragmentary, are crucial to the work's overall structure. Later in the same article, Boulez returns to the question which had preoccupied him throughout the decade, the relation of structure to serial principles:

"De même que certains peintres ne voient pas seulement dans la toile une surface plate à recouvrir de signes non figuratifs, mais qu'ils s'ingénient à découvrir une notion nouvelle correspondant à la 'perspective' abolie, ainsi, la musique se doit de découvrir une nouvelle manière de distribuer les développements d'une oeuvre, sans qu'il soit fait appel pour cela aux notions formelles et à 'l'architecture' du passé" (2).

The article also contains more precise indications of the direction of his thinking, couched in language which anticipates the design of the Third Sonata:

"Ne pourrait-on envisager les 'formants' d'une oeuvre? Liés, certes, à l'organisation de l'univers sonore propre à cette oeuvre, mais ne dépendant point d'elle? Rien ne ressemblerait moins au 'thème', puisque le thème consiste en des particularités déjà intégrées; cependant, ce 'formant' - particularités non intégrées - serait responsable de la physionomie de l'oeuvre, de son caractère unique. Tandis qu'en se confiant à l'organisation, on ne fait que rejoindre le hasard... par la loi des grands nombres" (3).

The reference to chance has a broader significance. It is clear from the recently published correspondence between Boulez and John Cage (4) that the introduction of choice as a compositional procedure was, contrary to received opinion, first postulated by Boulez in the letter of December 1950 which also refers to 'Un Coup de Dés'. Nonetheless, the enthusiastic adoption of chance procedures by the American was a major
cause of a rift which developed between the two composers after 1952. More significant still was the shifting position of Stockhausen with regard to aleatory principles. The year after the premiere of 'Le Marteau', part of Cage's 'Music of Changes' was performed at the Darmstadt Summer School. This was at the apparent instigation of Stockhausen, and the performance was followed by a vigorous exchange of views between him and Boulez concerning the validity of chance as a compositional philosophy. Stockhausen's version of events, in 'Texte II' is as follows: "I told Boulez about 'Klavierstück XI', which I had written shortly before. At first he was astonished then angry and abusive; he could not understand such nonsense. I was afraid (he said) of fixing everything exactly in the notation, and wanted to brush off responsibility....Then more than a year passed before Boulez sent me the first sketches of his Third Sonata"(5). A cooling of relations followed, and an overtly competitive attitude surfaced. In fact, the chronology of events is comparatively unimportant given the differences between Stockhausen's wholehearted embrace of aleatoric procedures in 'Klavierstück XI' and Boulez's attempt to redefine the essence of musical form in the Third Sonata. In any case, it is clear from 'Recherches Maintenant' that the Sonata had been gradually taking shape in Boulez's mind several months before the encounter described by Stockhausen, and further internal evidence to support this view is furnished by a study of the source material for the Sonata.

As we have seen, Boulez gave the first performance of the work in September 1957, but withdrew it for revision. In the meantime, he resumed the debate with the proponents of chance procedures in the article 'Alea', first published in 'La Nouvelle Revue Française', November 1957. This begins with an indirect but brutal dismissal of Cage: "La forme la plus élémentaire de la transmutation du hasard si situerait dans l'adoption d'une philosophie teintée d'orientalisme qui masquerait une faiblesse fundamentale dans la technique de la
composition; ce serait un recours contre l'asphyxie de l'invention, recours à un poison plus subtil qui détruit tout embryon d'artisanat" (6). It goes on to observe the paradox of serialism, whereby the more all-embracing its influence, the greater the danger that it will wrest control of the compositional process from the composer: "La schématisation, simplement, prend la place de l'invention; l'imagination - ancillaire - se borne à donner naissance à un mécanisme complexe qui, lui, se charge d'engendrer les structures microscopiques et macroscopiques jusqu'à ce que l'épuisement des combinaisons possibles ait signalé la fin de l'oeuvre. Admirable sécurité et puissant signal d'alarme!" (7). The arbitrary results of this process are summarised with the observation: "Dans sa Toute-Objectivité, l'oeuvre représente, nous y revenons, un fragment de hasard justifiable autant (ou aussi peu) que n'importe quel fragment" (8).

The article continues with a thinly veiled attack on Stockhausen: "Cette objectivité ouverte ayant failli, on s'est jeté alors comme des forcenés à la recherche de l'arbitraire. Quant à l'interprète, c'est à lui de vous transmettre les assauts du démon, il vous compromettra; interprète-médium qui s'instituera le haut officiant de cette diablerie intellectuelle" (9). This is likely to be a reference to the role played by the American pianist David Tudor, a disciple of Cage, and leading advocate of 'Klavierstück XI'. Accustomed as one is to the polemical mode of expression frequently adopted by Boulez, the sheer vehemence of this section of 'Alea' is verging on the pathological, and taken in conjunction with the verses of Henri Michaux's 'Poésies pour Pouvoir', which Boulez chose to set the same year, creates a disturbing impression of an increasingly embattled and isolated artist. Boulez continues this section of the article with the summary: "Voyez-vous où l'on en revient? Toujours à un refus du choix. La première conception était purement mécaniste, automatique, fétichiste, mais on se délivre du choix non par le nombre, par
The remainder of 'Alea' consists of an attempt to re-assert the composer's responsibility whilst at the same time suggesting the need for the development of more fluid formal structures. Thus, although, "classiquement, la composition est le résultat d'un choix constant...Suivant mon expérience, il est impossible de prévoir tous les méandres et toutes les virtualités contenus dans le matériau de départ" (11). Therefore, "Voyons si, en surmontant certaines contradictions, on peut arriver à absorber le hasard" (12). Unsurprisingly, Boulez remains on the defensive about this step, but his attempt at self justification is interesting in the context of the Third Sonata, since it is, with hindsight, an obvious reference to the operation of choice in that work. Significantly, the evidence suggests that the music was composed before the article was written, and this seems to be a characteristic of Boulez's practice: the seemingly abstract theorising is in fact a retrospective justification for a creative step which has already been taken.

"Cependant la hantise de ce qui Peut arriver prenant la place de ce qui Doit arriver, n'est pas due à la seule faiblesse des moyens de composition mis en jeu, à la seule volonté d'introduire la subjectivité de l'interprète ou de l'auditeur à l'intérieur de l'œuvre et de créer à ces derniers un constant et obligatoire choix instantané. On pourrait encore donner d'autres raisons apparentes tout aussi justifiables. Et d'abord, en ce qui concerne la structure de l'œuvre, le refus d'une structure préétablie, la volonté légitime de bâtir une sorte de labyrinthe à plusieurs circuits; d'autre part, le désir de créer une complexité mouvante, renouvelée, spécifiquement caractéristique de la musique jouée, interprétée, par opposition à la complexité fixe et non renouvelable de
la machine" (13).

Other influences were at work, unacknowledged in 'Alea', but cited specifically in the article 'Sonate, que me veux-tu?', first published in translation in 'Perspectives of New Music', Spring 1963, but originally given in lecture form at Darmstadt in 1959:

"A lire et relire attentivement le 'Coup de dés', j'avais été vivement impressionné par sa présentation typographique et j'avais constaté qu'elle se rapporte à une forme si nouvelle qu'elle ne peut être autrement distribué: la manière typographique a dû, pour Mallarmé, se metamorphoser. La 'mise en livre' du 'Coup de dés' est une nécessité première, fondamentale, où, certes, importe la disposition du texte selon les pages - avec cette répartition dans l’espace et les blancs - mais encore le caractère typographique" (14).

Again one is struck by the almost autobiographical significance of the commentary, where he can be observed thinking aloud towards the publication of 'Constellation', and the unique format it will require. He quotes Mallarmé's 'Notes' to the projected 'Livre', posthumously published in 1957, the year in which Boulez first performed the Third Sonata, in order to illustrate the close parallel between the poet's experiments in syntax and the evolution of mobile musical structures - although Boulez maintains that his own work was virtually complete before his acquaintance with 'Notes' (A strange claim in view of the work's subsequent history, but one which will be supported by the chronological evidence of the source material). He compares the particular suitability of music as a medium for this approach to that of language:

"La logique grammaticale associative fait que les mots ne peuvent s'interchanger aisément sans faire perdre à la phrase tout ou partie de sa
signification - la logique formelle se préoccupe actuellement d’étudier ce phénomène avec précision; tandis qu’en musique, la logique d’assemblment est moins rigoureusement délimitée, quant à sa validité: la non-signification, la non-direction de l’objet musical à l’état élémentaire permettent de l’utiliser dans des organismes structurés, selon des principes formels beaucoup moins restreints que le mot”(15).

It is amusing to note in passing the curious parallel with the early romantic view of music as the most perfect of the arts, and one to which all the other arts aspire. Boulez might well have cited Mallarmé's Preface to 'Un Coup de Dés', which develops further the parallels between music and his own innovative approach to syntax:

"...This unadorned use of thought with doublings back, goings on, runnings away, or the very portrayal of it, results for those who will read it aloud in a musical score. The different type-faces between the principal motif, a secondary and adjacent ones, dictate their importance to oral delivery and pitch on the page, middle high or low, will notate whether intonation rises or falls" (16).

As well as the discussion of Mallarmé, the article also cites the influence of Joyce and Kafka, before proceeding to outline the musical structure of the Sonata. Since it is the only published indication of the work's projected overall shape, it is of obvious importance in relation to the two movements which have so far been released for publication. He lists five 'Formants', the titles of which "underline their individual characteristics":

1. Antiphonie
2. Trope
3. Constellation, and its mirror image, Constellation-Miroir

4. Strophe

5. Séquence

Boulez, echoing Joyce, describes it as "A work in progress", and offers further explanation of his use of the term 'Formant': "...la physionomie d'une oeuvre provient de ses formants structurels: caractères spécifiques généraux, susceptibles d'engendrer des développements. Chacun d'eux apparaît dans chaque pièce exclusivement"(17). Elsewhere, he suggests that the work is open-ended on the most fundamental structural level: "Aussi bien les cinq formants me laissent-ils sans doute le loisir d'endendrer d'autres 'développants', s'imposant comme des tout distincts, se rattachant, toutefois par leur structure aux formants initiaux. Ce livre constituerait un labyrinthe, une spirale dans le temps"(18). This gives rise to the thought that the piece has an incompleteness integral to its conception, in the manner of a spiral-bound volume, open to additional insertions, and remaining in a state of perpetual evolution. Boulez's description of the individual movements emphasises the variety of ways in which he explores the concept of mobile form. These comments will be considered in more detail in relation to the available material. Of particular interest in a general context is his description of the overall design of the work, in which the third movement occupies a fixed position but the other movements revolve around it in a variety of possible orders. His concluding remarks include the following: "On aperçoit, dès maintenant, la richesse de possibilités incluse dans la rencontre de ces formants: supposez des pages-parenthèses, des cahiers mobiles, des constellations de formants. Bref, l'imagination n'est point en peine si le métier y pourvoit" (19).

Returning for a moment to the article 'Alea', the final section is devoted to a consideration of the role of the performer in the new mobile formal structure. Boulez notes
that, "S'il y a un seul exécutant, aucune difficulté, si ce n'est qu'il doit avoir plus d'initiative qu'auparavant, puisque cette initiative - cette collaboration - est exigée par le compositeur" (20). The crux of this redefined relationship between composer and interpreter is contained in the concluding remarks, which include the following:

"...loin de le nier, de l'annihiler, nous remettons dans le circuit créateur l'interprète lui-même, auquel depuis nombre d'années on avait seulement demandé de jouer le texte le plus 'objectivement' possible. Que dis-je? C'est même une glorification de l'interprète à laquelle nous aboutissons! Et non point d'un interprète-robot à l'effarante précision, mais d'un interprète intéressé et libre de ses choix" (21).

Well might Boulez express a degree of mock astonishment at these words, which are, in part, a reference to such works as his own Second Sonata, with its dauntingly rigorous directions, requiring the performer to "Avoid absolutely, expressive nuances". One notes with some amusement, that, despite his frequently articulated disdain for neoclassicism, the Boulez of the late 1940s and early 1950s was very much a child of his time in his suspicion of the concept of interpretation and his desire for objective presentation of the musical text. One can only surmise that his practical experience as Director of the 'Domaine Musicale' concerts must have led to a growing sensitivity towards the relationship between composer and performer. Henceforth the interpreter is invited to share in the creative process, a participation which inevitably involves him in a conscious attempt to understand the compositional principles which shape the musical design - to borrow Stephen Walsh's translation - "plugging" himself into the composer's thoughts. Only by such means is the performer of the Third Sonata able to make informed choices - rational decisions based on an understanding of the work's
internal processes as opposed to arbitrary decisions which must involve the intervention of chance.

Such an undertaking helps to provide a focus for analysis. Boulez avoids this word in his discussion of the performer's role, an omission which can be explained by his frequently expressed contempt for academic analysis. This is paradoxical for a composer of peerless technical resource, himself the author of an exhaustive analysis of Stravinsky's rhythmic technique in 'The Rite of Spring'. An awareness of Boulez's view of the nature of musical analysis is a prerequisite for the performer who accepts the invitation to "plug-in" to the creative process. The article, "...Auprès et au loin", first published in 1954, contains a discussion of the place of analysis in the young composer's musical studies. Boulez stresses the limits of analysis: "Les grands œuvres, par bonheur, ne cessent jamais de récompenser leur intransgressible nuit de perfection" (22). Therefore, "...sans nul regret, nous abandonnons l'illusoire précarité d'une précision satisfaisante et avouons la relativité dont ne s'exclut aucune analyse" (23). He goes on to discuss the function of analysis:

"L'analyse ne doit pas étudier les divers 'aspects' du phénomène éclairé différemment; elle doit, à l'intérieur de l'œuvre, approcher les différentes composantes qui concourent à la réalisation. Il convient de s'expliquer sur ce mot de 'composantes' qui peut prêter à contresens; par 'composantes' il ne faut pas entendre des facteurs unilatéraux (rythme, mélodie, harmonie) qui s'ajoutent les uns aux autres, dans une addition monstrueuse d'irréalité; il faut entendre plutôt composantes vectorielles qui, en s'ajoutant, vectoriellement, donnent une résultante dont la direction est autre, quoique définie par les composantes" (24).

This quotation is rather alarming at first reading, with its recourse to mathematical
terminology, a vector being "a quantity having direction as well as magnitude, denoted by a line drawn from its original to its final position"(25). The term appears at first sight to obfuscate rather than clarify Boulez's argument, namely that an analysis of individual components of a musical structure is only a starting point for a study of their interaction. Perhaps he was seduced by another, astronomical application of the term, viz. "An imaginary straight line joining a planet moving round a centre"(26). As we will see, this image corresponds to the evolving structure of the Third Sonata, whose outer movements revolve around a fixed Constellation, interacting with one another and determining the unfolding of the work - a design which, one suspects, was already being formulated at the time the article first appeared. Be that as it may, the quotation resonates with meaning for the interpreter, whose task it is to articulate the interaction of the various musical components in performance.

The article, with its rejection of academic certainties and acknowledgement of the open-ended nature of any analytical enquiry, was a considerable influence on my research. Boulez's attempt to define the direction which analysis should take in order to be of relevance, "Si une analyse pratiquée de l'intérieur est valable tant qu'elle est justifié par la genèse de l'oeuvre et par certaines caractéristiques de la perception qu'on en a, l'on doit tenir compte de ces deux facteurs importants, sinon l'on risque de spéculer en porte à faux"(27), focussed my attention on the necessity of making contact with the compositional process at first hand through a study of the source material. This section of the article concludes with a statement which, although written in the context of analytical study, could also serve as a summary of the various stages in the development of an interpretation: "Les conséquences dont on peut avoir l'intuition se perçoivent réellement d'après l'étude des structures morphologiques d'abord, puis on élargit ce premier plan jusqu'à la structure globale; alors,
en étudiant le mode d'engendrement de ces divers plans de structure, leurs interrelations, c'est-à-dire en généralisant de proche en proche, on pourra arriver à décrire ce qui constitue, à proprement parler, la démarche de l'œuvre"(28).

THE SOURCE MATERIAL

It was against this background that my investigations began. Further information regarding unpublished material relating to the work was provided by a stimulating article, 'Unpublished Bouleziana at the Paul Sacher Foundation', by Allen Edwards (29). The catalogue published by the Foundation confirmed that the manuscripts of the two published Formants and material relating to the three unpublished Formants were housed there, together with a considerable quantity of sketches consisting of one hundred and thirty six pages.

A preliminary visit was arranged to inspect this material, which is arranged in six folders, the first file containing a small amount of material relating to the work's overall design, and the remaining five folders holding the sketches and manuscripts for the individual formants. This section of the study will be primarily concerned with the genesis of the overall design, the material for which is jotted down on single sheets of paper and postcards, none of which are dated. Boulez's handwriting, although fairly clear, is not always easy to decipher especially as some of the jottings were simply aides-mémoires in abbreviated form. To add to the difficulties, some of the ink sketches are so badly faded as to make definitive reconstruction almost impossible.

One of the earliest drafts establishes the concept of a multi-movement work in which the relationship between the various serial parameters is exploited in a variety of ways
The concept of a proliferating, circular development is already present, although in an as yet unspecified way. The work was evidently to open with the exposition of a principal Formant, followed by Formants numbered 1-5, and concluding with a Formant serialising registers and dissolving in the process all the previous serial groupings - presumably completing the circle in the process.

A pencil sketch on blue card (Ex.3.2) carries the concept forward in three stages. First the length of each of the five Formants is established, with the third Formant already conceived as the most extended. This plan is of some significance in the light of Boulez's later work on 'Antiphonie', which although still incomplete, is vastly expanded in conception as compared with the fragment performed by the composer in 1958. There is already evidence to suggest that any attempt to complete the sonata would involve not only work on the three unpublished movements, but a revision of these proportions to accommodate this expansion of the original conception. A second stage, on the same card, shows Boulez experimenting with the possibilities of a mobile structure arranged in a 5x5 square. A jotting at the top right-hand side of the card raises the possibility of developments with mixtures being incorporated into the design. What became the final arrangement of the Formants is shown at the bottom of the card, with a fixed central Formant around which the other Formants revolve in a variety of possible permutations.

This tentative pencil draft is supplemented by a (presumably) later pen sketch (Ex.3.3), black ink on a blue postcard, clarifying the ideas already sketched and gathering them into a design of monumental proportions. A series of six mobile developments were to be inserted into the framework of five mobile Formants, and the whole was to be framed by an opening and closing 'Sigle' (anacronym), the two statements of which would be identical, in principle at least. It is clear from this that Boulez's remarks quoted above...
concerning the potential proliferation of material were not mere speculation, but that the idea of a vast, perpetually expanding compositional universe had been formulated specifically at an early stage in the work's gestation.

There is as yet no mention of titles for the Formants, however an undated postcard gives the following information:

Pour Berlin et Darmstadt
ordre des formants
Formant 4 Strophe
Formant 5 Sequence
Formant 3 Constellation
Formant 1 Antiphonie
Formant 2 Trope ordre δ α β γ
2-1-3-5-4

The Darmstadt première took place on 26th September 1957, with the Berlin performance following a few days later, so the implication is that the essential shape of the work had been finalised by then, despite the incomplete state of three of the Formants. In his performances over the next year or so, Boulez is known to have experimented with a number of different orderings of the movements. As we have noted, the recorded Cologne performance adopts the ordering 3-1-4-5-2. This creates a well balanced structure, although 'Constellation' has for the moment lost its place at the centre of the work. A performance in Dusseldorf on 29th October, 1958 restores 'Constellation' to its central position, and introduces a further variation in the ordering of movements: 1-4-3-5-2. Could it be that Boulez had intended to work more on the unfinished movements prior to these early performances, and that he engaged on a series of temporary expedients to
maximise the effect of the unfinished piece at its present stage?

The remaining material in the file of preliminary drafts relates to Formant 2, 'Trope'. Early sketches for this piece appear on the reverse of the card containing Ex.3.2. Taking this in conjunction with the evidence provided by the first performances, it is likely that this Formant was the first to reach its final form, and it will therefore be the first to be considered in this study.
REFERENCES

"Webern only organised pitch; we organise rhythm, timbre, dynamics; everything is grist to this all-purpose mill and we had better abandon it quickly if we are not to be condemned to deafness".
(2) Ibid, p.334
"Just as some painters do not see a canvas as a flat surface to be covered with non-figurative symbols, but strain to discover a new concept corresponding to the abandoned idea of perspective, so music has to find a new way of distributing the developments of a work without falling back on the formal concepts and 'architecture' of the past".
(3) Ibid, p.334
"Could one not imagine the 'Formants' of a work? Linked, certainly to the sound organisation specific to that work, but not at all dependent on it? Nothing could be less like a 'Theme', since a theme consists of features already integrated in the work; the 'Formant' - consisting as it does of unintegrated features - would be responsible for the work's physiognomy, its unique character. Whereas if one trusts in organisation, one is simply reverting to chance...by the laws of large numbers".
"The most basic embodiment of chance is to be found in the adoption of a quasi-oriental philosophy in order to conceal a fundamental weakness in compositional technique: a cure for creative suffocation with a more subtle disease which destroys the smallest embryo of craftsmanship".
(7) Ibid, p.408
"Schematisation simply takes the place of invention; imagination, a mere servant, limits itself to giving birth to a complex mechanism, which in turn takes on the task of generating microscopic and macroscopic structures until the exhaustion of all possible combinations marks the end of the work. An excellent safety device and a powerful alarm signal".
(8) Ibid, p.408
"In its All-Objectivity, the work represents a fragment of chance which is as justifiable (or unjustifiable) as any other fragment".
(9) Ibid, p.409
"Such frank objectivity having failed, its practitioners threw themselves like madmen into the search for the arbitrary...As for the performer, it is his job to pass on the assaults of the devil to you and to compromise you too; the performer-as-medium thus establishes himself as the high priest of this intellectual devilry".
(10) Ibid, p.409
"You see what is comes back to? Always a refusal to choose. The first idea was purely mechanistic, automatic, fetishistic; the second is still fetishistic, but escapes choice not by numbers but through the performer". (9)
(11) Ibid, p.411
"Composition is classically the result of constant choice"..."In my experience it is virtually impossible to see all the meanders and virtualities in the material with which one starts".
(12) Ibid, p.412
"Let us see whether, by overcoming some of the contradictions, we can succeed in absorbing chance". (13) Ibid, p.410

"However, the obsession with the can replacing the must is not simply due to feebleness of compositional resource, or the desire to draw the subjectivity of the player or the listener into the work, and thus force him continually to make instant choices. One could find other apparent reasons which are equally justifiable. First as regards the structure of the work, the rejection of a pre-established structure, the legitimate wish to construct a kind of labyrinth with a number of paths; on the other hand, the desire to create a self-renewing kind of mobile complexity, specifically characteristic of music that is played and interpreted in contrast to the self-renewing complexity of the machine". (14) Ibid, pp.434-35

"Reading and rereading Mallarmé's 'Le Coup de Dés', I was greatly struck by its appearance on the page, its actual typographical presentation, and came to realise that this formed an essential part of the new form: the typographical material had to undergo a metamorphosis for Mallarmé. The actual printing of 'Le Coup de Dés' is of fundamental and primary importance, not only as regards pagination - the spacial disposition of the text with its blanks - but also its typographical character". (15) Ibid, pp.436-37

"Grammatical associative logic makes it difficult for words to be interchanged without a phrase losing all or part of its meaning - in fact formal logic is at the present moment concerned with an exact study of this phenomenon. In music on the other hand, the logic of construction is less rigorously limited in validity: the non-significance and non-direction of the musical object in its primitive state make it usable in structured organisms, in accordance with formal principles much less restricted than those which obtain in the case of words". (16) Mallarmé, S. Preface to 'Un Coup de Dés' (1897) 'Cosmopolis'

"...the physiognomy of any work is determined by its structural 'formants', i.e. by specific general characteristics capable of generating developments. Each of these characteristics appears exclusively in each of the pieces which comprise the work". (18) Ibid, p.437

"The five formants clearly permit the genesis of other distinct entities, complete in themselves but structurally connected with the original formants: these entities I call 'développants'. Such a 'book' would thus constitute a maze, a spiral in time". (19) Ibid, p.443

"You will now realise the wealth of possibilities in the interaction of these formants - just imagine parenthesis pages, mobile cahiers, constellations of formants! The imaginative possibilities are, in fact, endless, provided the craftsmanship is there...". (20) Ibid, p.418

"With a single performer there is no problem, except that he must have more initiative than in the past, since this initiative - this collaboration - is demanded by the composer". (21) Ibid, p.419

"...far from rejecting, or doing away with the performer, I am plugging him back into the creative circuit, after he has for years been told to play the text as 'objectively' as possible. What am I saying? That I am actually ending up glorifying the performer! And not some terrifyingly precise robot-performer, but one who is interested and free in his choices". (22) Ibid, p.391

"The great works, happily, never cease to reimburse the inviolable darkness of their perfection". (23) Ibid, p.302

"...one abandons without regret the precarious illusion of a wholly satisfying precision, and
acknowledges the relativity from which no analysis is exempt".

(24) Ibid, pp.303-04

"It is no use analysis studying the different 'aspects' of the sound in different lights; it must, from within the work, address the various components which combine into the end product. It would be as well to explain this term 'components', which is open to misunderstanding; we should not understand it as referring to isolated factors (rhythm, melody, harmony) which are added up in a kind of monstrous fantasy arithmetic; rather it means vectorial components which, when added together vectorially, give a resultant whose direction is different, although defined by the components".

(25) Shorter OED

(26) Ibid

(27) 'Points de repère I: Imaginer', p.305

"If an analysis from within is valid so long as it is supported by the work's genesis and by the character of perception one has of it, one must needs take these two factors into account, or risk speculating in a void".

(28) Ibid, p.305

"As for the foreseeable benefits, they first become noticeable in the study of morphological structures, after which this first phase expands to take in the global structure; finally, by examining how these different levels of structure and their interrelationships evolve, that is by a gradual process of generalization, one can arrive at a description of what, strictly speaking, constitutes the work's progress".

(29) Edwards, A. in 'Tempo', June 1989, pp.4-15
CHAPTER FOUR

TROPE

The first explicit reference to the technical procedures of the Third Sonata occur in the essay 'Penser la Musique Aujourd'hui', first published in 1963, the year of the publication of 'Sonate, que me veux-tu?' In the chapter 'Musical Technique', Boulez expounds the serial principles on which 'Trope' is based. After a discussion of the symmetrical row structure of Webern's Concerto Opus 24, and of Berg's serial permutations in the allegro misterioso of the 'Lyric Suite', Boulez embarks on a discussion of his method of combining and expanding these processes, using the basic row of 'Trope' as an example. He segments the row into four unequal parts, as shown (Ex.4.1), thus producing various internal connections. He notes the 'isomorphic' links between (a) and b/d), each group consisting of the same basic four-note set characterised by intervals of a semitone and a perfect fourth (Ex.4.2). By permutating these cells, it is possible to obtain the additional intervals of an augmented fourth and a major second, as shown by my brackets. He goes on to note that segment (c) is symmetrical within itself, consisting of two minor thirds, G-natural - B-flat and C-natural - A-natural, but that the semitones and perfect fourths which characterise segments (a) and (b/d) are also present in (c) by means of permutation (Ex.4.3). Boulez concludes this section of the chapter with the comment: "Il y a donc, d'une part, symétrie apparente entre (a) et les deux fragments (b/d)" (1).

This explanation is of great interest, but Boulez's implicit claim to be building on Webern's serial technique is worthy of examination. The row of the Concerto Opus 24 is remarkable for its symmetry, as is that of his other example, the String Quartet Opus 28.
Both of these rows fall naturally into related segments of three and four notes respectively. By comparison, Boulez's segmentation is irregular, and somewhat arbitrary. Indeed, it would be possible to segment Boulez's row into three four-note cells and produce many of the same internal relationships which he demonstrates (Ex.4.4). This reduces as shown in Ex.4.5, which contains within each segment the characteristic semitone and perfect fourth interval, derived by means of Boulez's technique of "concealed symmetry". It also provides a major third interval (G-sharp - C-natural) in segment (b) to connect with the A-natural - C-sharp of segment (c). The exercise is by no means a purely academic one, since it demonstrates that unlike in Webern's symmetrical rows, the segmentation chosen by Boulez is by no means the only logical one available. Boulez might have added to his commentary the observation that the Third Sonata as a whole is unified by a single row, but that individual Formants derive their characteristics not only from the procedures outlined in Ex.4.1, but from the variety of serial treatments, including different types of segmentation. For example, the basic segmentation chosen for the only other published Formant, 'Constellation-Miroir' is as shown in Ex.4.6. However, this is to anticipate, and it is sufficient to observe for the moment that the technique of segmentation has profound implications for the compositional process, not only in terms of the intervallic connections discussed by Boulez, but in determining the overall design of individual Formants. In the same chapter, Boulez goes on to develop the possibilities of the segmentation chosen for 'Trope', showing how new series can be generated by a process of permutation. His demonstration of the technique shows how, starting with each of the four segments, he is able to generate sets of interlinked transpositions ("privileged" series) based on the relationship between the prime form and its retrograde inversion. A total of twenty-four series results from this process, two groups of four and two groups of eight. Since they
form the basis of the entire structure, they are reproduced here in full (Ex.4.7). By using the last segment of each row as the link in the process of permutation, Boulez is able to obtain four groups of circular transpositions. The process "... a déclenché des enchaînements cycliques de nature différente, puisqu'ils reposent sur la conjonction chaque fois renouvelée de deux figures isomorphes" (2). One concern of this chapter is an exploration of these links, and a consideration of Boulez's concluding remarks: "Ce principe engendrera, d'ailleurs, la grande forme de 'Trope', qui n'est autre qu'une permutation circulaire agrandie"(3).

The development of serial technique to enable the row to generate a work's overall structure is central to Boulez's compositional philosophy from 'Structures Ia' onwards, but the rather mechanistic methods employed in that piece had pointed towards a creative cul-de-sac. As we have seen, his solution in the Third Sonata is to exploit the potential of permutation as a form-generating principle. But in what ways are the permutations of Ex.4.7 used in the movement's overall design? Paul Griffiths confidently asserts that "Trope' provides a clear example of how a mobile form can develop as the necessary outcome of principles present within the series" (4), and points out that "...the serial method, which is permutational, logically entails permutable forms" (5). He goes on to note that, "these features of the series are mirrored in the Formant which also has four subsections, 'Texte', 'Parenthèse', 'Commentaire', and 'Glose', these being, so one may deduce, projections of the groups a, b, c, and d" (6). This is an important point, but we are left to make our own deductions as to the means by which this process is achieved. It is worth observing that, just as the segmentation of the series chosen by Boulez was only one of a number of available possibilities, so the choice of permutations involving prime and retrograde inversion of the series is itself part of the creative process, and only one of a range of options. For a fuller
understanding of this process it is necessary to consider the evidence provided by the available sketches.

THE GENESIS OF 'TROPE'

The available source material reveals the various stages in the composition of 'Trope', beginning with a verbal outline of the formal plan. This is followed by pencil sketches of the pitch series and preliminary drafts for all four sections. The final drafts, in pen, consist of a copy of the squelette ('skeleton') of each section, and a fair copy of the Formant, identical to the published edition.

The first drafts are as shown in Ex.4.8, and establish the overall design of four sections. At this stage, there was evidently the possibility of complete freedom in the ordering of the sections, which are to be distinguished from one another in their treatment of the basic compositional squelette. Thus \( \alpha \) will involve simultaneous statements of the skeleton and related champs ('fields') - Boulez's term for the labyrinth of serial commentaries he intends to exploit. The second section, \( \beta \) will separate these commentaries from the basic skeleton. As we will see, these descriptions correspond precisely to the formal plans of 'Texte' and 'Parenthèse'. The two remaining sections, \( \gamma \) and \( \delta \), propose a more complex relationship between the skeleton and possible developments, separated or 'hollow' at the same time (\( \gamma \)), and finally the skeleton disappearing altogether ('sans les notes') in its original form (\( \delta \)) (The following commentary will attempt to interpret these puzzling descriptions in relation to 'Commentaire' and 'Glose', respectively).

Underneath the above sketch, a revealing jotting, bracketing \( \beta \) and \( \delta \) together, suggests that this formal plan was conceived at the same time as the segmented series with
its isomorphic links, and confirms that Boulez's comments on circular permutation quoted above (3) were an accurate description of the genesis of 'Trope'. A further draft on the same sheet takes the formal process a stage further by plotting the possible links between the beginnings and ends of the four sections, and therefore by implication, establishing the parameters of choice available. Again, we can observe how closely the earliest drafts resemble the finished version.

The final stage in the elaboration of the form of 'Trope' is shown in a sketch found on the reverse of the blue card containing Ex.4.2 of the previous chapter. As mentioned earlier, the planning of this Formant appears to have taken shape at the same time as the earliest structural drafts for the work as a whole, and it can be observed how the evolving circular form of 'Trope' is a microcosm of the structure of the Sonata. This sketch is in two parts (Ex.4.9). An ink plan shows the various possible orderings of the four sections, with $\gamma$ now having two possible positions, either before or after $\delta$. Underneath, a series of pencil sketches attempts to represent these possibilities graphically, the final such attempt being an exact equivalent of the published format.

Before leaving the material dealing with the general planning of the Sonata, it is worth considering a small sketch which establishes tempi and metronome markings for the four sections of 'Trope'. This is part of a larger plan which includes the establishment of tempi for Formant 1, 'Antiphonie', and shows that Boulez originally conceived the two movements as being related by a gradual acceleration of pulse. Given the vastly expanded (although still unfinished) state of 'Antiphonie', one is again led to question the feasibility of Boulez ever completing the project as a whole without a fundamental revision which would extend to the already published Formants.

Returning to 'Trope', the pitch material is drafted on a single large sheet of
manuscript, and consists of the twelve transpositions of the row (A-L) with inversions (M-X) (Ex.4.10). Underneath this are a series of jottings demonstrating the various permutations available; they are identical with the procedures outlined in 'Penser la musique aujourd'hui' as described above, and shown in Ex.4.7. However, as represented in the shorthand used by Boulez (Ex.4.11), it can be seen more easily that certain series are "privileged", to use his term - and some more privileged than others. Thus A,V and G occur in each of the four sections. Q is present in three sections, K, O, F and N appear twice, and R only once. Significantly, some of the most heavily annotated rows in Ex.4.10 - E, I, U and W - do not form part of the "privileged" series, suggesting that they will have an important role to play in the generating of commentaries. One notes not only that these annotations link the isomorphice intervals of semitone (red) and perfect fourth (green), but that the same sets of dyads are consistently connected - namely the three minor seconds B-flat - A-natural, G-flat - F-natural and D-natural - C-sharp, together with the three perfect fourths, C-natural - G-natural, A-flat - E-flat, and E-natural - B-natural. Without wishing to anticipate here the fuller discussion of analytical issues which will be necessary later, it is evident at this early stage that the process of secondary permutation is one not only of considerable complexity, but, more important, of great flexibility, capable of shaping the musical structure at every level. The technique provides a window into a serial world whose possibilities are virtually limitless, and one enters into this world by attempting to relate the web of intervallic and motivic connections to their overall musical context.

The following consideration of the individual sections of 'Trope' is an attempt to articulate the issue of performer choice in relation to the source material. Unlike the other published Formant, 'Constellation-Miroir', it is at least possible to approach 'Trope' in the way on might begin to learn a traditional piece - by reading it through, slowly and painstakingly

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at the instrument. My own process of acquaintance with the piece began in this way, and continued for some time slowly building an aural impression of the musical detail, and allowing the unconscious the freedom to sense the shape of the musical discourse (although troubled by guilt that such an approach might allow chance to intrude into the learning process!). Eventually, at a more advanced stage, the interpreter arrives at the point of integrating his grasp of the musical details into his sense of the overall structure - this process remaining on an unconscious level with many performers. Such an intuitive response is impossible in this piece, since the performer himself has a considerable role to play in determining details of the movement's shape. This responsibility is on two levels - first, a limited degree of choice concerning the order of the four sections, and secondly, decisions on a more local level concerning optional passages in 'Parenthèse' and 'Commentaire'. To continue to be guided purely by one's intuition in arriving at these decisions would be a remarkable act of faith given the background against which the piece was conceived and in particular the invective directed by Boulez towards the advocates of chance procedures. Hence the necessity for an independent investigation of each section of the Formant, and a consideration of the various commentaries on it.

'TEXTE' AND THE PERFORMER

In Paul Griffith's opinion, `Texte' is the simplest of the four sections comprising `Trope', and he argues the case for placing it at the beginning of a performance of the movement, pointing out that Charles Rosen does so "in the recording made under Boulez's supervision" (7). Certainly `Texte' is less dense in texture than the other sections (unless one omits all the optional passages in 'Parenthèse'). However, Boulez himself, in his 1958 studio
recording of the Sonata, places 'Texte' second, adopting the order Glos-Texte-Parenthèse-Commentaire. Perhaps the decisions regarding performance order are not as clear-cut as Griffiths suggests. It is now time to consider the musical structure of 'Texte', in an attempt to articulate the process of shaping an interpretation. Whilst the element of performer choice is absent from this section (except in terms of its placing within the overall structure), its rhythmic construction allows the performer a degree of flexibility, and it is these sections of comparative rhythmic freedom which form the subject of the following investigation.

As discussed in the previous chapter, 'Texte' is based on the permutations of the row beginning with segment A (refer to Ex.4.7). It will be noted that this cycle of transpositions is less symmetrical than those, beginning with segment B, which shape the palindromic 'Parenthèse'. There, both prime and retrograde inversion are transposed by a tritone, in exact symmetry. In the case of segment A transpositions, the tritone relationships of PO-P6 and R12-R18 remain, but they interlock to form a series of minor thirds (Ex.4.12). This, as we will see, gives rise to a range of compositional options not available in 'Parenthèse'. Another potential resource in 'Texte' is that offered by the single note segment (b) which is at the same pitch in consecutive rows; G-sharp in PO and the complementary R18, D-natural in P6 and R12.

Turning to the score of 'Texte', it can be readily demonstrated that the musical structure is based on a statement of the four transpositions of Ex.4.7, which act in the manner of a cantus firmus. The original segmentation is retained, resulting in thirteen cells, as shown by the square brackets in the anotated score (Ex.4.13). However Boulez disguises the simplicity of the design by means of octave displacements, each four-note group being distributed between the hands in a way which emphasises the isomorphic links of perfect
fourth and semitone which are present in segments (a) and (c) (Ex.4.14). Even at this early stage of the investigation, one can observe ways in which the structure as a whole is governed by the properties of the row and its segmentation. Thus the single note segments (b) are given prominence by serving as pedal notes, against which are placed rhythmically free material of a more rhapsodic nature. The effect is to emphasise the tritonal axis of these two notes, G-sharp and D-natural, a relationship enhanced by the arrangement of the two three-note cells (d): in each statement, these same tritone notes, D-natural in cell (iv) and A-flat in cell (x) dominate the texture by again functioning as pedal notes.

Whilst 'Texte' lacks the palindromic severity of 'Parenthèse', it is evident that its row structure gives rise to a series of symmetries which shape its overall design. In fact, palindromic elements are inevitable in the row structures generated in all four sections of 'Trope', and just as the central segment of 'Parenthèse' acts as a pivot around which the section as a whole revolves, so in 'Texte', a similar function is performed by cell (vii). Its four notes are arranged so as to resolve the ambiguity between the R18 and P6 ordering (Ex.4.15). The resulting tritone F-natural - B-natural is placed at the centre of a triplet and thus forms a pivot for cell (vii) and marks the midpoint of the section as a whole. There is a further logic in this arrangement: the F-natural - B-natural tritone stands in the same relationship to the G-sharp - D-natural axis as do the prime - retrograde inversion transpositions on which 'Texte' is based. Again, the overall musical structure is mirroring the relationships generated by the original row.

Considering cell (vii) in more detail, it can be readily demonstrated that it consists of the twelve chromatic notes divided into three groups (Ex.4.16), and that each of these is a grouping of the same basic shape (Ex.4.17). We have seen that group (i) functions as a resolution of ambiguities. Groups (ii) and (iii) are distributed so as to demonstrate further
permutations. Thus (ii) emphasises the isomorphic perfect 4th and semitone relationships, whilst the disruptive (iii), with its grouping of single note and three-note cluster, emphasises the isomorphic links between segments (a) and (b/d) of the basic row.

So far we have considered only the pitch relationships, but it can be observed that the dynamic and agogic indications complement the connections already established. Thus the pivotal F-natural - B-natural pitches are at a higher dynamic level (mf) than the other notes of Ex.4.16, with the exception of group (iii). The poco sfz marking of this group suggests a momentary disruption, a ripple, emphasised by the accelerando and followed by a gradual revenir au Tempo into the next section (Hence the logic of the ppp marking of the grace note cluster just before the return to tempo: its pitches, F-sharp - G-natural - A-natural, are identical with those of the disruptive sfz chord, which thus dissolves into virtual silence).

It need hardly be said that the distinction between analysis and interpretation becomes rather arbitrary in this discussion: structure and interpretive detail fuse in such a way as to make a conscious awareness of the structural design essential for the "plugged-in" performer.

The creative conflict between rigorous organisation and improvisatory freedom was at the heart of Boulez's creative thinking during this period, and is indeed fundamental to his compositional philosophy. He has observed in conversation with Célestin Deliège: "...even in my early works, there is what one might call a contrast between free forms (sometimes there are, for instance, extremely free rhythms, almost improvised, or written down as they are thought up) and on the other hand extremely strict sections. This is something I still practise; it is one of my main ideas" (8). This is of great interest not only in relation to rhythmic structure but also, by implication, to pitch relationships, since there is no suggestion that such freedom can ever be applied to them.

As noted earlier, such contrasts between free and exactly notated rhythms are an
important element in 'Texte'. They have a similar relationship to one another as do the optional passages of 'Parenthèse' to the strictly palindromic ones. In the present section the rhythmically free material is confined to the four statements of the single-note cell (b) - that is, the axis notes G-sharp and D-natural, which act in the manner of pedal notes. As we would expect from the above discussion, these "extremely free rhythms - almost improvised" are applied to material whose pitch structure is rigorously ordered. These four passages will now be examined in the light of this seemingly paradoxical procedure.

The first such cell, (ii), is shown in Ex.4.18. Here the pedal note is accompanied by segments of RI8, arranged vertically in the order, (a),(d),(c) (refer to Ex.4.7). The other G-sharp pedal occurs in cell (vi), and this is decorated with segments of the complementary PO in the order, (c),(d),(a), but with minor alterations, as can be seen by comparing Ex.4.19 with Ex.4.7. The transpositions selected by Boulez in Exs.18 and 19 are, of course, those which form the basis of the overall design. Comparison of the two cells reveals how, even in a free rhythmic structure, he contrives to place the axis note D-natural at the apex of the phrase. Turning to the two cells which feature D-natural as the pedal note, it can be demonstrated that the above symmetries apply here also. Thus cell (viii), itself part of a statement of P6, is decorated by the complementary RI2, but in slightly disguised form since it commences with the seventh note of the series (Ex.4.20). The other D-natural pedal, cell (xii), itself part of a statement of RI2, is decorated with elements of P6, but in further permutations which demonstrate links with PO. This points to the fundamental circular unity inherent in the compositional process - a unity emphasised by the placing of the axis note A-flat (Ex.4.21).

It is clear that the above investigation of pitch content is of importance to the performer who would seek to interpret these rhythmically free passages with sympathy and
imagination. The infinite variety of nuances which breathe life into the dry dynamic and agogic indications can be released on an intuitive plane when the performer has taken steps to "plug-in" to the creative circuit. Such an approach assists one to shape not only those passages which appear to offer a degree of interpretive licence, but in fact informs one's interpretive approach at every level, even in sections where the construction is seemingly so rigorous as to allow the performer virtually no participation in the creative process.

We have seen that cell (vii) marks the centre of 'Texte'. Cells (iv) and (ix) are, as it were, nodal points in the structure, marking the dynamic extremes, pp and ff respectively of this section. Each of them occurs at an overlap of prime and retrograde inversion statements, and as in cell (vii), Boulez resolves the discrepancies in note order by use of pedals. The pitches used for this purpose are none other than the two axis notes - D-natural in cell (iv), G-sharp in cell (x). Thus these passages complement the rhythmically free passages discussed above: cell (x) uniquely contains both free and exact rhythms, and is thus a bridge between the two approaches to rhythm in 'Texte' and indeed in the entire work.

The technique of permutation is used with ever greater resourcefulness in establishing connections. In his exhaustive analysis of the cellular structure of 'Texte'(9), Manfred Stahnke draws attention to the vertical relationships in cell (iv). His grouping is as follows (Ex.4.22). This appears at first sight to be convincing, but in fact by concentrating on only one musical parameter at a time, Stahnke fails to draw attention to a series of linear connections which are of more importance in assisting the performer to shape the lines - namely the inversions shown in Ex.4.23. The other nodal cell (x) exploits further permutations against the axis note A-flat (Ex.4.24). Thus:

(1) R.H. A-flat - B-natural - C-sharp - A-sharp = (c)

(2) L.H. A-flat - F-natural - D-sharp - F-sharp = inversion of (c)
Of course, such a catalogue is of little help to the performer unless it is related to the other musical parameters. Of these, the $s f z$ dynamic marks are clearly of significance in relation to (3), whilst (4) and (5) mark the climax of the section, partly because of their register, at the highest and lowest extremes in the entire section.

It is evident from this analysis of seven of the thirteen cells of 'Texte', that the axis notes form a crucial element in the overall design, and one which reflects with inexorable logic the row structure on which the section is based. Their unifying role is enhanced by all the other musical parameters, and a sense of this unity, operating at all levels, enables the performer to begin the process of shaping a meaningful interpretation of the section as a whole.

The above analysis, like the ensuing one on 'Parenthèse', was written before I had the opportunity to examine the source material of 'Trope', and it was reassuring to find that my tentative conclusions were supported and strengthened after I had acquired a more thorough understanding of the compositional processes. One might, in parenthesis, make the general observation that, along with the enthronement of analysis as an academic pursuit in its own right, has come the corresponding desire for analytical certainties, as though by means of an examination of each individual musical parameter in isolation, the discipline would acquire a quasi-scientific basis. As we have seen, Boulez himself is critical of analytical methods which seek merely to categorise, without regard to the interaction of the various musical components: like any performer he is aware that this interaction constitutes the essence of the interpreter's art, and that it is capable of infinite subtle shifts of emphasis. My examination
of the source material of the Sonata was motivated by the desire to obtain as much understanding of the compositional process as possible, whilst avoiding the delusion that, in itself, it would hold the key to the composer's imaginative world. This investigation inevitably leads one to consider individual components in their turn, for it is only by a deeper understanding of each element that one can at least begin to relate them to one another with greater awareness. However, the moment when one begins to consider such relationships, the illusion of analytical certainty disappears and one is forced back on an empirical approach, guided at all times by a fusion between one's intuitive responses and musical observations made on a more conscious level. If, as interpreters, we are guided by an aural image of the printed page, then it is surely the case that our responses are in a constant state of flux. To deny as ill-focussed such an admission is to deny the possibility for an interpretation to develop and deepen. Hence the necessity to emphasise the essentially open-ended nature of analytical enquiry, even when, as here, it is informed by a detailed examination of the source material.

THE PENCIL DRAFTS

The final stage in the sketching process for 'Trope' is shown in the five pages of pencil drafts for the four sections. These are badly faded, but with patience and practice, it proved possible to decipher most of the sketches with a reasonable degree of certainty. The first of these 28-line sheets begins with a row plan for all four sections, identical to my Ex.4.7. Below this there is a draft of the squelette for 'Texte' (still referred to as α at this stage). This establishes pitches, rhythms and agogic markings, as shown in Ex.4.25, and it can be seen that the squelette for 'Texte', as with the other three sections of 'Trope', consists
of an ordering of the pitches of Ex.4.7. The segmentation into thirteen groups is marked by square brackets, and above these are tentative suggestions for commentaries - the letters corresponding to the rows as listed in Ex.4.10.

Immediately below the pencil skeleton is a pencil draft of the section as a whole in exactly the form described by Boulez in his first thoughts on the Formant - "squelette et champs en même temps". The draft is badly faded with much evidence of erasures, but it is already very close to the final version. The pivotal seventh group of the section evidently underwent much revision, and appears to have gone through a more rhythmically complex phase in which the rhythm of the final version was established but then further subdivided. The remaining material for 'Texte' consists of a pen copy of the skeleton, and a fair copy of the section as a whole. Of interest is the fact that titles for the sections appear to have been added at the final stage before publication. The four sections of 'Trope' are still identified by their original Greek letter names, but these were later crossed out and replaced by the published titles. This detail is not relevant to 'Texte' but will be of some significance in relation to the two sections which contain optional passages.

Despite the logic and fundamental simplicity of the design of 'Texte', one is left with the impression that a stage in the sketching process is missing and that there must at some point have been a preliminary draft of the rhythmic shape and the disposition of registers, not to mention the more detailed working out of the commentaries and the resolution of some of the inconsistencies noted above. It is, of course, the role of the performer to form an impression of the interrelationship of all these elements and to articulate these relationships in performance, and it is now time to consider 'Texte' further in the light of what we know about the compositional process and the performance issues raised by it.
THE SKETCHES FOR 'TEXTE'

The first requirement for the performer/analyst is to consider the relationship between the squelette and the champs (fields), that is to say, the basic material and the commentaries, which were to appear simultaneously. It was now possible, following the letter indications above the skeleton, to understand precisely the mechanism by which the pitch content of the surrounding commentaries were derived from the basic set of twenty-four transpositions of the row. The three supplementary sheets of analysis (Ex.4.26) summarise the pitch structure of 'Texte'. At the top of each sheet is the annotated score, with the squelette and letters identifying the row structure of the champs underneath. These rows are placed at the foot of the page, their four cells being labelled for ease of identification. The task of analysing how the pitch structure of 'Texte' is derived from these rows is a relatively straightforward matter, particularly as its comparatively sparse texture requires only single rows or combinations of two rows (as opposed to the complexities of 'Commentaire', where up to six rows may be used in combination). The mechanics of the process are that for each row of the champs, the notes of the squelette cell which it accompanies are omitted from the commentary: for example, the opening cell of the squelette consists of four pitches, E-natural, F-natural, B-natural, and F-sharp, which are omitted from the two rows, U and W, forming the commentary (hence the bracketing of these notes in Ex.4.10).

At first sight, the choice of rows for the champs seems rather arbitrary, however closer inspection reveals that the decisions are carefully organised in such a way as to complement and develop the pitch relationships already inherent in the squelette. Thus the four rows on which the squelette is based are A, Q, G, and V, and attention has already been drawn to the four single note cells, G-sharp in rows A and Q (groups (ii) and (vi)), and D-
natural in rows G and V (groups (viii) and (xii)), which together form the pivotal tritone on which the section hinges. An examination of the champs for these four cells reveals that they are arranged in complementary pairs, thus providing the key to the symmetries already observed:

<table>
<thead>
<tr>
<th>squelette</th>
<th>champs</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Q</td>
</tr>
<tr>
<td>Q</td>
<td>A</td>
</tr>
<tr>
<td>G</td>
<td>V</td>
</tr>
<tr>
<td>V</td>
<td>G</td>
</tr>
</tbody>
</table>

It is worth considering for a moment the detailed organisation of these cells, whose rhythmic freedom invests greater significance in the pitch structure. They illustrate on the one hand the flexibility of Boulez's treatment, but also the inexorable logic of his serial thinking. Thus the first of these groups, (ii), gathers the three available cells of row Q into chords, although slightly altering their sequence to a, d, c. This contrasts with the treatment in group (vi), where the champs are divided into two arpeggiated chords consisting of five and six notes respectively. These are derived by reading row A in sequence, beginning with the note G-natural, which follows the omitted squelette note G-sharp, as shown in my annotation. The champs of group (viii) repeat this procedure, using row V, and again starting from the note after the missing squelette note, but reading the row in retrograde form, and adopting a new segmentation of 3+3+4 notes for the arpeggiated chords. This increasing flexibility of treatment is continued in the final single note group, (xii), where the two four-note cells, (1) and (2), are derived from row G by permutating the notes of the original four-note cells, as indicated by the cross beams in the annotation.

Such technical resourcefulness is already remarkable, but the possibilities are
multiplied when two rows are available for the champs, as is the case with six of the thirteen
cells of 'Texte'. Again, the first question must be, on what basis are these rows paired? The
choices appear haphazard at first sight: surely the notes of any two rows could be so
permutated as to form the champs? Comparison of the ordering of the pitch structure in each
case shows the logic of the pairings. Thus in group (i), the champs consist of rows U and
W, chosen because the squelette notes are found within the four-note cells, a and c, of these
two rows. Their positions in these cells are complementary rather than identical, as shown
in the annotation: these are the only two rows of the available twenty-three which contain the
four squelette pitches in this configuration. A close examination of Boulez's treatment of the
champs cells shows, not only that the two single notes of cell b, G-natural and D-sharp, are
paired to form an upbeat to the single-note group (ii), but that this group as a whole is folded
within the pitches of group (i), since the final cell, d, of row W is placed after it. A similar
procedure is followed in the treatment of the complementary single note group, (viii), where
the resolution of the final three-note cell of row B from the previous group, (vii), only occurs
after the statement of the champs of group (viii). Thus the rhythmic freedom of the four
single-note groups, suggesting a fluid, improvisatory character in contrast to the more fixed
framework of the other groups, can now be demonstrated as having a counterpart in the pitch
structure, where the cells can be distributed so as to enfold those of the single-note groups,
thus creating the effect of a trope.

A result of the circular row structure inherent in the conception of 'Trope' is that all
four sections display palindromic features in varying degrees. This is, of course, especially
so in the case of 'Parenthèse', where the squelette is cast in the form of a palindrome, but one
senses the device operating within the structure of 'Texte' also. In the light of an
understanding of the pitch structure of the section, a comparison of the opening group, (i),
with the closing group, (xiii), is revealing. The choice of rows W and L for the champs of
group (xiii) creates a similar relationship with the squelette notes as had been the case in
group (i), with these pitches being equally distributed between the two four-note cells of each
row. In addition, the distribution of cells in the champs has many parallels in both pitch and
rhythmic structure, with U and W of group (i) corresponding respectively with W and L of
group (xiii). This group is not only freely palindromic within itself, being framed by the two
three-note cells, d, but the final interval is a direct reference to the opening rising seventh of
the section as a whole.

Such symmetries in the choice of champs can be observed throughout 'Texte'. Thus,
the choice of rows P and J to form the champs of the three-note group (iv) is seen to be
governed by the positioning of the squelette notes, which occur sequentially as pitches 12, 1,
and 2 of each row. (It is amusing to note in passing a compositional finesse: the strictly
notated pitches of row P are troped within those of row J, but these are grouped chordally as
grace notes - a reversal of the normal procedure within 'Trope', where passages of comparative
rhythmic freedom are inserted between strictly notated sections). The other three-note
squelette group, (x), has an identical positioning of its squelette notes within the two rows,
E and T, which together form its champs. The arrangement of the cells is more symmetrical
than in group (iv), but their provenance is at times disguised by permutation, as in the
derivation of cell (1) from pitches 10, 11 and 3 of each row - a sequence which looks
arbitrary until one excludes the squelette pitches, 12, 1, and 2, after which cell (1) is shown
to consist of consecutive pitches.

The only other instance of the simultaneous use of two rows as champs occurs in
group (vii), the exact midpoint of the section. Its use of rows B and J at first sight appears
strange, since the distribution of squelette notes within the rows is different. However,
Boulez is able to exploit other pitch convergences between these two rows, the climactic central *poco sfz* chord consisting of a combination of cells b, c, and d of row J, whilst at the same time combining cells a and c of row B. The four notes of the remaining cell, a, of row J are used to frame this chord, their triplet rhythm echoing that of the *squelette* notes within which they are folded, again in the manner of a trope.

These relationships, and the pitch structure of 'Texte' as a whole, are demonstrated in the annotated score (Ex.4.26), with accompanying *squelette*, and row structure. There is no pretence that this analysis is more than a first step in understanding the complexity of the serial relationships generated in even this comparatively texturally simple section. However, a start has been made in attempting to understand the compositional process from a performer's standpoint. As a postlude to this analysis and as a preface to the ensuing consideration of 'Parenthèse', it is worth quoting the words of that perceptive commentator, Edward Cone, at the end of a recently published article on Brahms interpretation (10): "The test of the foregoing analysis lies, of course, in performance... one encourages performance and analysis to criticise each other, as it were. In so far as the dialogue proves to have been interesting and fruitful, the analysis will have been a success".

'PARENTHÈSE' AND THE PERFORMER

It is evident that, before addressing the question of choosing the order in which to perform the four sections of 'Trope', the performer must take decisions on a more local level with regard to the functions and indeed the shape of individual sections. As noted above, two of the sections contain optional passages whose inclusion has a significant bearing on the proportions of the movement as a whole. Boulez's remarks in 'Sonate, que me veux-tu?' serve
as a starting point for the "analysis from within" which he advocates. The principle of a trope had already been used by him in the slow movement of the Second Sonata, but the idea is expanded in the Third Sonata to embrace the structure on various levels. Boulez lists three uses: "ils se greffent à l'intérieur des valeurs générales données qu'ils commentent - dans ces deux cas, ils doivent être joués; ils s'intercalent entre ces valeurs générales et sont inscrits entre parenthèses avec d'autres caractères typographiques - ils peuvent se jouer ou s'omettre" (11). So far, so good, but at no point does Boulez provide the performer with any criteria for the exercise of this choice.

Turning to 'Parenthèse', the more straightforward of the two sections containing optional interpolations, one possibility would be a performance which omitted all of these passages. The result would constitute a statement of the fundamental elements of this section. As Paul Griffiths (12) has pointed out, this consists of a statement of a twelve-note row, followed by its retrograde inversion, each transposed a tritone, and laid out in the following sequence (Ex.4.27). The segmentation into unequal groups of 1:4:3:4 pitches is maintained throughout 'Parenthèse' and articulated by the rhythmic groupings. As Griffiths demonstrates, this grouping of pitches suggests internal relationships within the row, cells b and d in combination consisting of a transposed form of a. The tritonal transposition of the row and its retrograde inversion enables Boulez to exploit the permutational possibilities of cell a, as illustrated in Ex.4.27. These procedures already recall the aim expressed in '...Auprès et au loin': "...de considérer la séries non comme un ultra-thème, liée à jamais aux hauteurs, mais comme une fonction génératrice de tous les aspects de l'oeuvre" (13). The layout shown in Ex.4.27 creates a palindrome by inversion, and this palindromic pitch structure is mirrored in the other musical parameters: in the rhythmic groupings, their internal rhythmic detail, and in dynamics. This organisation even extends to register, with segments b and d fixed in
register, in contrast to the mobility of the four-note segments a and c. The rigid compositional logic of the compulsory sections leaves little room for interpretive licence, but this restriction is offset by the freedom granted to the performer in the paranthesis passages. An investigation of the function of these sections is therefore of importance for any performer faced with the range of choices offered by the composer.

The first such passage, P.1, (Ex.4.29) begins with a gesture of disruption, a massive eight-note arpeggiated chord, paradoxically related to the previous section, A, since it gathers together in transposed form, at the interval of a minor third, the first eight notes of the row. An attempt to illuminate the compositional process by means of pitch-class analysis is doomed to failure. The resultant grouping, into two semitonal clusters (Ex.4.28), renders such an approach useless as a tool for more detailed analysis, but does illustrate another of the row’s latent symmetries - and hence the paradoxically disrupting effect of a chord which seeks to impose such a symmetry. The pitch-class arrangement also obscures the intervalllic properties of the chord: these consist of major 7ths and minor 3rds, precisely the intervals which characterise segments (c) and (d) of the original row. The only interval already used which is not encompassed in the chord is the B-flat - C-natural, minor second/major seventh: now, with inexorable logic, as the chord dies away, a minor 7th, A-natural - G-natural emerges, and leads into the next gesture, throughout which it remains inaudibly in the background. This figure, accelerating as it moves from low to high register, is based primarily on the major 7th interval, but contains vertical reminders of the minor 3rd/major 6th characteristic of cell c. Again one observes the comprehensive technique whereby the linear 3rds and 6ths of section A become vertical in P.1, and the major 7ths become primarily motivic. The final gesture of this parenthesis reinstates the minor 7th A-natural - G-natural in the background against the major 7th interval, but now transposed into a two note E-natural
- F-natural cell. This is answered by a three note B-natural - B-flat - C-natural cell, which anticipates the next Tempo section both in pitch and in its triplet rhythm. There is, of course, the danger that this analytical approach can result simply in a description of musical events. Nonetheless it is clear that a function of P.1 is both to act as a commentary on material already stated and to anticipate the discourse of the following section. It could even be argued that P.1 is itself palindromic in shape, containing as it does, three segments, the last of which reestablishes the eight notes of the first. Even the internal rhythmic organisation is palindromic in conception, with its articulation of a range of triplet rhythms deriving from section A. Such observations enable the performer to feel to some small degree, "plugged-in" to the creative process, able to begin to contemplate informed decision regarding the inclusion of this passage. Do all the other such passages have a similar function, and if so what conclusions can be drawn regarding the overall shaping of 'Parenthèse'? Is a selective inclusion of parenthetical passages a feasible option?

Even a cursory examination of the next parenthèse, P.2, reveals that its function is again to act as a commentary. The previously stated material, section B, consists of the overlapping four-note figure E-natural - F-natural - B-natural - F-sharp (E-natural - B-natural - F-natural - F-sharp in its retrograde inversion form), together with the three-note cell, G-natural - A-natural - G-sharp (Ex.4.30). The intervallic permutations available here include all intervals apart from thirds and sixths. This parenthesis exploits these intervals in such a way as to emphasise the perfect fourth/tritone clash available in the E-natural - F-natural - B-natural - F-sharp group, and the ambiguity of the order of the two middle notes. It opens, as does P.1, with a seemingly disruptive gesture which mirrors, in rhythmically compressed form, the shape of the preceding section B. Its ten notes include all the notes of the chromatic scale apart from the ambiguous F-natural - B-natural tritone. Hence the added force of the way in
which this interval is contradicted by the next gesture, a perfect fourth, F-natural - B-flat, defiantly placed in the same register as in the preceding section, and emphasised in both dynamics and rhythmic accentuation, the contradictory B-flat being given extra prominence by its lengthened value. The logic of the solitary F-natural at the end of P.2 lies in its removal of the 'offending' B-flat. In the meantime, the tritone interval has reasserted itself, although not at the original pitch, the B-natural having been, as it were, banished from its original register. As in P.1, the material is derived from transposed and permutated versions of melodic cells from the preceding section, expanded in both register and dynamic range. The rhythmic cells are, with occasional variation, non-retrogradable and therefore reflect again the palindromic nature of the entire structure. Despite these similarities, P.2 differs from P.1 in being entirely concerned with exploiting the tensions latent in the preceding material: there is no attempt to anticipate the next section, whose intervallic content and registral distributions are a contrast to the preceding P.2.

The next parenthesis, P.3, occupies a pivotal position, placed at the exact centre of the structure. The suspended D-natural remains in the background throughout, making three appearances, all at its original pitch, as though reminding the listener of its continuing presence - a procedure recalling on a larger scale the use of the minor seventh in P.1. The opening of P.3 with its minor third and major sixth intervals recalls those of the preceding section, C, but this is interrupted by an eight-note chord reminiscent of the opening of P.1, and consisting of another permutation of its notes, now transposed at the interval of a tritone, and therefore paralleling the transpositions in the overall design of 'Parenthèse'. Both gestures are repeated, in permutated form, the eight-note chord now dissolved into a très rapide arpeggio (Ex.4.31). The first eight-note chord permutates the last eight notes of the basic row's retrograde inversion, but in transposed form, whilst the très rapide figure restores the original
note order, but retains the transposition (Ex.4.32). The miraculous symmetry of the organism as a whole suddenly becomes apparent. As we have seen, the overall structure is based on the tritone relationships of original set and retrograde inversion, and the combinatorial possibilities of the last four notes. It is now clear that the eight-note chords of P.1 and P.3 are applying the same techniques to the first eight notes of the basic set. Moreover, a comparison of the choice of transpositions reveals that the tritonal relationships are retained in these parenthesis sections (Ex.4.33). The "plugged-in" listener is drawn to these discoveries not primarily by analytical method but by the unfolding of the musical discourse, and the way in which these relationships are made explicit in linear terms at the exact centre of the section as a whole. The notes of the arpeggio are immediately repeated, at the same register, but in a different pitch permutation: the marking fortissimo suggests that the composer is almost embarrassed at having exposed the pitch relationships so audibly, and is withdrawing again with a whisper into his secret world of permutations.

The second half of P.3 is essentially a palindrome of the first half, but the process of transformation continues, suggesting new connections and tensions. The 'missing' first four notes of R19, G-natural - D-natural - A-flat - A-natural, play a crucial role. The last three of these four notes form part of the next gesture (f) (Ex.4.34), which restores the intervals of the corresponding cell (c) (Ex.4.31) by means of an added F-natural. This rogue note, sounded pp, is immediately contradicted by the reappearance of the missing G-natural emphasised by its sforzando dynamic but also by the fact that it is itself a foreign body in the succeeding gesture (g), which forms a further permutation of the last eight pitches of R19 (Ex.4.34). Finally, the link between the outermost cells, (a) and (h) can be demonstrated as follows (Ex.4.35): both contain the first four notes of R19, and by the technique of chord multiplication, build eight-note chords. The transpositions are at a tritone to one another and so provide a further
instance of the way the basic row structure of 'Parenthèse' constantly influences the composition on a more local level.

Thus the remaining bracketed groups, P.4 and P.5, are essentially palindromes of P.1 and P.2, although with some adjustments. The central parenthesis, being in itself palindromic, has in effect provided an anticipatory commentary on the next section, which must therefore be extended in order that P.4 fulfil its role as commentator. This section, which groups P.2 and the last gesture of P.1 into a freely palindromic restatement, is again concerned with the perfect fourth/tritone relationship of P.2, resolved this time in favour of the B-natural. The final parenthesis, P.5, restores the eight-note chord of P.1 at its original pitch, thus bringing the section as a whole full circle.

What implications for performer choice can be drawn from this analysis? It is clear that the arbitrary omission of any of the five optional sections would cause an imbalance in the structure. The relationships which exist between P.1 and P.4 and between P.2 and P.5 are so delicately balanced that it would not be possible to omit one without compromising the palindromic structure of the whole. P.3 is to some extent more independent, although its pivotal role in exploiting the potential inherent in the basic series makes it the richest and most varied of all the optional sections. The performer certainly has a real choice in articulating the structure, but for the "plugged-in" performer, there are essentially four options:

1. play everything
2. omit all bracketed sections
3. omit P.3
4. play only P.3

In exercising these options, one is always mindful of Boulez's words: "...la liberté - ou la libération - de l'exécutant ne change absolument rien à la notion de structure, le problème
n’étant, en fait, que rejété un peu plus loin, les solutions restant toujours à trouver" (14).

THE SKETCHES FOR 'PARENTHÈSE'

The conclusions reached in the preceding paragraph concerning the status of the material in parentheses predate my study of the sketches. It was with a sense of relief that I was able to confirm that further analysis, based on the evidence provided by the source material, not only reinforced the views expressed there, but shed further light on the compositional processes of 'Parenthèse', and afforded insights of a more general nature into Boulez's approach to mobile structures.

As noted above (Ex.4.8), in the evolution of the formal plan of 'Trope', the intention was that in section ß, the skeleton and commentaries would be separated note par note, as distinct from the simultaneous treatment of section α. There is as yet no indication of the means by which this might be achieved, nor any suggestion that the commentaries might involve an element of choice. It should perhaps be reiterated at this point that the titles of the four sections comprising 'Trope' were apparently only fixed at an advanced stage after the completion of a fair copy of the Formant as a whole. The fair copy itself is of interest, in particular for the manner in which the parenthèse sections are inserted with sellotape, as though they had been drafted independently.

The sketches for 'Parenthèse' (B) are more extensive than those for 'Texte', and enable us to follow the genesis of the section stage by stage. The first two lines of the page of pencil sketches consist of a draft of the squelette with some jottings for possible row combinations along the same lines as those of 'Texte' (Ex.4.36). However the question marks in two places suggest that there was evidently some uncertainty at this stage concerning the
exact pitch content of the champs. In addition, the layout is already somewhat different from
in that in 'Texte', with the horizontal brackets indicating that some champs were to be troped
within a larger framework. The disposition of the letters suggests that at this stage there was
no plan to group the cells of the squelette into larger units. Underneath is a second version
of the squelette, which shows many changes of mind with regard to register, and is now very
similar to the final pen draft apart from a slight alteration of register in the penultimate group
(Compare Ex.4.36 and Ex.4.37). Of particular interest in this second pencil version are the
various vertical dividing lines. These may well be a later addition, but they show a stage in
Boulez's shaping of the section since they correspond to the points of the parenthèse
insertions. The crossings-out reveal that he had conceived the insertions as occurring at
exactly symmetrical points in the palindrome, but had revised this conception in the light of
the considerations investigated in the previous section of this chapter. These vertical lines are
superseded by brackets underneath the stave which correspond to the final groupings.

The parenthèse sections evidently caused Boulez much more difficulty than
the squelette, and the remainder of the page of pencil sketches is taken up with
fragmentary drafts for these. There is as yet no indication that there was to be an
element of choice in the performance of these interpolated sections - indeed some
sketches suggest that at this stage they were conceived as part of a conventionally notated
structure. The first such draft is shown in Ex.4.38, and, fragmentary though it is, reveals
that Boulez originally placed the eight-note chord of P.1 immediately after the initial
G-sharp before proceeding with more of the squelette and sketches for what became P.1.
This does raise again the question as to what extent the commentaries are an integral part
of the structure, and casts renewed doubt on the advisability of omitting any of them,
whatever the theoretical options may be. Taking this sketch in conjunction with the first
pencil draft (Ex. 4.36), it is possible to trace the various pitch connections between the opening phrase and P.1 in more detail than in the previous section of this chapter. Thus Boulez's first thoughts were to use transpositions N and K as commentaries on both the opening G-sharp and the closing three-note cell of section A. These two transpositions are related by their opening segments, and N is particularly heavily annotated in Boulez's table of the row transpositions (Ex. 4.39). The pitch content of the whole of 'Parenthèse' is analysed in my annotated copy, which places the score above the rows used for the champs (Ex. 4.40). Thus it can be seen that the disruptive eight-note chord of P.1 consists of all the notes of rows N and K except for the opening group. The parenthèse then proceeds by inserting the champs, consisting of rows E and U, before concluding with the cells of row K, in effect creating a parenthesis within parenthesis. The choice of rows follows the procedures established in 'Texte', with the pairs of rows linked by the positioning of the squelette notes. An interesting unifying element within P.1 lies in the fact that although the troped middle panel is based on rows E and U, the groupings also correspond to the annotated dyads of row N (refer back to Ex.4.39). It should perhaps be added that the above analysis supplements rather than replaces the one in the previous section of this chapter, where an attempt was made to consider the pitch content in relation to the other musical parameters.

The remainder of the pencil sketches for this section provide insights into the compositional process similar to those considered above, and relate almost entirely to the pitch material. Boulez was evidently particularly exercised by the combinatorial possibilities of transpositions F and O, which share the same opening four notes in a way which recalls the K-N relationship exploited above. Unusually, Boulez jots down, at different places on the page, two identical drafts of the possible relationships between
these two transpositions. The reason for this becomes apparent when one examines in detail the treatment of the champs, and there relationship to the squelette. The palindromic characteristics of the squelette result in a pivotal single note, D-natural, linked to a repeated three-note cell, G-natural - A-natural - G-sharp. As the first squelette sketch shows, Boulez treats these central cells as a linked unit, with each using the combination of rows F and O as its champs, and he intended to exploit these relationships at the central point of the palindrome. They can be traced most overtly in P.3, where the eight-note chords at opposite ends of the groups utilise all the available notes of the two rows, the succeeding très rapide arpeggio is a retrograde of O, and the answering furtif group is a retrograde of F. The procedure is a very similar one to that discussed in relation to P.1, and exactly parallel in its derivation of the eight-part chords. The effect is to impart a unity of pitch structure, which I had sensed, and been able to analyse in some detail prior to seeing the sketches: now it was possible to understand the operation of the compositional process in more detail. It is interesting to note in passing that the climactic assez large F-sharp of P.3 was originally emphasised in the sketch by a trill, F-sharp - G-sharp, whilst the succeeding arpeggio was originally marked $p > ppp$.

Immediately below this sketch is material relating to what became the fourth parenthèse. This is quite similar to the final version except for the numerous changes of register, but of particular interest is the concluding gesture, which was later moved to form the end of P.1, and replaced in the final form of P.4 by a transposed version of the same shape. The relevant sketch is reproduced below my annotated score, and a comparison of the two is revealing. Apart from the numerous changes of register, the sketch is much more rudimentary in its rhythms, the precise details of which were
evidently finalised at a later stage. This section is particularly complex in its pitch structure, with the complementary rows V and A framing rows O and K. The remaining material consists of troped inserts formed from cells of rows F and O: their fragmented appearance here contrasts with their prominent structural placing at the centre of the palindrome in the previous section.

The final two lines of the pencil sketches consist of three sketches for the final parenthèse, the last of which is virtually identical to the final version in both pitch and rhythm, but excluding the massive final chord, which was presumably added after the ambiguities of the first sketch for P.1 had been resolved, and the overall shape of the section had been finalised. As elsewhere, the structure of the squelette is reflected in the champs, and this closing section mirrors the opening in its pairing of rows N and K, although reversing their original functions: row N is now broken into its constituent cells, whilst row K forms the concluding eight-part chord, which bring the section back full circle to its opening gesture.

This necessarily inconclusive survey of the available sketches for 'Parenthèse' has allowed the performer to share some of the stages of the compositional process, and in particular helps shed light on the rôle of the interpolated passages. A growing awareness of the structural importance of these and their place at the very heart of the musical conception enables the performer to draw his own conclusions concerning their relevance to the musical dialogue, and to shape his performance of 'Parenthèse' accordingly.
'COMMENTAIRE': ASPECTS OF ANALYSIS AND PERFORMANCE

'Commentaire' is the climax of 'Trope' in terms of textural complexity, rhythmic inventiveness, and dynamic range - not to mention pianistic difficulty. As we have seen, Nicholas Maw, one of the earliest commentators, viewed the structure in traditional terms with 'Commentaire' regarded as the development and 'Glose' as a varied recapitulation. Nonetheless, most performers have followed the composer's lead and placed 'Commentaire' at the conclusion of the Formant, where it makes a characteristically brusque ending. As well as the formidable technical challenges posed by this section, there is the element of performer choice in the presence of optional passages, which suggest links with 'Parenthèse'. The purpose of this enquiry, as with 'Parenthèse', is to examine the issue of performer choice in the context of an analysis of the section and of the available source material.

The title is a description not only of the function of the optional sections, but also refers to the operation of a comprehensive serial technique, as indicated in Boulez's original plan quoted in Ex.4.8: "γ = squelette ou champs séparé, ou en creux en même". Thus all of the available technical resources will be found here: the skeleton or its 'field', separated in the manner of 'Parenthèse', stated simultaneously as in 'Texte', or 'hollow', that is to say, absent, in anticipation of 'Glose'. If the ambition of the performer/analyst is to 'plug-in' to this process in an attempt to understand the generating forces of 'Commentaire', the task is indeed a daunting one. In fact, as was the case with 'Glose', my initial attempts at analysis were unrewarding, the complex texture proving resistant to the empirical approach which had been successful to a degree in considering
the element of performer choice in 'Parenthèse'. A particular problem in 'Commentaire' is the manner in which the squelette pitches are surrounded by commentary, and indeed are submerged by it at times. But this is to anticipate. Fortunately, it has been possible to refer to the sketches, which provide the key to the pitch structure.

During my first visit to the Paul Sacher Stiftung in 1995, I was able to consult the squelettes of all four sections, and the one for 'Commentaire' is the starting point for our investigation (Ex.4.41). It consists of a statement of the eight transpositions of Ex.4.7c, each of the seven nodal points joining overlapping rows being clearly marked with an X, as in the squelettes already examined. However a comparison with the squelettes of 'Texte' and 'Parenthèse' shows that even at this early stage in the compositional process, 'Commentaire' has a much more dramatic character with more extreme contrasts of dynamics, register, texture (four-part chords), and various modes of attack: noteworthy in this respect is the treatment of the four single-note nodes, each of which is characterised by a contrasting staccato grace-note in contrast to the legato treatment of the three four-note nodes. Despite these and other symmetries, the squelette of 'Commentaire' lacks the palindromic elements of 'Texte' and 'Parenthèse', and is therefore more open and dynamic in its formal structure. This embryonic character is developed to a far greater degree in the final form of the section.

Because of the complexity of 'Commentaire', it has been decided in the interests of clarity to present the analysis directly in relation to the musical text. Each page of Ex.4.42 consists of three elements: the score of 'Commentaire' at the top, the squelette underneath, and the relevant sketches on the lower half of the page. These pencil sketches are more extensive than those for the other sections, occupying two large sheets of manuscript paper, which are badly faded with much evidence of erasures.
During my second visit to Basel in January 1996, I was able to undertake a thorough examination of these sources, and to catalogue the contents of the two sheets, with the pencil draft of the squelette at the top of the first sheet, and underneath the row tables alternating with sketches. The division between the two becomes disjointed after the first set of tables, with much revision of the sketches for C.3. A short section at the join between the two pages lacks sketches altogether, otherwise the composition of the second half of 'Commentaire' appears to have been a more straightforward process, as indicated by the more organised division between row and sketches on the second page. The row tables provide the key to the pitch organisation, and are therefore reproduced in full. After this stage, the extant pencil drafts are on the whole close to the finished score, suggesting that Boulez simply erased preliminary sketches as he shaped the material towards its final form. Hence sketches are only reproduced where they reveal an intermediate stage in the compositional process.

A comparison of the squelette with the score of 'Commentaire' shows that it forms the basis for the compulsory sections, S.1 - S.10, as in 'Parenthèse'. However the relationship is a much more complex one in 'Commentaire'. The eight rows are not simply laid out in succession with commentaries confined to the optional bracketed sections, but are themselves accompanied by commentaries (champs) which are at times allowed to obliterate the original squelette pitches altogether. This is illustrated in Ex.4.42: the sections where the squelette appears in its original form are bracketed in red, whilst the sections of the squelette bracketed in blue are those where it does not appear in the score of 'Commentaire' but is represented by its champs, rather in the manner of a negative image. On examination, a logical pattern may be observed in this process, particularly in the treatment of the seven nodal points. Thus in the first half, the single-
note nodes, G-sharp and F-natural, are suppressed, whilst in the second half, the corresponding notes D-natural and B-natural are present but concealed within the surrounding commentary. This procedure is in contrast to 'Texte' where, as we have seen, the nodal notes form prominent points of axis around which the structure revolves. Conversely, of the three four-note groups, only the first is stated in its original form, the other two being submerged within the champs. The second of these four-note groups forms the exact centre of 'Commentaire', but is only heard in recognisable form, very prominently, in the ensuing commentary. Already there are implications for the performer here: even at this early stage of our investigation it is evident that the optional sections consist of commentaries folded within a framework of allusions, and an understanding of the structure as a whole will have an important bearing on the operation of choice in this section. Whereas in 'Parenthèse' the optional sections are much more extended than the skeleton which they elaborate, in 'Commentaire' the balance is more even and the relationship more subtle.

The squelette reproduced in Ex.4.41 is a copy of the pencil version found at the top of the first page of sketches for 'Commentaire'. It is identical to the pen version apart from the absence of dynamic indications, but it contains important additional information concerning the rows to be used for the champs. As in the other sections, the identifying letters correspond to those of the composer's table of transpositions (Ex.4.10). Boulez has already taken decisions concerning the status of each group of the squelette in the plan of 'Commentaire'. They may be present (frappées), absent (absentes), or occasionally half-present (demi-présent). In addition, the placing of the bracketed sections (parenthèses), has been fixed with apparently none of the uncertainty which characterised the drafting of 'Parenthèse'.

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'Commentaire' opens with a dramatic gesture in the top register of the keyboard, immediately setting it apart from the more subdued character of the other three sections. The notes of the squelette are present, framing this opening section, S.1, but enriched by commentaries obtained from the rows P, B, and L. The sketch reveals the compositional principle which will be applied consistently throughout this section and indeed the Formant as a whole: the chosen rows are used minus the four notes of the squelette, thus making champs of eight notes, grouped to form chords of three and five notes in each case. As shown diagramatically, B is combined with the opening squelette chord to produce a composite seven-part chord. The notes of P provide a rhythmically free commentary on this opening. B and L are used in combination to anticipate and accompany the final A-natural of the opening squelette group (a). The concluding acciaccatura is based on the five-note chord formed from the notes of B and L, and serves not only to conclude this group but to anticipate the next group (b). A simple statement of (b) in its unadorned squelette form closes S.1, whilst at the same time preparing for the first optional section, C.1.

If the analysis reads so far as being somewhat academic, this is a necessary stage in any attempt to understand the compositional process, and is by no means exhaustive even in terms of pitch relations: thus it may be observed that the three chosen rows P, B, and L have as their single note cell the notes B-flat, A-natural, and G-natural respectively, and all of these occur in the opening squelette group (a). Furthermore, the three and five-note chords of the champs are derived from these rows by the simple device of using consecutive notes of the eight available in the series. If one places the pitches back within the context of the musical framework as a whole, it can be seen that the shape of the squelette still dominates the opening section, despite the
wealth of commentary. This remains on a decorative level because of its imprecisely defined rhythmic structure in contrast to the precision of the squelette.

The compositional principles having been established, the first optional section, C.1, is straightforward in its pitch content, being derived from the notes of row Q. The logic of this choice is that the last three-note cell of Q corresponds to the notes which concluded the previous compulsory section, and the remaining notes of Q are arranged so as to comment on the falling major seventh of this preceding group whilst at the same time expanding the dynamic range and elaborating the triplet rhythm. It may be noted in passing that, as with the sketches for 'Parenthèse', the sketch here fixes the pitch combinations whilst leaving precise details of register and rhythm to the final stage.

At this point, the squelette pitches disappear temporarily, to be replaced by the champs. Thus the next section, S.2, retains the rhythms and dynamics of the squelette but derives its pitch content from row G. Again the sketches reveal the precise means of organisation: all the remaining eight notes of the series are used, grouped in chords formed from the notes adjacent to the four displaced. Of greater interest than the technique of pitch organisation in isolation is its effect in context: whilst the optional section C.1 is an effective commentary on the preceding opening, it would be perfectly possible to accept the composer's invitation to omit it: the effect of this alters the function of section S.2, whose pitch shape inverts that of the preceding S.1.

In the meantime, the pitch content of S.2 has deprived the original squelette of one of its characteristic intervals, the perfect fourth, F-sharp to B-natural. This interval is now quietly but prominently reinstated at the opening of the next optional section, C.2. The pitches here are derived from a combination of rows V (principally) and Q, as shown by Boulez's sketch of chord combinations, and the eight available notes
are so organised as to conclude with a gentle reminder of the other principal interval of the absent squelette - the minor second/major seventh. This leads smoothly into the next section, S3, which is likewise dominated by the major seventh. A comparison of the two optional sections so far reveals that C.2 has a more structural function than C.1 which, despite its higher dynamic level, is essentially decorative.

The squelette is still represented only by its rhythm and dynamic envelope in S.3, the nodal G-sharp being absent. It is replaced by two three-note chords formed from rows D and U, operating the familiar principle of adjacent pitches: the notes are those of the two cells containing G-sharp, as illustrated in the sketch. As though to compensate for the brevity of S.3, the following optional commentary, C.3, is one of the most extended in 'Commentaire'. Why should this be so, and what is its place within its context?

A striking feature of C.3 is the predominance of accented dotted rhythms, which are at once a commentary on the preceding group and an anticipation of the the succeeding group (e). Despite its abrupt opening, C.3 is a continuation of S.3 in pitch content, consisting of a simultaneous unfolding of the remaining notes of D (in retrograde) and U. A subtle feature is the prominence given to the descending compound interval, G-natural to A-sharp, formed from the final note of each row, mirroring the rhythm and interval of the preceding S3, and thus hinting at the background to the commentary - the silent single note G-sharp of the squelette. The remainder of C.3 is an extended upbeat to the following section, S.4, and its pitch material is drawn from five rows forming a champs around squelette group (e). The rows are separated and therefore fairly easily defined, but the composition of this section evidently caused Boulez some difficulty, judging from the quantity of sketches. A possible explanation
for this is that the rows chosen, viz. X-R, G, B-I, enable him to exploit pitch convergences between the groups (see my connecting arrows) giving the section as a whole a palindromic character - shown in the return of the bass to low E-natural and A-natural via C-sharp from a central pivot of E-flat. The two stages of sketches reproduced in Ex.4.42 enable one to trace the route through to the finished version which, as usual, shows an expansion of registers, and a more dramatic, sharply defined character. Both the palindromic elements of C.3, and its dual function as commentary and anticipation, suggest a kinship with the procedures of 'Parenthèse', and distinguish it from the preceding optional sections.

The length of C.3 is more than balanced by the following section, S.4, which incorporates no less than six squelette groups, (e) to (k). These divide readily into two groups, of which the first three contain the pitches of the original squelette, in contrast to the final groups where the pitches are virtually absent. The re-entry of the squelette pitches is an important moment: they have been absent since the opening section, and Boulez gives them due prominence, reducing the accompanying champs to a simple statement of row A, and thrusting through to a massive climax marking the appearance of the first four-note nodal chord, group (g). It will be observed that the marking $fff$ is restricted to four appearances in 'Commentaire', all of them climactic moments - the beginning, the final cadence, and two other compulsory passages of which this is the first. In each case the music takes on a cadenza-like character with a momentary relaxation of rhythmic rigour. Here the chord is sustained with sostento pedal through the commentary, which is formed from two pairs of rows, B-T and R-H. The logic of this choice is that each pair has as its single cells the notes A-natural and E-natural, which form the outer notes of the sustained chord. As always, the rows are used as champs -
that is, minus the four notes of the sustained squelette chord. The remaining eight notes of each row are grouped into three- and five-note chords in the case of rows R and H, and, in rows B and T, melded in a more complex 'crossover' technique, first to introduce the squelette chord, and then to dismiss it in a brusque gesture as the sostenuto pedal is lifted. Boulez's row tables make it possible to catalogue the pitch derivations, particularly as they show the chordal combinations in some cases. It is likely that there was extensive further drafting, since the surviving sketches are fragmentary, spread over various parts of the sheet. Of particular interest are the drafts for thefff flourish before the trill. This evidently caused him some difficulty, and a series of fragments are spread across five staves at the bottom of the sheet, before the final form begins to emerge. The dismissal of the four-part chord forces the squelette underground again, but under protest, as the violent tremolo indicates. This is a massive amplification of the original trill of group (h), the dynamics and rhythm of which are retained. As shown in the sketch, the pitches are derived from row P (whose single note cell B-flat has the adjacent notes C-natural and B-natural, the three constituents of the original squelette). The violent juxtaposition of material at opposite ends of the keyboard which occurs here is followed by a more fragmented gesture. Meanwhile, the squelette remains in the background, but its champs, consisting of rows Q and A, contain as their single- and three-note cells the four-note chord of group (j), thus leaving their two four-note groups to be utilised. The sketches show the process, with Q (its cells in retrograde) a whispered upbeat and coda. Row A carries the rhythm and dynamics of the original squelette group as we would expect, but also retains the melodic shape of the original very closely, being an exact transposition of the squelette notes, a minor third higher than the original. The final fragment of this extended section, group (k), and material for the following C.4 are
missing from the sketches. However, with the information provided by the pencil squelette that the group is based on rows J and W, it is possible to reconstruct the serial process. The original single note node, F-natural, of the squelette all but disappears (demi-présent), being reduced to an afterthought at the end of a six-part chord clearly based on two four-note cells from J and W, minus their F-natural. The concluding note brings this magnificently diverse section full circle, back to the F-natural on which it had begun.

The brief ensuing commentary, C.4, is a pendant to the previous section, continuing to derive its pitches from rows J and W. It begins with an echo of the end of S.4, but then amusingly inverts the processes: the suppressed F-natural of the preceding section returns as a soft sustained note, before dissolving in contrary motion onto the grace-notes F-sharp and E-flat - the single-note cells of J and W respectively. In its reinstatement of suppressed pitches, C.4 recalls the procedures of C.2, whilst its palindromic contour suggests a link with C.3.

Almost as brief is the ensuing section, S.5, but this conceals a concentrated structure, based as it is on three squelette groups, (l), (m) and (n), of four, three, and four notes respectively. The first of these has as its accompanying champ row V, which incorporates the squelette notes as its one- and three-note cells. The row table is missing from the sketches, but the process of reconstructing the use of the two remaining four-note cells is straightforward, and the pitches of the squelette remain dominant on account of their extremes of register. Two short sketches, closely related to the final version, are found on the bottom right-hand corner of the first sheet of sketches for 'Commentaire'. The middle group (m) likewise retains the squelette pitches, accompanied by chords derived from row K. The other row used to form champs is row E, which contributes
a cadential flourish, whilst its shape recalls the opening group of the section (another instance, among many, of the way in which commentaries operate on all levels of the structure). The logic of the choice of E and K lies in the fact that they are two of only four transpositions (the others being 0 and P) where the three notes of the squelette group occur consecutively. In the final group (n) of this section, the squelette pitches again disappear, although rhythm and dynamics remain. The pitches are drawn from row R and the technique as before is to displace the squelette by adjacent pitches in the chosen champs. At first sight, row R seems a curious choice, but the ear provides the explanation: the three pitches generated allow Boulez to turn this group into a commentary on the pitches of the preceding group (m), whose concluding C-natural to B-natural is echoed in displaced form to conclude the section.

As elsewhere, when the squelette pitches are withheld, the ensuing commentary contains a violent re-assertion of them. Optional section C.5 begins with a free inversion of the previous fragment, but introducing the characteristic minor thirds of group (n). The pitches assemble the remaining notes of row R, continuing directly from the preceding section. This however is merely an upbeat to the main event of C.5, a fortissimo restatement of the missing pitches of the preceding group (n). It is noteworthy that at the same time as restoring the pitches, Boulez inverts all the other musical parameters: p becomes ff, legato becomes staccato, and a formerly regular rhythm becomes irregular. Just as this group marks the centre of the squelette, so is C.5 the exact centre of 'Commentaire'. After this outburst, the pitch content of which is derived from row X, the end of C.5 consists of a fragmentation of the characteristic minor third intervals of the squelette using a four-note cell derived from row E. In surveying this section as a whole we are confronted with the paradox that an optional section not only
demonstrably continues the musical argument of the preceding section, but is placed at a crucial juncture at the very centre of the piece. Bold indeed would be the pianist who elected to omit it in full knowledge of its musical significance.

The squelette pitches return in the next section, S.6. This is a dramatic moment in the squelette with its contrast of registers and semitonal clashes, and Boulez is content to preserve the jagged outline of the original with champs provided first by row E (continued from the previous section - another proof of the integral nature of C.5) and then by row K.

The following commentary, C.6, preserves the wide intervals and dynamic contours of the preceding section, and has a loosely palindromic shape. Because of this, the performer might be forgiven for regarding it as a self-contained unit which could easily be omitted without damage to the overall structure. In fact, the commentary also operates on another, more subtle level. Whilst the pitch derivations from rows O, Q, and L are fairly straightforward in themselves, they give rise to a series of secondary relationships. Thus the opening triplet is not just a rhythmic echo of the opening of the previous group, since its pitches are none other than those of the suppressed squelette group (n). As noted above, this group was placed at the centre of the original squelette, and its omission in S.5 prompted an angry gesture, and restatement of the pitches in the succeeding C.5. Not only do these exact pitches come quietly to the surface again, but they are heard in the context of a varied form of the following groups (o) and (p), thus restoring the order of events of the original squelette.

This is a timely reminder, since it is the prelude to another climax. In perfect symmetry, section S.7 begins with an fff chord which balances that of S.4. There, the climax centred on a four-part nodal chord; here it is the single-note which comprises
group (q). This is the only one of the three single-note nodes of the squelette to be heard at its original pitch, but Boulez disguises its presence by sounding it as the middle note of a five-note cluster. As in the earlier climax, the $fff$ chord is held in the air by the sostenuto pedal during a quasi-improvisatory commentary. If the rhythm of this is relaxed in character, the pitch derivations are among the most complex in 'Commentaire'.

Three rows, L, B, and A, all of them in retrograde, and broken into their constituent cells form the basis of the champs. These cells are used in the sequence a, d, c, b, as shown in my analysis. The chords formed from them, based on identical but transposed cells, demonstrate the technique of chord multiplication expounded by Boulez, and used in various ways in the Third Sonata, culminating in the Blocs of 'Constellation'. Unlike the previous $fff$ climax which was sustained into a thunderous trill, the sostenuto chord of S.7 is allowed to die away, after which the three remaining squelette groups of this section all but disappear. Thus the succeeding four-note chord (r) is demi-absent, represented by its rhythm and dynamics. Its pitches do appear within the texture, but broken into dyads each of which is accompanied by the eight available notes of the champs, rows R and X.

The sketches fail to make clear the intermediate stage between the row charts and the final version: the suggested division fits the pattern of cell groupings more logically than the alternatives. During the second part of this section the original squelette became increasingly fragmented, and at this point it disappears again, the rhythmic and dynamic contour of (s) being filled with the available notes of row T, as shown. The final group (t) of this section is demi-absent, the appearance of two of its four pitches being delayed until the final grace-note chords. Its champs, consisting of two four-note groups, is common to rows C, L, and P, as indicated by Boulez's sketches of the available chordal combinations.
The following optional section, C.7, inverts the shape of S.7 by beginning softly with sustained chords but ending with a fortissimo, the pitches of which include those of the sostenuto chord which had opened S.7. This sense of balance and continuity between the two sections is emphasised by the tempo marks, the accelerando which concluded S.7 being continued during C.7 towards the Vivo, before a slackening of tempo at the end. Characteristically, the commentary operates on two levels: the opening is both an inversion of the end of S.7, and a reinstatement of its characteristic upbeat grace-note, a rhythm which dominates the section. More subtly, the opening three notes are the pitches of the previous, absent squelette chord (s). This chord continues to haunt the commentary, making a brief reappearance at the same register later in the section. Meanwhile, even more subtly, is a reference to squelette group (r), which had been demi-absent during S.7, where its sustained F-natural was shortened and concealed in the surrounding texture. This pitch is now stated gently but insistently three times at its original register (Is it entirely coincidental that the notation in the squelette had consisted of three tied notes?). A further reference to group (t) occurs in the semiquaver figure towards the middle of the section, where the four grace-notes reinstate its pitches in a whisper. The pitch content of the section is unusually rich, but Boulez's sketches of the chord combinations formed from the six available rows make reconstruction a fairly straightforward process. After the Vivo climax, the two rows from the next section are utilised so that C.7 flows seamlessly into S.8. The join between the two groups of rows is X, which is common to both, and it is now combined with B to bring the section to a close with an anticipation of the opening of the next section, and, as already noted, a reference back to the opening of the previous S.7.

It has been some time since the squelette has forced its way to the surface of the
texture, and S.8 closely resembles the treatment of S.6, in the manner in which two
groups are placed consecutively with a minimum of textural elaboration. In fact, despite
some similarities of rhythmic structure, the effect of the two sections is quite different
in context: S.7 is an abrupt contrast to the preceding C.6, whereas S.8 begins like an echo
of C.7, as though the roles of 'text' and 'commentary' had been reversed. The four-note
accompanying cell is derived from row V.

This sudden re-emergence of the squelette pitches alters the mood of the
commentary, and C.8 is rhythmically fragmentary and subdued in its responses. It begins
with a soft perfect fourth, and the sketch shows this placing to have been an afterthought.
Otherwise the intervallic content consists of echoes of the characteristic major sevenths
of the preceding section. The pitches are straightforwardly derived from rows T, M, and
V, used in sequence. As an aside, it should be noted that there is a typographical error
in the printed edition: the first bass note must be E-flat in order to preserve the row
structure. At the subito ritenuto, the champs of the following section are introduced, so
that the whispered close to the section is derived from row O. As is evident, C.8 does
not have the integrated character of some of the other optional sections, and therefore its
omission would not effect the dialogue to the same extent. Nonetheless, it provides a
rare point of comparative relaxation in 'Commentaire' and forms a gentle upbeat to the
contrasts of the following section.

The single sustained note of the squelette is present in S.9, but its treatment is
somewhat similar to that of the single note of S.7, being accompanied by a small
semitonal cluster, and then almost obliterated by a violent descending triplet freely
derived from row T (the texture at this point, with a sostenuto chord gently resonating
throughout a violent outburst, anticipates those of the Blocs sections in 'Constellation').
As the annotation indicates, the two four-note cells of this row are freely permutated around the pivotal F-flat, a flexibility which foreshadows the techniques of 'Glose'. Two brief sketches show Boulez experimenting with various possibilities before arriving at the final version, however the brusque, dismissive characterisation is constantly present.

Paradoxically after such a terse statement, the ensuing final commentary is one of the most extended: its position means that it must fulfill a dual function as both a retrospective glance back at S.9 and preparation for the cadential flourish of S.10. Its links with the previous section are shown by its echoes of the jagged dynamic contrasts of S.9, and continual use of its upbeat acciaccatura figure, but its prime role is as a commentary on the as yet unheard events of S.10. The pitches of the squelette are about to disappear again, and Boulez prepares for this in the two climaxes of the commentary. The first, and more massive, places the pitches of the four-part squelette group (x) at the peak of the climax, and in so doing departs momentarily from the principle that the champs must avoid using the squelette pitches. The second, lesser climax, occurs towards the end of the section, when the chord is heard sffe in transposed form. There was a considerable amount of sketching for this section, and with champs consisting of no less than six, at times overlapping rows, the derivations are by no means straightforward. Fortunately, one of the sketches consists of an intermediate stage listing the vertical combinations for each row. Although clef signs are missing, it is possible to reconstruct the process of pitch distributions for the section. The link to the final section is row Q, and Boulez again characterically breaks his own self-imposed serial laws in allowing the A-flat squelette pitch to sound gently through just before the final section begins.

The outline of the squelette is preserved in the opening leap of S.10, and with it
the characteristic perfect fourth and major seventh/minor second intervals. Boulez derives the four-part chords from row Q by permutation of its two four-note cells, as illustrated. An angry rumble is the response to the missing squelette. Its pitches are present within the four upbeat grace-note chords which introduce the multiple trills, as fourths and sevenths again dominate the texture. The squelette has forced its way to the surface, and the resulting eruption of sound is the climax of 'Commentaire', and indeed of the entire Formant. Of the three available rows, the champs at this point are derived from row F only, the logic of the choice being that its single-note cell is B-natural, the very note on which the squelette trill begins. The other rows, J and T, serve to introduce and conclude the trills. The pitch derivations are not obvious, but fortunately the sketch of these rows groups them into chordal combinations as they appear in S.10. If the squelette trill had been almost submerged in the surrounding texture, the final group (z) is allowed to make its departing gesture unadorned. The concluding champs magnify the leap before resolving on a four-part chord in the middle register, which returns in transposed form to the intervals of the squelette. Its pitch structures are freely derived from row M, the single-note cell of which is C-natural - the concluding note of the squelette.

Of the four sections of 'Trope', it is 'Commentaire' which is the richest in terms of the range of options it offers to the interpreter. Unlike in 'Parenthèse' where the symmetry of the squelette is reflected in that of the commentaries and therefore the logical options are restricted, 'Commentaire' has almost double the number of optional sections, and there is a constant interplay on many levels between rigorous compositional logic and freedom of choice. How therefore to exercise this choice? It will be evident from the foregoing analysis that one of the principal generating forces in the music is the
relation between the *squelette* and the *champs*. 'Commentaire' is uniquely rich in this interaction: in both 'Texte' and 'Parenthèse' the two are clearly separated, whilst as we will see, 'Glose' is a negative image of the original in which the *squelette* pitches are totally absent in their original sequence. It is the complexity of the relationships between compulsory and optional sections which makes the possibility of performer choice such an intriguing one. As we have seen, the commentaries have a variety of functions. On the one hand are those sections which confine themselves to a brief commentary on the preceding material (C.1) or introduce a momentary note of relaxation - both C.4 and C.8 fulfill this latter function. At the other extreme are passages which take up the musical argument, bridging the compulsory sections with a continuous flow of additional commentary. Optional sections particularly rich in this respect include C.3, C.4, C.5, C.7, and C.9, and it would be hard to justify the omission of any of these given some understanding of their musical importance. Whatever the decisions taken in this regard by the performer, it is evident that a heightened awareness of the role of the various commentaries can only be of assistance in enabling him to exercise his options in the most musically informed way: a parallel perhaps to the composer's paradoxical quest for creative freedom through the expression of a peerless compositional technique.

**GLOSE: ASPECTS OF ANALYSIS AND PERFORMANCE**

The prospect of undertaking a detailed analytical study of 'Glose' was particularly intriguing. Of the four sections of 'Trope' it had always seemed the most elusive in musical content, the mysterious opening in the low register recalling that of 'Parenthèse'. The predominantly subdued mood of the section as a whole is reflected in its
comparatively strict tempo, there being much less of the flexibility which characterised the two sections with optional insertions. Another instantly striking feature of 'Glose' is its texture: the contrast between the predominantly linear character of much of the writing, disrupted by the sudden eruptions into clusters accompanied by violent changes in the dynamic level and a freer, more rhapsodic pulse. The musical meaning of these had always puzzled me: massive clusters representing bands of frequencies are common in Stockhausen's piano music (most notoriously in 'Klavierstück X'), and Ligeti's 'micropolyphony' exploited the device to the point where it was in danger of becoming a cliché. Yet clusters in Boulez's music are comparatively rare: there is no example in either of the first two piano sonatas, and even in the Blochs of 'Constellation-Miroir', the texture is one of thick chords, containing as many as eleven parts, rather than of clusters. The chapter 'Technique Musicale', in 'Penser la Musique Aujourd'hui', contains the following stricture on their use: "En fin de compte, ces clusters et glissandi relèvent d'une stylistique trop primaire à mon gré; leur abus récent a tourné rapidement à la caricature. Ce matériau vite 'ficele' n'est pas garant d'une grande acuité de conception; il dénote, en revanche, une étrange faiblesse à se satisfaire d'organismes acoustiques indifférenciés"(15). Why then their sudden appearance in 'Glose'? Why had Boulez in his performances of the work chosen, uniquely among interpreters, to begin 'Trope' with 'Glose'? Was this a temporary expedient because of the still incomplete state of three of the Formants, was it pure whimsey (unlikely), or were there cogent musical reasons for the choice? It was these and other interpretive issues that provided the background to my approach to 'Glose', together with the knowledge that the available commentaries provided little guidance on these questions, and that in contrast to 'Texte' and 'Parenthèse', this section had received scant critical attention.
We have seen in the other sections of 'Trope' how the entire structure is evolved from the permutations of the original series: the four 'squelettes' derive directly from them, and the final versions consist essentially of sophisticated commentaries on these basic elements. Thus the palindromic shape of 'Parenthèse' is a reflection of the symmetrical structure of its four twelve-note rows, whilst the permutations on which 'Texte' is based give rise to a series of tritonal relationships which shape the musical discourse. 'Commentaire' has eight rows in its circle of permutations, double the number of 'Texte' and 'Parenthèse', and therefore the squelette has a correspondingly more involved structure with seven nodal points. These consist of alternate single-note and four-note cells, and it is the interplay between squelette and commentary at these moments which give the section much of its impetus and dynamism. 'Glose' is likewise based on a series of eight row forms, but its permutations occur as three-note and four-note cells, thus giving it a more compressed framework than that of 'Commentaire'. This is reflected in the squelette itself, the pen draft of which is shown (Ex.4.43). Whilst longer and more complex in structure than those for 'Texte' and 'Parenthèse', it lacks the range of textural and dynamic contrasts found in the squelette for 'Commentaire'. How would Boulez proceed to elaborate it, and what would prove to be the relationship between the basic material and the introverted yet at times violent tone of 'Glose'?

My initial attempts at analysis were discouraging. There was always Manfred Stahnke's comprehensive study of the cellular structure, but as we have seen, it provided in itself no great insight into the actual processes of composition. Likewise, my own first attempts foundered precisely on my inability to relate the familiar row structure to the musical content of 'Glose'. Clues began to emerge during my first visit to Basel, when I was able to examine the preliminary sketches for 'Trope' among which are the first
jottings indicating the characteristics of each section (Ex.4.8). It will be recalled that
section 8 was to consist of "squelette en creux (sans les notes)", that is, the squelette
pitches themselves would be absent although presumably related in some unspecified way
to the pitch content of the section. I eagerly made a copy of the squelette itself, hoping
that this information would enable me to unlock the pitch structure. There was no time
to examine the detailed pencil sketches as I was able to do in the case of 'Texte' and
'Parenthèse', and I found to my frustration that many questions concerning 'Glose'
remained unanswered. It was now at least possible to relate the underlying rhythmic
structure of the section to that of the squelette, but the pitch structure remained elusive.
Hence one of my first priorities on returning to the Paul Sacher Stiftung was to make a
thorough study of the pencil sketches for 'Glose'.

As with the other sections, the available sketches are notated on a twenty-eight
stave sheet. However, unlike 'Commentaire', where the two pages are on the whole
clearly divided into sketches above which are placed the relevant row charts, the sketches
for 'Glose' present a much more haphazard appearance with no obvious sequence in the
ordering. This, together with the presence of two pencil sketches for the squelette,
suggests that the composition of this section was particularly problematic. However the
presence of indications for the champs in the second of these squelettes was the first
important clue as to the pitch structure of 'Glose'. Because of the difficulty in
deciphering and identifying the sketches, it was decided to make a transcription of the
entire page in the hope that it might shed some light on the compositional process. The
crucial final pencil squelette, beginning on the seventh line of the sheet is clearly
identified by Boulez. Since the sketches are fragmentary and at best difficult to read, it
must be admitted that there is inevitably an element of conjecture in some of the
transcriptions, especially so given the absence of clef signs in all but a few cases. Nonetheless, it proved possible, painstakingly, to identify most of the sketches with a fair degree of certainty, in conjunction with the evidence provided by the final version. Once this had been achieved, and the sketches arranged in order, it became apparent that they were more complete than had appeared at first sight, and that they could provide some significant insights into the genesis of 'Glose'.

The same layout of analysis has been adopted as in the other sections of 'Trope', with the relevant squelette group placed under the text. Underneath this appears my preliminary draft of the rows used for champs, following the letter indications in the second pencil squelette, and adopting the procedure used by Boulez in 'Commentaire' of blocking out with brackets the unavailable notes. At the foot of each page are the sketches, rearranged to correspond with the compositional sequence of the final version (Ex. 4.44). Once they are catalogued in this way, it can be seen that, like the sketches for 'Commentaire', those for 'Glose' fall into two basic categories: preliminary thoughts about the cellular structure of the rows to be used, followed in most cases by an intermediate sketch bearing a greater or lesser resemblance to the final version. Only now was it possible to reconstruct the compositional process in the light of all the available evidence, and to understand the consistency and indeed fundamental simplicity of the principles on which 'Glose' is based.

An immediate surprise was the distribution of the squelette groups. In 'Texte', the other through-composed section, they had acted as a cantus firmus, evenly distributed and constantly present. However in 'Glose' the layout is much less even, bearing some resemblance to that of 'Commentaire', where optional sections interrupt the progress of the squelette. A pattern began to emerge: gaps of varying length appear at each of the
seven nodal points, but the longest breaks in the squelette are reserved for the three points where a four-note chord is preceded and followed by a single note, as at (d), (l), and (w) in Ex.4.44. These mark precisely the moments at which the texture dissolves into clusters, and the rhythm assumes a flexibility reminiscent of the optional passages in 'Parenthèse' and 'Commentaire'. It was particularly intriguing, having just completed a study of the interplay between text and commentary in these sections, to observe how Boulez would articulate this relationship in a section where he had chosen to dispense with parenthetical passages altogether, and even to cut the umbilical cord of the squelette itself.

My experience of the use of clusters as a pianistic texture was limited to Stockhausen's 'Klavierstück X', and his introduction of the concept of 'degrees of comprehensibility' - broadly speaking, the denser the cluster, the less comprehensible it is because the individual pitches become obliterated in the texture. Although Boulez describes the clusters in 'Glose' as bandes de fréquences, it is evident from the footnote to the printed score of this section that he took a characteristically fastidious view of the components, insisting that all the pitches must be sounded. If this was unsurprising, an unexpected feature of the sketches which emerged during the copying stage was that some of the most extensive drafts were for the passages involving clusters, and so it was to these that I turned in the hope that they would provide some clues as to the compositional processes of 'Glose'.

The first such passage occupies the greater part of the first line, and comprises squelette groups (c), (d), and (e). Applying the principle of champs to group (c), it quickly became apparent that the squelette note G-sharp is absent, but replacing it is a most sophisticated commentary based on rows I and C. The group begins and ends with
an incomplete cluster comprising the final two notes of these rows: the missing central note is none other than the *squelette* G-sharp. At the midpoint of this loosely palindromic structure occurs an *sffz* dyad, the pitches of which are C-sharp and D-sharp, the single-note cells of rows I and C respectively. The note which they displace is again G-sharp, the corresponding single-note cell of the *squelette*. Either side of this climax, symmetrically arranged, are the first groups of clusters, and Boulez maximises their shock effect by extreme dynamic markings. The pitch structure is derived from the four-note cells of the *champs*, taking the outer notes of each cluster as defining the pitch parameters. The permutation of the two rows is complex, but the cross groupings shown on the annotated score have a logic despite their arbitrary appearance and the absence of conclusive evidence from the available sketches: thus all the clusters combine notes from both rows with the exception of the final cluster of each group, the first of which uses a dyad from row C, and the second a dyad from row I. If this explanation appears to labour the point, it is a pertinent example of the combination of flexibility and inexorable logic which characterises Boulez's serial technique throughout 'Trope', and which is seen in its most developed form in 'Glose'. Just as suddenly as the clusters appeared, they vanish, framed by the incomplete cluster which had opened a window on an unfamiliar landscape. A plausible explanation for their occurrence is already presenting itself: if the *squelette* is to be totally submerged in 'Glose', would it not be logical that the points of minimum density (single notes) in the *squelette*, should be transformed into those of maximum density (clusters) in this negative reflection of the original? Confirmation for this hypothesis emerges from a study of the following groups. *Squelette* group (d) consists of four notes grouped into dyads of a minor third and major sixth. Not only are the chords splintered into grace-notes, but the characterising intervals are suppressed in
favour of the 'isomorphic' ones of major and minor seconds, and (especially) perfect fourths. In the *squelette*, this group is the central panel either side of which is a single note, and whilst the rhythm and register of the low B-natural are retained, its pitches are obliterated by the eight-part chord. Again, 'Glose' is constructing a negative image of the original structure.

The above commentary suggests an explanation for the appearance of cluster groups, and moreover, one which is consistent with their two subsequent appearances. The next nodal point, consisting of a four-note group preceded and followed by a single note, occurs at the midpoint of the section, and comprises *squelette* groups (j), (k), and (l). It forms a more integrated statement than the passage examined in the previous paragraph, and again the ear is teased by the palindromic arrangement. Not only does this exist within the passage as a whole, with the brief central panel abandoning clusters, but each group of clusters is framed by identical shapes. It is interesting to note, in passing, the sketch for this section: the two dyads which introduce the second group of clusters are represented chordally, and Boulez evidently had second thoughts in order to register more clearly the intervallic relationship between these upbeat grace notes and those which conclude the group. A legitimate question at this point is to ask why Boulez did not repeat the opening pitches exactly as he had done at the end of the first group in order to emphasise the symmetrical structure? As always with Boulez there is a logical answer, but this is to anticipate the discussion below concerning the next series of connections.

The pitch structure of this passage is fairly straightforward, since it uses the rows in sequence. A small sketch, which I have re-ordered below the principal draft, shows clearly the derivation of the first group from row F, and also the succeeding chord based on the available notes of row N. The second cluster group is similarly derived from row
G, with the dyads formed from permutations of alternate notes as shown. Taking the passage as a whole, it bears a similar relationship to the structure of 'Glose' as does the middle optional section in 'Parenthèse': both have strongly palindromic elements, and function as hinges in the overall design. However the row structure of 'Glose' lacks the palindromic rigour of 'Parenthèse, and as we will see, despite the range of textural contrasts, its structure is so closely woven that there is no place for the type of optional commentaries which characterise 'Parenthèse'.

The third passage involving the use of clusters occurs in the final line, thus balancing the opening group: a further example of palindromic elements in the context of an essentially dynamic overall design. As with the earlier examples, Boulez continues a dialogue with the absent squelette. Thus the missing single note of group (v), F-natural, is replaced by the corresponding single-note cell of the champs, B-natural. Even though it is sounded momentarily fortissimo, the pitch is rather submerged in the descending chords which are derived from row N by permutating the three available cells. The cluster group itself, (w), is derived from rows M and I by a still more elaborate process. Fortunately there are two sketches; one of the rows themselves, followed by a sketch of the cluster groups numbered in the order of their appearance and on the same line as the row to which each cluster relates. The sketch is reproduced below the annotated text of 'Glose', and is self-explanatory. Again one notes how the four-note chordal figure of the squelette is dissolved into a linear minor seventh progression with only vestiges of its characteristic triplet rhythm remaining. Its pitches are derived from row A, the remaining notes of which are used to conclude the passage. The final single-note group (x) of the squelette is replaced by a crashing eight-note chord, itself an upbeat to a semiquaver dyad whose notes, G-natural and B-double flat, are the pitches adjacent to those of the missing
A-flat. This device recalls the use of clusters with a 'hollow' centre found in the corresponding passage at the beginning of 'Glose'.

As my understanding of the technical means employed in 'Glose' increased, I began to appreciate more fully the meaning of Boulez's first jottings concerning the structure of this section: "squelette en creux (sans les notes)". The meaning of this description was now, clear since the squelette is represented rhythmically rather than by its pitches, but, given the complex way in which the rows of the champs were crossed-over one another in a labyrinth of permutations much more complex than those even of 'Commentaire', was there another layer of relationships in 'Glose' which my pitch analysis had so far failed to uncover? It was my continued perplexity over the central palindromic group which provided the first clues. It will be recalled that Boulez could easily have matched the symmetrical arrangement of its first set of clusters (group j, row F) when ending the second set (group l, row G). The reason for the seeming perversity of not completing the palindrome exactly suddenly leapt off the page: the four grace-notes, C-natural, F-natural, C-flat, and B-flat are none other than the pitches of the next squelette group, (m). Could it be that the serial technique had another dimension, namely that the squelette pitches were present after all, but crossed over, in a different sequence from that of the original. It took only a brief examination of the remainder of 'Glose' to show that this was indeed the case. The opening of the section had demonstrated a complex series of permutations of the champs, such as to distract attention away from the more sophisticated compositional game which Boulez is playing, namely that the pitches of the two opening squelette groups are crossed over one another. Thus the pitches of group (b) of the squelette are found in the top stave in the opening of 'Glose', whilst the missing pitches of group (a) exchange places to appear with the original squelette rhythm of group (b)
in the passage immediately following. The process is clarified by my crossed arrows linking 'Glose' and its squelette in Ex.4.44, and this technique can be observed throughout the section.

An understanding of these techniques, and the manner in which they are applied, changes one's attitude to 'Glose'. Just as 'Commentaire' had exploited in a highly imaginative way the various levels of interplay between a basic shape and a series of commentaries, so 'Glose' can now be seen as an equally resourceful elaboration of fundamentally simple ideas. The fact that it lacks the optional interpolations of two of the other sections can lead us as performers to set it to one side: to 'play the notes' and hope that the musical content will somehow emerge. However no pianist who takes the opportunity to become acquainted with the structure and musical character of 'Glose' can fail to be inspired by the range of interpretive challenges it offers to the 'plugged-in' performer.

In a recent London performance, I was able to put these various discoveries concerning the genesis of 'Trope' and the operation of performer choice to a practical test. By adopting the ordering 'Glose' - 'Texte' - 'Parenthèse' - 'Commentaire', I felt able to impart a more dynamic shape to the music than on previous occasions, when I had followed the more usual option of beginning with 'Texte'. In addition, the Formant seemed to flow more naturally as a result of accepting Boulez's invitation that it could be placed after 'Constellation'. This raises yet another dimension to performer choice in the Third Sonata, and it is now time to consider the other published Formant in relation to the sketches, and the light they shed on its musical structure.
REFERENCES

(1) Boulez, P. 'Penser la musique aujourd'hui', p.83
"There is, on the one hand, manifest symmetry within (c), and on the other hand, concealed symmetry between (a) and the two fragments (b/d)".
(2) Ibid, p.88
"...has given rise to cyclic links of a different nature, depending on the constantly renewed conjunction of two isomorphic figures".
(3) Ibid, p.88
"This same principle was to generate the overall form of 'Trope', which is simply an enlarged circular permutation".
(4) Griffiths, P. 'Boulez', p.39
(5) Ibid, p.39
(6) Ibid, p.39
(7) Ibid, p.39
(8) Boulez, P. 'Conversations with Célestin Deliège', p.13
(9) Stahnke, M. 'Struktur und Aesthetic bei Boulez'
(11) Boulez, P. 'Points de repère I: Imaginer', p.439
"They may be integrated rhythmically into the text itself or grafted inside the overall given values on which they comment; and in either case they must be played. Or they are interpolated between these overall values and printed in parenthesis, in different type, in which case they may be either played or omitted".
(12) Griffiths, P. 'Boulez', pp.39-41
(13) Boulez, P. 'Points de repère I: Imaginer', p.306
"...to consider the series not as an ultra-theme, permanently tied to pitch, but as a generative function of all aspects of the work".
(14) Ibid, p.415
"The freedom - or liberation - of the performer makes absolutely no difference to the concept of the structure; the problem is simply pushed back a little and the solutions remain to be found".
(15) Boulez, P. 'Penser la musique aujourd'hui', p.46
"In the last reckoning, these clusters and glissandi depend on a stylistic conception that is too elementary for my liking; their recent abuse has rapidly turned to caricature. This quickly 'parcelled' material is no guarantee of great acuteness of conception; it suggests, on the contrary, a strange weakness for being satisfied with undifferentiated acoustic organisms".

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CHAPTER FIVE

CONSTELLATION

This, the central Formant of the Third Sonata, has a strange history. As we have seen, it only gradually evolved in Boulez's conception to assume a fixed position at the centre of the work as the longest Formant around which the other four would revolve in various possible orders. The sonata has never been heard in this form: the available evidence suggests that Boulez, in his 1957-58 performances, began the work with 'Constellation' as a temporary expedient in view of the fragmentary state of three of the five Formants. However it is not only the three fragmentary Formants which remained unresolved following the subsequent withdrawal of the work. The autograph score consists of both versions of the central Formant; 'Constellation' itself, and its mirror version 'Constellation-Miroir', in which the order of the six sections is reversed. This concept of a fixed central Formant which is capable of revolving around itself reflects the design of the sonata as a whole. When the third Formant was eventually released for publication in 1963, it was the mirror version alone which was printed, and performances since then have been based on this ordering of the sections, with the exception of the recording by Claude Helffer. It was Helffer who implicitly raised the question of the alternative ordering of 'Constellation' when, in a letter of 27th February 1965, he asked the composer, "D'abord, quel est le titre exact - 'Miroir' comme sur la partition ou 'Constellation-Miroir' comme sur la mode d'emploi?"(1) Boulez's reply, consisting of hastily written annotations, was to underline the words 'Constellation-Miroir', with the comment, "Titre exact (ordre inverse). La Constellation devait imprimée après, par une fantaisie de l'U.E. que je n'ai pas compris" ("Exact title [reversed order]. Constellation..."
[reversed order]. Constellation must be printed subsequently, by a fantasy of U.E. which I failed to understand"). It is curious to find Boulez, who has always exercised strict control over the publication of his scores, disclaiming responsibility for the decision to print only the mirror version of the third Formant. On the other hand, he was away for long periods around the time when the piece was published. Whatever the truth of the matter, the published material has retained a sense of being partial and indeed to an extent incomplete.

The hostile critical reception accorded to the publication was partly directed at the unwieldy format of the score, with its alternate use of green and red ink to distinguish the six sections. The autograph manuscript consists of pages fixed end-to-end with adhesive tape and folded-over, and of a format that could be accommodated on a music desk, thus making it possible to realise Boulez's suggestion that choice be exercised during the performance rather than planned in advance. However the sheer size of the printed score, with pages cut through the middle of sections, makes this an impractical option. It helps to explain a curious paradox concerning the work's performance history, that early performances using the pre-published materials sound more spontaneous and creative in their approach than those of a later generation of performers working from the published score. My approach as a performer has followed the procedure dictated by the layout of the printed score, viz. determining the ordering of sections in advance and reassembling the score into a more manageable format. Decisions concerning the choice of routes through the score were taken as far as possible to emphasise musical continuity rather than diversity. However there has always been a sense that one has exercised these choices in a rather arbitrary manner, and that the score analysed on its own terms would provide the pianist with crucial information concerning the interaction of composer and performer.
advocated by Boulez; "et non point d'un interprète-robot a l'effarante précision, mais d'un interprète intéressé et libre de ses choix" (2). But where to begin an analysis of a Formant of such daunting complexity? Since the derision and incomprehension which greeted the published score, there has until recently been little attempt to understand the work on its own terms.

One reason for the lack of commentaries on 'Constellation' may be that there is seemingly no detailed technical exposition comparable to that which Boulez provided for 'Trope'. The observations in 'Sonate, que me veux-tu' contain interesting general remarks about the structure as a whole and about the issue of performer choice, which is likened to the plan of an unknown town: "L'itinéraire est laissé à l'initiative de l'interprète, il doit se diriger à travers un réseau serré de parcours. Cette forme a la fois fixe et mobile se place, ainsi, au centre de l'œuvre à laquelle elle sert de pivot, de centre de gravité" (3). However, the article also contains the disclaimer, "Il m'est absolument impossible d'analyser, dans le détail, le mécanisme de cette pièce" (4) - a somewhat disheartening thought for the analyst. The answers in 'Conversations with Célestin Deliège' similarly expand the nature of performer choice in general terms rather than dealing with specific technical issues. It is only on re-reading 'Penser la Musique Aujourd'hui' that one is able to trace specific although unacknowledged references to the compositional procedures of 'Constellation'. The short opening chapter, whilst primarily polemical in intent, nonetheless contains several references of some significance in the context of the Third Sonata and 'Constellation' in particular. Thus after a waspish aside on the misuse of stereophony (a reference perhaps to 'Gruppen' and 'Gesange der Jünglinge'?), Boulez adds a comment concerning the function of musical space which could with hindsight be seen as a reference to the sound-world and physical layout of the as yet unpublished 'Constellation': "L'espace ne s'identifie point avec
cet autodrome sonore auquel on a tendance à le réduire; l'espace serait plutôt potential de
distribution polyphonique, indice de répartition de structures"(5). The kernel of this chapter
lies in the passage where he acknowledges that, in the search for, "une nouvelle logique
des rapports sonores", there will arise "...des cas particuliers pour lesquels la tradition - pas
plus lointaine qu'immédiate - ne pourrait nous donner même un indice de solution, elle nous
laisse démunis de ruses; il s'agit non seulement de questions morphologiques, mais
egalement de problèmes de structures, de grandes formes"(6). His sketch of possible
solutions follows, and is worth quoting at length, since as we will see, it contains the
essence of his compositional technique in 'Constellation':

"La tessitura, en particulier, y joue un rôle déterminant. Les
relations verticales se conçoivent comme matériel direct de
traitement, comme intermédiaire dans l'élaboration d'objets
complexes, soit encore comme supervision du travail sur des
objets complexes; dans les trois cas, on ne pourra traiter la
dimension verticale avec la même technique, chacun ayant ses
exigences propre réclamant des lois d'organisation dérivées,
bien sûr, d'une loi première mais organiquement spécifique.
De même, les fonctions horizontales n'ont que peu de liens
direct avec les anciennes lois contrapunctiques; le contrôle
des rencontres n'observe pas les mêmes rapports, la
responsabilité d'un son par rapport à un autre s'établit selon
des conventions de distribution, de répartition. Ainsi que
pour les relations verticales, on peut les diviser en trois
groupes: de point à point, d'ensemble de points à ensemble de

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points, enfin relations entre les ensembles d'ensembles" (7).

The following chapter, and greater portion of the book, consists of a technical exposition of formidable complexity. Here is to be found the oft-quoted description of 'Trope' and its spiral structure deriving from the subdivisions of the row. Boulez goes on to discuss "Inventaire et Répertoire", and it is at this point that he raises the possibility of a row which is mobile in its divisions. The logic of the argument is difficult enough to grasp, but is compounded by the impenetrable musical example provided by Boulez in his Ex.39. In fact, the example is drawn from the preliminary drafts for 'Constellation', and Boulez is citing the technical procedure used to derive the pitches in a section of Blocs. The rows listed are two of the transpositions arranged in their corresponding cellular divisions. This first section of the musical example is clear enough but the subsequent attempt to distinguish mobile density from fixed density is flawed by the absence of any explanation as to how the 'enrichment' is achieved. Examination of the sketches provides the answer to one's perplexity: the example given by Boulez is incomplete, and the chord multiplication which produces the enrichment is the product of the interaction of three rows rather than the two provided in the example (The technique of chord multiplication in 'Constellation' will be considered in detail below). Boulez proceeds to list examples of the use of tessitura and mode of attack to influence the shape of structures of varying densities, all of which are based on the chords of his first musical example from 'Constellation'. This section of the chapter concludes with what is in effect a statement of the compositional philosophy which inspired the central Formant: "Nous n'avons pas le dessein de décrire l'ensemble des constellations créées par fixité et mobilité; qu'il nous soit permis de signaler seulement l'immense crescendo menant de toutes les organisations au repos à toutes les organisations en mouvement, de l'ordre le plus
inéductable au chaos restitué" (8). This is not only a challenge to the would-be analyst, but a warning of "le potentiel d'inconnu enclos dans un chef d'oeuvre". Nonetheless, in embarking on a study of this Formant, there is the encouragement of the remarks made by Boulez in the opening chapter, concerning the relationship between a composer and his works: "Je demeure persuadé que l'auteur, aussi perspicace soit-il, ne peut concevoir les conséquences - proches ou lointaines - de ce qu'il a écrit, et que son optique n'est pas forcément plus aiguë que celle de l'analyste (tel que je le conçois)"(9). It was in this spirit that I approached the central Formant of the sonata; not in a desire to find a verbal description of a masterpiece, but in an attempt to obtain as deep an understanding as possible of the compositional process in the hope of shedding some light on the interpretative issues, and in particular that of performer choice. As in my study of 'Trope', I had the good fortune to be able to spend an extended period studying the source material for 'Constellation', without which the project would have been an impossible task.

THE SKETCHES

An immediate surprise on turning to the sketches for 'Constellation' was how different was the approach to the material compared to 'Trope'. In the earlier Formant there was considerable sketching for the final version, but the route from the establishment of circular permutation to the four squelettes had been an apparently direct one, with little intermediate sketching. I had assumed that because 'Constellation' seemed to allow for more performer choice, the composition itself would reflect this in a more flexible handling of the serial processes. Thus I was confounded to discover that not only had Boulez contrived a much more elaborate organisation of the basic row structure than in 'Trope',
but that rhythms were serialised also, and further charts showed evidence of a systematic ordering of all the other musical components - modes of attack, registers, and dynamics. It was decided at this point to make a copy of all the available sketch material in an attempt to understand how the musical structure had evolved into its unique shape. The following is a reconstruction of the stages of my discovery of this process.

It will be recalled that the earliest drafts for the Third Sonata refer to the middle Formant in the following terms: "Série normale avec grpt. de valeurs (dépendant de la série)". The folio of sketches for 'Constellation' begins with some general comments:

"Disposés Comme une constellation

Absolument sans ordre et sans choix

Sans pesanteur

Avec densités différentes

Régistres de fixité complète à différenciation totale

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Effets de sonorité [récupérer]

½' Ped. - Harmonique sans attaque

Ped. plus ou moins longtemps après attaque

Grand différenciation des attaques" (10)

Noteworthy is the emphasis placed on texture and sonority at this early stage in the conception. This is consistent with Boulez's rare public comments, which glide over the question of performer choice. Thus his introduction to Charles Rosen's performance at the Queen Elizabeth Hall is preoccupied with the novel sonorities, and Leonard Stein recalled in conversation a similar emphasis on pianistic effects when he was coached by Boulez

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prior to a performance in 1963 (11). At this distance, accustomed as we are to the use of harmonics and massive contrasts of sonority in the keyboard music of Stockhausen and Xenakis, it is the fastidiousness of Boulez's calculations which catch the ear rather than the novelty of the effects, which must nonetheless have sounded strikingly original at the time of the work's first performance. As an aside, it is interesting to compare the above thoughts with those for the other Mallarméan work which was taking shape at the same period as the Third Sonata - 'Pli Selon Pli'. The sketches for this include a preliminary verbal description which echoes that for the Sonata: "de la prédétermination totale à la totale indétermination" ("from total predetermination to total indeterminacy").

The next stage in the sketching for 'Constellation' was the organisation of the various musical parameters and their interaction. The table of pitches (Ex.5.1) is identical to that for 'Trope' except for the organisation of the internal divisions. The first row (A) consists of six cells, grouped 1-3-3-2-1-2, and this grouping is applied to the larger structure of the two groups of twelve rows. Thus the prime forms (A-L) are grouped 1-3-3-2-1-2, and the inversions (O-X) 2-1-2-3-3-1. These larger groupings are identified by Greek characters: α, β, γ, δ, ε, and ζ for the prime forms, and η, θ, τ, κ, ι, and µ for the inversions. Already the internal segmentation of the row has influenced the structure on another level, recalling the compositional processes of 'Trope'. There, the segmentation 4-1-4-3 was retained identically throughout all twenty-four transpositions of the row, and this choice of divisions dictated the overall formal shape of four revolving sections. In 'Constellation', each of the rows is divided into six cells, following the pattern established by row A - two groups of three notes, two groups of two notes, and two single notes - but the ordering of these cells is constantly changing. A numerical chart on the left side of the row table lists the various permutations:
At first sight this is a seemingly arbitrary arrangement, however closer inspection reveals a simple arithmetical principle. Within the basic number series 321321, and reading downwards, the next six-figure number is formed simply by subtracting 1 from each digit: thus reading from the top, 133212 becomes 322131 which becomes in turn 211323.

Reading horizontally, the method is slightly different: each group to the right is formed by beginning with the next lower number, and reading off the series in a circular manner, as indicated by the underlined numerals. An identical process is applied to the inversions to produce the following set of segmentations:

A small inconsistency can be noted in the second row of (i), where the strict observance of arithmetical principles would result in the sequence 123312, a duplication of the segmentation of the second row of (η). Boulez's arrangement maximises the range of available permutations and the result of this process is a reservoir of varied cell
relationships which form the basis for the pitch structure of the entire Formant. If the result seems at this stage rather contrived, it is worth noting that such number sequences formed an important part of the teaching of Paul Klee at the Bauhaus as an illustration of the transformation of forms by displacement. The relevant page in 'Notebooks, Volume 2' (12) cites examples including the patterns of bricks in masonry, before making specific reference to stars and constellations. Klee's influence on Boulez was a decisive one during this period as can be judged from the fact that the article 'A la limite du pays fertile', written in 1955 around the time when the first drafts of the Third Sonata were produced, borrows its title from one of Klee's paintings, and Boulez had earlier intended to use the same title for 'Structures Ia'.

Two tables of durations are listed on a separate sheet (Ex.5.2). Following the procedure sketched in the general plan, these are linked to the pitch series by the simple expedient of giving each note of the chromatic scale a corresponding duration value based on semiquaver units. Thus in table (a), E-natural = a semiquaver, D-sharp = a quaver, D-natural = a dotted quaver, through to F-natural = a dotted minim. Table (b) inverts the process, E-natural now being the longest note (a dotted minim) and F-natural the shortest. The procedure is very similar to that used in 'Structures Ia', and as we will see, the serial processes are employed with equal rigour, although to more flexible aesthetic purposes.

Given the emphasis placed on sonority in the earliest plans for the Formant, it is unsurprising that Boulez should have sought to extend the serial principle to encompass this parameter as well. A description of the six types of sonority, and of their relative durations, is found on a sheet which also contains a table of their distribution within each of the twelve-note rows (Ex.5.3). As can be seen, Boulez identifies three basic types of attack; tenu (T), sec (S), and harmonique (H), each of which can be modified by pedal (Tp, Sp,
and Hp respectively) to create six categories which correspond to the six cells of each row. The accompanying tables of permutations resemble in their layout the number sequence of the pitch cells, but despite their diagonal symmetries, they resisted all attempts to uncover the logic of the series. Help came from an unexpected source. Hidden amongst the sketches for the final Formant, 'Séquence', was a page of jottings (Ex.5.4) which turned out on closer inspection to be intended for 'Constellation', consisting of further notes on the use of sonorities and varied modes of attack. At the bottom of this page, Boulez identifies each of his six sonorities with a number from 1 to 3. It is a simple matter to substitute these numbers for the corresponding abbreviations in the tables of Ex.5.3, thereby producing number sequences identical to those quoted above for the pitch cells. Hence yet another musical parameter is being shaped by the consequences of the initial choice of pitch segmentation.

The only remaining musical parameters are those relating to register and dynamics, and a scale for each of these is defined on a separate sheet (Ex.5.5). Each group of rows in its prime form is paired with one of the groups of inversions, and a scheme of registers devised for each, with a range of from three to the maximum seven octaves. Five possible forms of distribution are available for each of the groups, and it is evident at this early stage that the arrangement for registers allows for somewhat more flexibility than that for pitches and rhythms. A seven point scale is also available for dynamics, with the same system to be used as for the registers, although in an as yet unspecified way.

The next stage in the sketching process indicates that the serial processes are to dominate the large-scale structural organisation in a manner similar to those found in 'Trope'. A page of diagrams (Ex.5.6) shows how the concept of segmentation will dictate the form of 'Constellation'. Thus there will be six sections, arranged in a grid. The overall
shape of the groups, 133212 - 212331, corresponds to the basic divisions of the first row. Already the outer sections are intended to be comparatively brief with only a single group of rows to be used. The middle four sections are richer in material, and therefore more extended. Two of these confine themselves to the prime forms of the row, \( \alpha - \zeta \), whilst the other two sections utilise the corresponding inversions, groups \( \eta - \mu \). It is possible to identify the sections as being in the following order: Points 1, Blocs I, Points 2, Blocs II, Points 3, Mélange, with the Points using the inversions and the Blocs the prime form of the row. Arrows underneath each group of rows indicate by their direction whether the prime or retrograde form will be used in a particular section. Comparison of these shows that all twelve groups will appear in both forms, but once only; in other words all forty-eight possible forms of the basic row will be used. Thus the grid, as well as being a structural plan, contains in essence a summary of the entire pitch structure of 'Constellation'. The final group is linked by a circle to a smaller grid, which appears to be simply a summary of the pitch groups of the main diagram. However, in turning to the detailed pitch sketches, it becomes clear that the connection is in fact the establishment of a link between the overall structure of the Formant and that of the concluding section Mélange, which, to judge from the order of the sketches, was evidently the first section of 'Constellation' to reach its final form.

**MÉLANGE**

A study of the gestation of Mélange suggests that in many respects it is a microcosm of the Formant as a whole. Thus the 'mixture' is on one level simply that of combining the two textures, Points and Blocs, with the colours reversed from those in the main part of the
Formant; *Points* are in red rather than green ink, * Blocs* in green rather than red ink, with the total of six tiny sections corresponding to that within the larger structure. However, a closer inspection reveals that the parallels exist on a much more detailed level. The first sketch of Ex. 5.7 organises the pitch content spatially in accordance with the layout of the small grid in Ex. 5.6, and therefore in a way which is virtually identical to that of the movement's overall shape. Analysis of the pitch content shows that it consists of the two single row groups, α and ε, of the prime forms of the row. The notes of α form the *Points* (red ink), those of ε the * Blocs* (green ink). The pitches are disposed in their segments within the six sections so as to correspond with the layout in the grid: two single note groups at the beginning and end, two groups of two-plus-one-plus-two notes, and two groups of three-plus-three notes at the centre. Thus the segmentation within the rows used in *Mélange* corresponds to the deployment of groups within the larger sections, as shown in the large grid of Ex. 5.6. The pitches of row A (α) are used in their retrograde order, and those of row J (ε) in their prime form. The logic of the choice of these two rows lies not only in the fact that their pitch segmentation is identical, but also in the intervallic relationship which links their single notes, E-natural - D-natural, and D-natural - C-natural respectively. Rhythms are already established in this first sketch, and correspond to those in the second of the tables chromatically derived from the pitches. In a further series of sketches to the right of the first sketch, more precise details of pitches and registers begin to emerge, with grace notes already giving an illusion of freedom within the meticulously planned rhythmic structure. In so doing they articulate a curious paradox of 'Constellation': no work of Boulez is freer in its relationship to the interpreter, and yet at the same time more rigorous in its compositional procedures. As these details are evolved, they are incorporated into a second grid underneath the first sketch. Details of dynamics and modes
of attack are added as the sketch begins to approximate to the final form of *Mélange*.

Before considering this, one other small sketch needs consideration. This separate sheet of jottings (Ex.5.8) can be identified as a preliminary sketch defining the various serial parameters for *Mélange* with regard to durations, dynamics and registers. Evidently both registers and dynamics are to be within the medium scale III - V, and a comparison of the tables of Ex.5.5 with the printed score, Ex.5.9, reveals the extent of Boulez's calculations. Thus the two single notes of α, D-natural and E-natural, are positioned precisely within register four as defined by the parameters set in Ex.5.5 - the only available register for single pitches within the three-octave range to be used for group α. Conversely, single notes within group ε can be placed in either register three or five, the latter being the one chosen for the opening D-natural. More flexibility of register is available for two- and three-note groups, but Boulez keeps within the range of registers three to five throughout *Mélange*, although in order to accommodate the low G-sharp of the third group, it is necessary to think of the compass as transposed down a semitone, whilst the balancing high B-flat of the fifth group is an upward extension by a semitone. Dynamics are linked to registers in their overall range, which extends from *p* to *f* (that is, between III and V on the scale), and each note of a group is within a separate dynamic register.

These various parameters having been fixed, it remains to examine the final version in relation to the sketches. Textures are meticulously organised, with each of the two groups containing the full range of six available modes of attack, and in the order listed in the sketch (upper diagram of Ex.5.3): it is necessary to read forwards for ε (prime form) and backwards for α (retrograde form). Again, *Mélange* is functioning as a microcosm of 'Constellation', exhibiting the entire range of textures in a concentrated format. It might be added at this stage that a study of the sketches is an antidote to any pianist who becomes
frustrated at the unprecedented detail of Boulez's pedal marks. The distinguished American pianist, Paul Jacobs, is quoted as making the following observations on the Third Sonata: "Boulez does not allow himself either to love or relax with a sound. What he does concern himself with is the exploitation of harmonics, with scrupulous instructions for pedalling: one-half pedal for sixteenth notes, a full pedal for eighth notes. It's subtlety carried to absurdity" (13). Whilst experience of performing the work teaches one that Boulez's pedal marks do at times need modification in response to differing acoustics, this sweeping statement is surely missing the point of the extraordinary textural range, its meticulous organisation, and the challenge of realising it in performance.

A comparison of the pitches of the final version with the sketches shows that whilst those of group $\alpha$ are simply presented in their original form, some of those in group $\varepsilon$ are modified by the addition of related notes to form chordal textures - again a parallel to the procedures in the Formant as a whole, where Points are used lineally and Blocs thickened by means of chord multiplication. The process in Mélange is a comparatively simple example of this technique, with the final three-note chord of group 4 in the sketch being multiplied by the succeeding minor third dyad which opens group 5. Conversely, the two notes of this chord are each multiplied by the intervals of the preceding three-note chord. The technique accounts for the addition of a C-natural to the opening pitch, D-natural: the two single notes of group $\varepsilon$ are being 'multiplied' into a dyad, thus defining the individual pitch content of the group from the very beginning. Such 'crossover' techniques are a fundamental feature of the pitch techniques applied to Blocs, and used in an ever more resourceful way to exploit the unique characteristics of each segmented row. Even within this tiny section, Boulez offers two choices of ordering to the performer. The first would present the two groups in sequence with Blocs followed by Points, the second,
and, judging from the sketches, the original layout, folds the groups within one another so that they function as miniature tropes: again a microcosm of 'Constellation', and a fundamental compositional principle of the Third Sonata.

If this detailed examination of *Mélange* has been somewhat mechanistic at times, the purpose has been to examine the parameters which, by extension, govern the structure of the Formant as a whole, and to raise at least one question implicit in the previous paragraph: given the rigour of the compositional process, how real are the choices which Boulez offers to the performer, and did he have in mind an ideal, indeed a fixed order of performance for 'Constellation'? Paul Jacobs had no doubts: "The piece works only in one particular order, that is the one published and played. No omission or repetition is possible" (14). Whilst nobody could question the second sentence, since these parameters are indeed fixed by Boulez, the opening part of the statement is at odds with the apparent flexibility offered to the performer. Is then the issue of choice a reality or illusion? The question was one which stimulated my own investigation of the manuscript sources, and whilst it would be foolish to expect definitive answers, it remained a constant reference point in my gradual understanding of the compositional procedures which shaped 'Constellation'.

**POINTS**

The remainder of the large sheet which contains the sketches for *Mélange* on its left side is filled with sketches for *Points*. The brief *Points* I was evidently the next section to be composed, its sketches occupying the top right hand section of the sheet. Sketches for *Points* 2 follow underneath those for *Points* I, and are continued on the next sheet which also contains sketches for *Points* 3. Thus composition of the entire *Points* sections evidently preceded detailed work on the two sections of *Bloc*, and as indicated in the
overall formal plan (Ex. 5.6), these three sections utilise all twenty-four forms of the
inversion of the row, with the six groups of rows used in both forward and retrograde form.
Comparison of the three Points sections shows a consistency of sketching procedure with
regard to the treatment of every row. In each case, the row structure is segmented into its
six cells and spread over three staves, each cell being assigned one of the six modes of
attack, and every pitch accompanied by its identifying rhythm derived from the serial tables
of Ex. 5.2. The grouping of cells into larger units of from one to three groups is described
numerically at the top of each row, and these larger groupings open up the possibility of
combination and permutation of cells within an individual row. This larger segmentation
is shown below for all six groups of rows:

(η) 2/123/31 12/3/312
(θ) 3/23/112 231/12/3 12/3/231
(τ) 32/311/2 232/311/2 11/2/323
(κ) 131/22/3
(λ) 132 213
(μ) 321 231 312

Its principal feature is the diagonal which dissects the left hand column, and it is a simple
matter to extrapolate the numerical groupings,

1 3 2 2 1 3
3 2 1
2 3 1 3 1 2
1 2 3 3 2 1 2 1 3
2 3 1 3 2 1 2 1 3
2 3 1
which reflect the symmetries found within the smaller cellular divisions. As there, the process is not an entirely mathematical one: exact arithmetic would call for a 321 division of group (μ), but since this would result in an identical grouping to that of group (0), Boulez diverts the diagonal in the interests of greater compositional choice.

Underneath the rows, with their definition of rhythms, cellular divisions, modes of attack, and larger structural groupings, the detailed sketching occurs. Given that so many of the musical parameters are now in place, it is fairly easy to follow the process step by step. In the case of Points I the relatively simple material consisting of the two rows, M and N, comprising group η reached its final form quickly, the single sketch being virtually identical to the published score. The annotated score, Ex.5.10, placed alongside the sketches, (refer to Ex.5.7) shows the three stages of the compositional process. Modes of attack are drawn from Ex.5.3, and follow the serial order established there. The juxtaposition and combination of the two rows allows for a considerable degree of freedom and pitch overlap with the simple origins of the pitch structure concealed; thus the notes C-sharp and F-natural are treated as convergent and appear only once. The middle line is particularly free in its handling of the order of pitches, the larger grouping of three cells of row M being freely permutated in its sequence of pitches. A consequence of this is that whilst each pitch retains its rhythmic value, there is not necessarily any continuity of rhythm within cells; intervening notes, or even whole cells, can function as tropes, interrupting the rhythmic connections within a cell. Although less varied in musical character, Points I is in some respects a counterpart to Mélange at the opposite pole of the movement, the two sections being of similar length and virtually identical in their range of dynamics and registers, although the latter are more varied in Points I: thus the first three-note cell of row M extends over a register of only two octaves, whilst the other one
expands over a four octave range.

As shown in the general plan (Ex.5.6), Points 2 utilises all six groups of inversions, arranged in two larger groupings, 01κ and λημ. Each large group contains within it a group of three rows (κ or λ), one of two rows (η or τ), and a single row (0 or μ). Two groups, λ and η are to be used in their retrograde form, the remainder in their forward version. (It is curious to note in passing the slight asymmetry resulting from the use of both single rows in their forward form). The sketches, spread over two sheets, effectively divide into two groups, with a first group of six rows consisting of 0τ and κ sketched on the same sheet as the drafts for Mélange and Points 1, and detailed musical sketches appearing underneath (Ex.5.11.i). A second sheet lists the remaining group of six rows, comprising λμ and τ, followed by the relevant sketches (Ex.5.11.ii, continued in Ex.5.12.i).

During this second stage of sketching, dynamics and registers are established, and although the pencil is faded, the sketches can be identified as logical in their ordering. The only evidence of compositional difficulty appears in the sketching for what became the opening group of Points 2, with its complex simultaneous unfolding of three rows, two of them in retrograde form. Here the initial sketches are fragmentary and are followed by two further drafts. Referring now to the numbering in my copy of the published score (Ex.11.iii), it is fairly certain, judging from the ordering of the sketches, that the order of composition of the eight groups comprising Points 2 was; 3,4,5,7 and 6 on the first sheet, followed by 1,2 and 8 on the second sheet. Symmetries in the composition of these two larger groupings can be observed, with the extended groups 7 and 1 involving three rows in combination, the shorter groups 6 and 2 consisting of a combination of two rows, and the fragmentary 3,4,5 and group 8 involving a single row only. My numerical annotations of the original rows, identification of the sketches, and annotated copy of the published
score show the three stages in the compositional process (Ex.5.11). They reveal both the pitch structure and the precision with which details of rhythm and attack are calculated, although Boulez allows himself some flexibility. Thus *tenu* can be interpreted not only as simply a sustained pitch, but one which is absent apart from its beginning and ending, marked by grace-notes. An example of this occurs at the very opening of group 1, where the held C-natural is marked by only by the presence of two grace-notes, which, by their placing, define its rhythmic length of nine semiquavers. As in *Points* 1, an individual note may be a point of convergence of more than one pitch, although the only instances of this in *Points* 2 are confined to the opening section. The most striking example occurs where the middle C-sharp (*) marks a pitch convergence of all three of the rows used. It is so disposed as to become the focal point of the group in all its musical parameters. Rhythmically it is the most sustained note and it is placed at the exact halfway point of the section, its register is at the exact centre of the compass used in the section, its dynamic *f* is at the extreme of those available in *Points*, and it is harmonically reinforced by the addition of the simultaneously sounding perfect fifth. The three stages of sketches (Ex.11.ii) show how it was conceived as a pivotal note from the beginning but only gradually found its final register (the stages are marked by [x]). A small anomaly in the printed score is the absence of the final pitch, D-sharp of row N. This is clearly present [y] in the first two sketches (Ex.11.ii). In the final sketch, Boulez began on lines 22-23 of the sheet but continued the final few notes on staves 19-20 above, missing the dotted minim D-sharp which occurs at the join - even Boulez is human!

The disposition of the sketches, therefore, shows quite clearly that the idea of groups of various lengths was part of the conception from the beginning, although the identification of the various routes through each section was among the last elements to be
notated at the pen score stage. In considering the possibilities of performer choice, what are the range of options which Boulez makes available? Examination of the available routes through Points 2 shows that the possibilities are comparatively restricted, mainly as a consequence of the fact that groups 3-7 are available in only two possible orders. The other option concerns the relative position of groups 2 and 8, which are interchangeable. Hence the only possible orderings are:

\[
1 \ 2 \ \{3 \ 4 \ 5 \ 6 \ 7\} \ 8 \ \text{or} \ 1 \ 8 \ \{3 \ 4 \ 5 \ 6 \ 7\} \ 2 \\
\{3 \ 5 \ 7 \ 4 \ 6\} \ 8 \ \ 1 \ 8 \ \{3 \ 5 \ 7 \ 4 \ 6\} \ 2
\]

It is interesting to note that the bracketed groups 3-7 are found together in the first sheet of sketches, and that therefore the decision to group them together seems to have been part of the original conception. The option is whether to play the three fragmentary groups 3, 4, and 5, derived from row 0 consecutively, or to 'trope' them by inserting another group. Significantly, the single three-part chord of group 5 is the only occasion in Points 2 that this texture appears. Its placing in the sketches, just above those for group 6 enables us to appreciate how this group's pitches revolve around the same three notes, framed at either end by the recurring D-natural - C-sharp interval. Hence the placing of the solitary chord of group 5 becomes a pivot for Points 2, summarising its dominant intervals, which constantly recur in almost motivic fashion, and placed at the centre of a section which itself bisects the two Blocs sections with their massive chordal textures. An understanding of the function and interaction of the various musical parameters in Points 2, helps one to base one's choices as a performer on a level which is more conscious than purely intuitive. As elsewhere, the intention is not to attempt to find definitive answers to questions of interpretation, but more modestly, to contribute to an awareness of the compositional process.
Examination of the sketches for Points 3 (Ex.5.12), shows that the basic compositional procedures remain the same as for the other Points sections. The material is as described in the preliminary sketch (Ex.5.6), with one group less available than in Points 2, the two rows of group η already having been employed in Points 1. As in Points 2, the sketches are spread over two sheets with groups 0, t, and κ and their related sketches appearing under the final sketches for Points 2, and the two remaining groups being on a separate sheet which also contains preliminary sketches for the Blocs. Rhythms are identical to those used in Points 2, but Boulez, although retaining the larger groupings of cells established earlier, is more flexible and indeed less consistent in his disposal of the cells, sometimes retaining the vertical arrangement used in Points 2 (as in group t), at other times favouring a horizontal ordering (as in group κ). As always, theoretical considerations are overridden by the desire to obtain the maximum flexibility. This greater freedom of approach extends to the ordering of notes within the groups, to the pitch content, and indeed to the overall design of the section. The ten groups which form Points 3 are less symmetrical in their proportions than the eight of Points 2. Only one group, 10, uses a combination of three complete rows, and there is a preponderance of shorter groups using sections of two incomplete rows. Perhaps this asymmetry reflects an imbalance in the pitch content of Points 3, with only five of the six groups of rows being available.

Compared to Points 2, where with the exception of the three short groups using row O, all twelve notes of a given row will be employed within the group, in Points 3 the procedure is a more fragmented one with sections of a row being used and then broken off. An extreme example of this technique is the dispersal of row T over three sections, 1, 5, and 7, of contrasting musical character. Examining the row structure of the groups in more detail, it is clear that as in Points 2, they fall into two larger groupings, with the row tables
and sketches on the second sheet forming groups 6, 8, 9, and 10, and the remainder on the first sheet. My numerical annotations of the rows and identification of the sketches in relation to the printed score (Ex. 5.12) clarify some aspects of the compositional process.

The ordering of the sketches is of some interest, with the four-part chord which opens group 2 being in isolation at the top of the sketches, followed by more fragmentary sketches for this group (Ex. 5.12.i). This is the only time such a thick texture occurs in the three sections of *Points*, and the chord contains within it the three pitches of the pivotal chord, group 5, from *Points* 2. Immediately underneath this sketch is the opening of group 4, the registers of its first two notes already established, and recalling another characteristic shape of *Points* 2, the beginning and end of group 6. These may be unconscious reminiscences, but what is interesting from the disposition of the sketches is the fact that sketches for groups 2, 3, and 4 appear together, with no indication at this stage that they were to form three separate groups. Could it be that the original conception was for a single large group using all three rows, O, P, and Q, in their entirety, balancing the other large group, 10, and following the more symmetrical arrangement of *Points* 2?

The second sheet (Ex. 5.12.ii) is almost exclusively devoted to sketches for group 10, with its three entwined rows, and shows Boulez beginning with the pitch C-sharp (*) in the bass. In the second sketch it has moved up an octave and into a more central position within the group, and in the final version it is placed at the exact centre and is heard three times, ever more insistently dominating the musical texture: the structural parallel with group 1 of *Points* 2 needs no further comment. The other constant feature of these sketches for group 10 is the three-note semiquaver figure (y), formed from the notes of row W, and tropped into the texture just before the central C-sharp. Its pitches, consisting of adjacent semitones, again recall the pivotal chord of *Points* 2. Mention has already been made of
the quasi-motivic function of this cell, and the greater flexibility of pitch treatment in
*Points* 3 ensures that such motivic connections become increasingly apparent. Of some
interest in this regard are the omissions from the sketches. There is, as far as I have been
able to ascertain, no sketch for the tiny group 5, and the opening of group 7 is missing.
In each case, the missing notes consist of the same three-note cell of adjacent semitones,
formed respectively from three note segments of rows T and S: it is almost as though
sketching were unnecessary and that Boulez was simply slotting them into prominent
positions which enhance the motivic connections already established. The dominant rôô
of this cell reflects the statistic that nearly a third (seven) of the twenty-four three note
segments contained in rows M-X consist of semitonal clusters. Such considerations
dominate the disposition of the single row X, and its division into three groups (6, 8, and
9) parallels the treatment of the single row, O, in *Points* 2. Each of its three groups are so
ordered as to contain a three-note semitonal cluster, and all end with an upward leap of
major seventh/minor 2nd, thus reinforcing the other principal motivic shape used in the
three sections of *Points*.

The issue of performer choice in *Points* 3 appears to be a less straightforward one
than in *Points* 2, with many more options being available. Closer examination, however,
reveals that in practice the choices are more restricted than at first appears. Thus whilst
there are two possible starting groups, 1 and 2, with a number of possible continuations, the
choices are narrowed by the requirement to play all groups. Unless groups 1 and 2 are
played consecutively at the beginning, there are a limited number of routes back to them.
Only the ends of groups 3 and 4 lead back to group 1, and only groups 3 and 7 lead back
to group 2. Group 3 therefore acts as a filter, enabling only the following combinations:
1 2 3 etc
1 2 10 3 etc
1 5 7 2 3 4 6 etc
2 4 3 1 etc
2 10 4 3 1 etc
2 3 4 1 5 etc
2 10 3 4 1 etc

From this it can be seen that the longest group, 10, can be troped into the opening sequence after group 2, rather in the same way that groups 2 and 8 are interchangeable in Points 2, but that otherwise the options are quite restricted. As in Points 2, there are two larger groupings, with groups 1-5 and 7 played first, with the option of inserting group 10 after group 2. This is certainly a tempting proposition: the common F-sharp which joins the two groups assists the impression of continuity, although as we have seen, the likelihood is that groups 2-4 with their interlocking pitch material were conceived together. Elsewhere, my own preference is for an ordering which emphasises the motivic connections: hence the interpolation of group 6 between groups 5 and 7, allowing the threefold repetition of the semitonal cell at different transpositions. Needless to say, these are only my personal inclinations in the light of a study of the musical structure: each performer must decide his own order of performance based on a thorough study of the available material.
Judging from the evidence of the sketches, Boulez evidently left the composition of the Blocks until the end. Although the compositional process is fundamentally the same as that for the Points, the segmented row structure is used as the basis for a series of chordal elaborations, ranging from simple dyads at the beginning through to gigantic complexes of up to eleven parts in Blocks I. The chordal basis of Blocks II is slightly less dense, and it is likely that this stage of the compositional process preceded that for Blocks I: the disposition of the sketches supports this chronology since the pitch structure of Blocks II is sketched on the sheet which also includes the final sketches for Points 3. As shown in the general plan (Ex.5.6), the Blocks are to be derived from the six groups formed from the prime form of the row, twelve in all, including the retrograde forms, with each section including a distribution of forward and retrograde versions of the groups. As in the Points, the first step was to characterise each note of the row with an identifying rhythm drawn from the serially derived tables of Ex.5.2. For the Blocks, Boulez employs the 'inverted' form of the rhythm, with E-natural becoming the longest value, a dotted minim, and F-natural the shortest, a semiquaver. The next stage, as with the Points, was to dispose the six segments of each row into larger groupings of three, two and one. These are shown below and will form the basis for the permutation of groups in Blocks II.

\[
\begin{align*}
(a) & \quad 1/33/212 \\
(\beta) & \quad 322/13/1 \quad 22/131/3 \quad 131/32/2 \\
(\gamma) & \quad 322/1/31 \quad 21/313/2 \quad 1/322/13 \\
(\delta) & \quad 211/3/23 \quad 1/32/321 \\
(\epsilon) & \quad 13/321/2 \\
(\zeta) & \quad 21/1/323 \quad 321/13/2
\end{align*}
\]
As with the grouping of the Points, the aim is to provide the maximum number of options, although it is noticeable that in the preliminary plans for Blocs he avoids the extreme combinations of /323/ and /11/.

The next stage in the compositional process was to convert the single pitches of each of the twelve rows into chords of various densities. The ordering of this procedure is of some interest, with groups α ζ and ε notated first, and their chordal elaborations to the right. Underneath, in tabular arrangement, are the remaining groups, δ γ and θ, with the chordal derivations continuing vertically to the bottom of the page. This sequence is reproduced in Ex.5.13, and reflects the increasing density of the chords, with α and ζ in the range of one to three notes, ε (in its original form) and δ, from one to six notes, and the two groups of three rows, γ and β containing the most complex aggregations of up to seven notes. Reference has already been made in this chapter to the technique of chord multiplication, and Boulez's tendency in his writings to convey the impression that it is a logical, unifying process, which would provide the key to his compositional procedures if only we were able to understand his musical examples. In fact, it would be more accurate to speak of chord multiplication as a flexible principle which serves his creative needs, and he uses it in a variety of ways to derive the pitch material for Blocs II. Because of a tendency in some critical commentaries to treat as self-evident this aspect of Boulez's approach to serial technique, it was decided to make a detailed study of the operation of the principle in Blocs II, in the hope that it will provide some supplementary examples to assist an understanding of an important element of this musical style - after all, the link between Boulez's technique and the actual sound of his music is a direct one.

The sheets of annotated musical examples (Ex.5.14) attempt to clarify the procedures used in Blocs II. In each case, Boulez's two sketches are separated by annotations which
provide a link between the segmented rows at the bottom of the page and the chordal elaborations at the top. The first group of examples sketched, for rows A, L, K, and J, illustrates the flexibility of the process in operation. A basic principle throughout *Blocs* is the use of a cross-like linking of the six cells in each row. The application is shown in its simplest form in row A, with the cells paired into groups, I and 6, 2 and 5, 3 and 4, and each note multiplied by the vertical combination of intervals from its corresponding cell (it should be noted that the two- and three-part chords thus formed always take the final note of the group as their root: thus the first three note cell of row A has F-sharp as its root rather than F-natural). This is succeeded by a group, ζ, consisting of two rows, L and K. Here the principle remains the same, but the crossover occurs between the group rather than within each individual row: the annotated example shows the process clearly. The treatment of row J is particularly revealing as it is to play a significant part in the structure of *Blocs* II. Boulez began by subjecting it to the same process as the other single row, A, simply multiplying the groups using the same pairings as before. However compositional needs evidently dictated a more complex vertical enrichment. This is achieved by means of making available the inversions of all the two- and three-part chords, thus providing an additional series of intervals. To take a specific example, the single note, C-natural of cell 5 is multiplied by all six intervals resulting from the inversions of the three-part chord formed from the notes of cell 2 - E-flat, A-natural, and E-natural. The available intervals are: augmented fourth plus perfect fifth, augmented fourth (again) plus semitone, and perfect fourth plus diminished fifth, resulting in the following pitches above C-natural: F-sharp plus C-sharp, F-sharp (again) plus G-natural, and F-natural plus B-natural. These six pitches together form the tenth chord in the vertical enrichment of row J, and the process is summarised in my annotation.
The method outlined above is applied throughout *_blocs*. The other group, δ, consisting of a pair of rows, I and II, uses exactly the same technical principles, but combines the crossover technique used in the other pair of rows, L and K, with the inversion technique described above. Thus each note is multiplied first by the corresponding chord in its own row (1-6, 2-5, 3-4) and is then multiplied by that in the paired row, as shown in the annotated example. The groups containing three rows, γ and ζ, extend the technique, but in slightly different ways. The multiplication used in γ is the more straightforward. As shown in the annotated example, the notes of row G are multiplied by the corresponding chord within the row and then by the equivalent chord in each of the other two rows. Having obtained six chordal groups for row G, Boulez simply uses these same chords for each of the cells in rows F and E, creating a uniformity throughout the three rows. On the other hand, the technique of chord multiplication is shown at its most involved in group ζ, where a series of complex chords are obtained by multiplying each note by the corresponding chord plus inversions in both of the other rows, as shown in the annotation. The operation of the technique here produces chords of up to seven parts, the most dense textures available in *_blocs* II. If I have dwelt on the mechanics of the process at some length, the purpose has been precisely to illustrate the point that practical considerations govern the application of the principle of chord multiplication. Hence the *how* by which individual chords are obtained, although of analytical interest, is of less importance than the *why*: what will be the consequences of the series of compositional choices made at this stage?

Having formed the chordal groupings, Boulez proceeded to apply an identifying mode of attack to each. Although the single rows A and J have a different sonority for each of the six cells, elsewhere the method is a more uniform one than in the *Points*, with groups
of cells having the same treatment. The route from here to the completed score appears to have been a fairly direct one with the detailed sketches closely resembling the final version, with little evidence of extensive redrafting. The pencil score identifies the chordal groups used for each section, so it is a fairly straightforward matter to locate the rows themselves, and the precise identity of the chords used throughout. These are as indicated in the annotated score (Ex.5.15), which shows the derivation of the pitch content of *Bloc II* from the chordal sketches (Ex.5.13).

The question posed at the end of the previous paragraph, a complex one in itself, is inextricably linked with the issue of performer choice. Yet the task of the performer/analyst attempting to discuss the operation of choice in *Bloc II* appears an equally daunting one. Turning directly to the printed score, one is confronted by a labyrinth of twenty groups ranging from one consisting of a single note to several of considerable length and textural complexity, and a seemingly bewildering range of possible permutations of order. In fact, closer inspection reveals that the possibilities are strictly controlled, and as with the *Points*, the alternatives available to the performer are dictated by a musical structure whose main details are already in place. Thus it is possible to begin with either group 1 or group 6, but there is no way back to 6 once group 7 has been played. Hence the first five groups form a larger grouping with the choice of playing group 6 at the beginning or end. After group 7 there is a choice of group 8 or 13, but since there is no way back to 13 after group 14 has been played, the choice is effectively one of playing group 13 before or after the star-shaped cluster formed by groups 8 to 12. Group 17 can be interpolated at this point, but must be followed by group 13. Within this final section there is some flexibility of the placing of the single chord (15) and the single note (19). Thus the twenty groups fall into three larger sections: 1-6, 7-13, and 14-20. What, if any, relationship do these observations
The ordering of the next stage in the sketching process, which converts the chord sketches into the twenty groups of *Bloc I*, establishes the sequence of composition, and shows that the interpolations of groups 15 and 19 were meticulously planned, with their final layout having been already been fixed at the sketching stage, as was that of the 'star' group. An awareness of the musical structure helps to explain a puzzle in the disposal of sketches. Most of them are ordered in sequence on a large twenty-four stave sheet. However sketches for groups 6, 7, 13, and 17 are missing, and are to be found on the two sheets of sketches for *Bloc I*. Preliminary sketches for group 13, and two sketches for group 6, are found at the bottom of the sheet containing the concluding sketches for *Bloc I*. These two groups are the only instances in either section of the pitch content being derived from the interlacing of three rows - a procedure fairly common in the texturally more simple *Points* sections. On the lower right-hand side, upside down, of the other sheet of sketches for *Bloc I*, a second sketch for group 13 is followed by sketches for the missing groups, 7 and 17. The opening E-flat of group 17 is missing, but close inspection of the previous page shows that it is present at the bottom right hand corner, already characterised by its innovative pedal markings. Presumably, Boulez simply continued the sketch onto the adjoining sheet, and the seemingly fragmentary sketches are in fact continuous. The assumption must be that these four most mobile groups in *Bloc II*, containing related pitch material, were sketched independently of the remainder of the section, and the likelihood is that, despite the sequence of the chord sketches, the detailed sketching for *Bloc II* would have succeeded that for *Bloc I*. Hence the order of composition is likely to have been: chords for *Bloc II* followed by chords for *Bloc I*: detailed sketching for *Bloc I* followed by detailed sketching for *Bloc II*. The sketches for
Blocs II are identified in my copy of the originals (Ex.5.16), which are on the whole remarkably close to the final version of Blocs II.

A comparison of the groupings which dictate performer choice, with the pitch content of the chord sketches, and with the annotated score, shows both the logic of the arrangement, and the unity of the musical conception which it articulates. Thus the opening section of Blocs II, groups 1-5, derives its pitch material from the chords of rows I, G, and D, which form a horizontal sequence of chord sketches: The two extended groups, 2 and 4, which utilise respectively rows G and D, contrast with one another in register but are complementary in musical shape. Each has a loosely palindromic structure resulting partly from the repetition of pitch sequences to mark the beginning and end of groups. The exactness with which the cessation of sounds is calculated is reminiscent of the editing of taped sound, and indeed a remarkable feature of Blocs is the co-existence of absolutely precise rhythmic durations with freely resonating harmonics evoking the sound world of the electronic studio. There is the choice of troping part of row I between these two larger groups. The two groups 1 and 4, formed from row I, are smaller counterparts to groups 2 and 3, and the section ends with a 'signature' - group 5 - consisting of a single three-note semitonal cluster formed from row I, and recalling the most characteristic motive of the Points sections. The alternate rather than simultaneous use of the chord sequences of this opening section is a curious, if incidental, parallel to their visual appearance in the chord sketches.

This opening section is framed by group 6, which can either precede or follow it. Groups 6 and 13, the two most mobile groups, are formed from the vertical combination of rows A, L, and J which appear under one another at the head of the sheet (The visual appearance, and indeed the musical structure of Blocs II, comes to resemble that of a vast
cross: in so doing, it parallels both the microstructure of chord multiplication, and, on a larger scale, the formal plan of 'Constellation' with its reversible format. The derivation of the chordal structure of these rows was analysed in detail in the discussion of chord multiplication, and an examination of the results of the process is revealing. Although the revised enrichment of row J produced chords of up to seven notes, a remarkable feature of the three rows is the number of single notes which remain after the process of chord multiplication. Particularly prominent are the pitches C-sharp and E-flat, which appear twice. In the remaining nine rows there are only two single notes remaining: C-sharp in row B, and E-flat in row K. These coincidences explain the logic of the placing of the resonating E-flat at the beginning of group 17, and the climactic C-sharp of group 19. The effect of this is to evoke resonances with the Points sections, where C-sharp is used in a pivotal role at the centre of the most extended groups. Here it has a double function, involving the completion of rows B and J. In so doing, it emphasises the crucial structural role of J in Blocs II. Its appearance here together with its use in the two most mobile groups, 6 and 13, imprints its characteristics over the entire span of the section, and emphasises the fundamental unity of the framework within which performer choice is able to function.

Row K is left to one side in this new grouping, but it is used to form groups 7 and 17, both of which have an important function in relation to the placing of the pivot groups, 6 and 13. The 'star' formation, groups 8 to 12, is derived from rows H, F, and C - again a horizontal reading of the available ordering. Groups F and C are used in combination, with H alone forming the nucleus of a constellation of six revolving cells - an arrangement which again reflects the larger structure. This positioning of the nucleus of the 'star', at the heart of the section as a whole, is significant: its pitch content consists of three-note chords.
each consisting of semitonal clusters, and therefore recalling the unifying motive of the
*Points* sections. The final grouping of *Bloc* II uses the remaining rows, E and B, in
sequence, paralleling the technique used in the opening section involving rows G and D.
As there, the groups are contrasted in register, with row B in the bass clef and row E in the
treble. The chordal shapes of this final group recall those of the opening of *Bloc* II, the
pitch content mirroring the circular structure. Although more massive chordal textures are
available here, their effect is softened by their use in arpeggiated form at a subdued
dynamic level. This makes for a smooth transition into the next section of *Points*, with the
resonating echoes of the bass C-sharp lingering in the background.

The final section of 'Constellation' to be drafted, at least in its early stages, was
*Bloc* I, which, with its extreme contrasts of register and dynamics and massive
aggregations of chords is the most immediately striking of the six sections. As shown in
the formal plan (Ex. 5.6), its pitch structure complements that for *Bloc* II, the material
consisting of the prime and retrograde forms of rows B to L not already used elsewhere
(row A is not available, having been employed in *Mélange*). Effectively, the five groups
of *Bloc* I complete the pitch spectrum of 'Constellation' by using all eleven remaining rows
of the available forty-eight forms. The shaping of this material is governed by the same
serial parameters which had shaped *Bloc* II. Thus the gathering of the six cells of each
row into three larger groups is identical to the divisions established in *Bloc* II, and the
chromatic serialisation of rhythms linked to pitch is likewise adopted from *Bloc* II. As
there, the next stage was to convert the individual pitches to chords using the technique of
chord multiplication examined above, and the results of the process are shown in Ex. 5.17.
A detailed comparison of the two *Bloc* sections is revealing. How is it that similar
technical procedures can produce material which is on one level so similar, and yet be used
to generate musical results which are in other ways so varied? The question goes to the
heart of Boulez's musical style, and even a partial attempt to answer it can reveal layers of
musical meaning concealed rather than revealed by the rigorous technical processes. This
is not to deny the importance of an understanding of Boulez's serial technique: indeed it is
worth making the observation that only by the most thorough examination of the technical
procedures can we attempt to identify the point as which the non-rational - i.e. imaginative
- elements begin to shape the direction of the composition. Nonetheless, in addressing the
how of the musical structure, we must continue to be aware of the why behind any technical
procedures - however inexorable they may seem.

We have seen that the use of chord multiplication in Blocs II, whilst technically
consistent in its application within a given row, could be adapted according to musical
needs to produce a considerable variety of textural density. Essentially, the processes used
in Blocs I are identical to those found in Blocs II, and indeed an examination of the chordal
structure of the two Blocs sections shows considerable pitch convergence. This is as one
would expect, since the 'crossover' technique which pairs together groups 1 and 6, 2 and
5, and 3 with 4 in order to generate the vertical combinations, effectively cancels the
distinction between prime and retrograde forms of the row. Boulez evidently took the
compositional decision that Blocs I required a more enriched chordal structure than that of
Blocs II. Chordal density ranges from the comparatively simple textures of rows II and I
to the massive sonorities of row B which contains chords of the maximum possible density
of eleven notes (to go beyond this would create clusters, a texture not totally rejected by
Boulez, but used only rarely). Consequently the technique of chord multiplication is
extended, and where necessary adapted, to serve creative needs. An examination of the
derivation of the chord structure of *Bloc 1* shows some interesting developments of the principles already established - albeit applied in a less consistent way than in *Bloc 11*.

A particularly revealing example of this occurs in the treatment of row J. As noted above, this single row had played a very important structural role in *Bloc 11*, and Boulez had modified his original chordal sketch in order to produce a more enriched version in the light of his compositional needs. It plays an equally prominent part in *Bloc 1*, its middle group, consisting of pitches 5 to 10, forming the entire pitch material for the third of the twelve sections. This particular section is one of the most texturally memorable in 'Constellation', consisting of soft, sustained chords in the extreme treble of the instrument. The technique used to derive the three sets of chords is a particularly complex one, with the notes of some of the cells being multiplied by two adjacent chords. Thus the single pitch, C-natural, of cell 2 is multiplied by the chords of both cells 4 and 5, but without using the available inversions. The two notes of cell 3 are each multiplied by the chords of cells 4 and 5, but now adding the inversions to produce complex ten-note chords, whilst the three notes of cell 4 revert to a lighter five-part texture as a result of multiplication by a combination of cells 2 and 3. Ex.5.18 attempts to show the process diagrammatically. What is interesting from this description is the flexibility and indeed inconsistency of the technical processes. They must have been musically dictated, and our rather laborious examination does begin to shed some light on a puzzle. Alone among the entire series of sketches for the *Bloc* sections, there is no trace of detailed sketches for this section among the two pages of sketches for *Bloc 1* (Ex.5.19). However, between sketches for groups 4 and 6 are a few verbal jottings, "avec resonance - registres - ton 8ve"; which may well refer to group 3. Could it be that Boulez worked directly from the chord sketch (Ex.5.17) for this section, modifying it as compositional needs dictated, or perhaps used the
chord sketch in conjunction with an intermediate sketch, presumably lost? This is pure speculation, but the point of our examination is to emphasise the fact that Boulez is no different from other great composers in his adaptation of technical procedures to serve creative needs.

Given the greater freedom of the means used to derive the chordal groups of *Bloc* I, it is an interesting if at times speculative exercise to analyse the process by which such agglomerations as the eleven-part chords of row B are obtained (here the technique involves a further extension of the procedure used in row J, multiplying each note of cell 3 with the inversions of cells 4 and 5 in all three rows B, C, and D). Perhaps even more interesting however is what Boulez has chosen not to do. The most extreme instances of the avoidance of complexity are those cells where the texture is left as single notes, and a surprising feature of *Bloc* I is that it contains nine such groups. Since it would have been easy for Boulez to eliminate them altogether, their presence must serve a creative purpose, and a comparison of these groups with the nine monodic groups of *Bloc* II is revealing (Ex. 5.20). There are only three instances of overlap: the single note A-natural of row L, and the two cells of row J. These cells are dominated by the two pitches C-sharp and E-flat, which play such an important role in the concluding sections of *Bloc* II, and an aggregate of the monodic cells in both *Bloc* sections shows that they are dominated by the pitch C-sharp which occurs seven times, with the five appearances of E-flat equalling that of any other pitch. The primacy of these pitches is emphasised by the fact that they are among the most extended in duration, consisting of eleven semiquavers and nine semiquavers respectively. Yet again, Boulez is creating hierarchies within serialism which can be exploited to his expressive ends.

One other serial parameter established at the chord sketching stage remains to be
considered before an examination of the music itself: the disposition of modes of attack. Reference was made briefly during the discussion of Blocs II to the simplification of procedure as compared to the Points sections, with groups of cells being given a mode of attack rather than each of the six cells having its own distinguishing sonority. However a comparison of the two Blocs sections shows that although the procedure may be less involved than the series of circular permutations applied in the Points sections, nonetheless, the distribution of attacks is meticulously calculated. A breakdown of the distribution is as follows (row A of Blocs II is omitted since its pattern of modes of attack corresponds to that of the Points, and in any case it is not used in Blocs I):

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<tr>
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<th>Blocs I</th>
<th>Blocs II</th>
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<td>T</td>
<td>4</td>
<td>7</td>
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<tr>
<td>S</td>
<td>8</td>
<td>3</td>
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<tr>
<td>H</td>
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<td>Tp</td>
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<tr>
<td>Sp</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Hp</td>
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<td>7</td>
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</tbody>
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It can be seen that each type of attack occurs eleven times, and that the heavier textures of Blocs I will be to some extent offset by its greater share of the two detached forms of attack. Conversely, the lighter textures of Blocs II are to be given more opportunity to exploit the subtle pianistic colours offered by the use of harmonics.

The route from chord sketches (Ex.5.17) through detailed pencil sketches (Ex.5.19) to the final draft is as straightforward in Blocs I as in Blocs II, and my annotated copy of the published score (Ex.5.21) identifies each chordal group in relation to the sketches. Although the musical textures are more complex than those of Blocs II, the
sectional layout of *Bloc I* is more continuous, with twelve sections as compared to the twenty, more fragmented sections of *Bloc II*. As we have seen, the likelihood, judging from the disposition of the sketches, is that *Bloc I* was sketched in detail before *Bloc II*. This follows the pattern of the *Points* sections, with *Points 2* having fewer but more extended sections, and the later *Points 3* being more fragmented with a greater range of performer choice available.

For greater ease of comparison, the pitch content of the two *Bloc* sections is summarised in tabular form (Ex. 5.22). It can be seen that, for the three most extended sections of *Bloc I*, Boulez simply couples rows from the large groups, B and γ, using the rows in their entirety. Thus section 7 comprises rows G and D, and the enormous sections 8 and 12 couple rows F and C, and E and B, respectively. At first sight, this procedure looks different from that of *Bloc II*, but closer inspection shows identical couplings, albeit used in a more fragmented way. Thus, in *Bloc II*, rows G and D are used independently of one another, but in the complementary sections 2 and 4; rows F and C are coupled to form groups 9 and 12; and in the final section beginning with group 14, rows E and B are used in alternation. A comparison of the distribution of the remaining rows is revealing. Thus the two 'thematic' motives of row J appear prominently at the beginning of *Bloc I*, the two-note, C-sharp - B-natural, being troped into the middle of group 1, and the three-note, A-natural - E-flat - E-natural being placed in particular prominence at the beginning of group 2. A comparison with the placing of these motives in *Bloc II* shows remarkable similarities, and if this motivic convergence seems coincidental, or even a flight of analytical fantasy, it can again be pointed out that the ordering of sketches for *Bloc II* suggests that it was precisely these groups involving row J that Boulez worked on first, after having completed *Bloc I*: the motivic reminiscences, with their reversal of dynamics,
are wholly calculated.

Apart from row J, the only other rows in Blocs I to be presented in other than complete form are rows H and I, each of which are broken into their three chordal groups, and alternated to form sections 4 to 6 and 8 to 10. This accounts for the restrained textures resulting from the chord sketching stage, with four cells remaining monodic and a preponderance of chords of low density (chord multiplication in row I consists of $1 \times 6 \times 16$, etc., whilst in row H, the process is simpler: $1 \times 16$ etc.). These produce six sharply characterised brief sections, and Boulez makes direct reference to them in Blocs II. It can be seen that the single chord of group 4 in Blocs I is quoted as the single chord group 5 of Blocs II, whilst the other single chord group, 9, of Blocs I, is a compacted version of the nucleus of the 'star' arrangement, centre of group 8, Blocs II. Such incisions in the texture are, of course, no accident: in each case, they mark the appearance of the characteristic cluster of three semitones which unifies Points and Blocs. The gentle opening of Blocs II, group 1, has as its counterpart group 10 of Blocs I, where the use of harmonics creates a ghostly shadow of the sustained textures of Blocs II. A characteristic of the textural treatment of rows H and I in Blocs I is the manner in which even complex chords are broken into arpeggiated figures. Examples of this occur in both groups 6 and 11, where the contrast with the corresponding groups 3 and 11 of Blocs I, is extreme in terms of texture, register and dynamics: fundamentally identical material in terms of pitch and rhythm is transformed by reversal of the other musical parameters. Throughout, the two Blocs sections act as enormous mirrors, refracting the sound: their interchangeability in the two versions of 'Constellation' is not an imposed formal device, but a reflection of their fundamental structural function as opposite poles of a revolving sphere.

In the light of this examination, it remains to consider the issue of performer choice
in Blocs I. As already indicated, the options are even more restricted than in Blocs II because of the greater length and continuity of individual sections. Indeed, the main areas of choice involve comparatively minor adjustments in the ordering of the six brief groups derived from rows II and I. Group 1 is the only available opening, and must be followed by group 2. The remainder of Blocs I is divided into two by the opening of group 8 which acts as a filter, being accessible from groups 3, 6 and 7 only. Groups 3 and 4 are mobile in relation to one another and to groups 5 - 7. Given these constraints, the possible orderings are:

1 2 3 4 5 6 7
1 2 4 3 5 6 7
1 2 4 5 6 7 3
1 2 4 7 5 6 3
1 2 3 4 7 5 6
1 2 4 3 7 5 6

This appears to allow a fair degree of performer choice, but in practise revolves round the interchangeability of groups 3 and 7: the other mobile groups, 4, 5, and 6 are miniature, as we have seen. Similar constraints govern the choice of order in the second half. The three miniature groups 9, 10 and 11 can be varied in order, but the basic choice is the ordering of the two extended groups, 8 and 12, either of which can be used to end the section. As we have seen in our study of the work's performance history, pianists have almost invariably chosen to conclude Blocs I with group 12, which makes for a suitably dramatic ending to the most texturally complex and pianistically demanding section of 'Constellation'.

The intention of this analysis has been an attempt to enhance appreciation and
understanding of the music by a study of the compositional process as revealed in the sketches. It was never the intention to prescribe orders of performance for the various sections of 'Constellation': to make any such attempt would be an act of presumption, and would amount to an implicit criticism of the structural basis of the piece. In any case, one must remember that the most fundamental choice of all, that between 'Constellation' and 'Constellation-Miroir', is at present denied to the performer, at least in the printed version of the score. A revised version of the original edition is now available, handsomely produced, and meticulously edited by Robert Piencikowski. It was a pity that Universal Edition did not take the opportunity of rectifying an omission from Boulez's published oeuvre by issuing both versions of the score. One trusts that it will not be too long before a full critical edition of both versions of the piece is made available, hopefully under the direction of the same editor. In the meantime, if one fact only emerges from the foregoing analysis, it is the fundamental unity of conception on all levels which gives 'Constellation' its musical characteristics - 'Formants', in the literal sense of the word, which leave its basic character unchanged in both versions, and within the concept of formal mobility. If there is indeed a link between analyst and performer, I would suggest that it is rooted in the pursuit of musical connections. Their articulation on paper by the analyst is a mere adjunct to the more challenging task of the performer to make these connections audible in performance. My own preferences in performances of this movement are for those orders which make the connections most clear: choices which emphasise unity rather than contrast. However, each performer must make his own choices guided by his musical intuitions and knowledge of the compositional process. If this study of 'Constellation' encourages the curiosity of others or assists in developing an appreciation of Boulez's creative intentions, it will have achieved its purpose.
REFERENCES

(1) Private correspondence, deposited in the Paul Sacher Stiftung
"First, what is the exact title - 'Miroir' as on the score, or 'Constellation-Miroir' as in the explanatory notes?"

(2) Boulez, P. 'Points de repère I: Imaginer', p.419
"And not some terrifyingly precise robot-performer, but one who is interested and free in his choices".

(3) Ibid, p.441
"The actual route taken is left to the initiative of the performer, who has to pick his way through a close network of paths. This form, which is both fixed and mobile, is thus situated at the centre of the work as pivot, or centre of gravity".

(4) Ibid, p.440
"I am absolutely incapable of analysing the mechanism of this piece in detail".

(5) Boulez, P. 'Penser la musique aujourd'hui', pp.18-19
"Space is not the same as the speedway of sound to which it tends to be reduced; space is rather the potential of polyphonic lay-out, an indication of the distribution of structures".

(6) Ibid, pp.24-25
"a new logic of sound-relationships... special cases to which tradition - recent as well as ancient - cannot give us the smallest clue, leaving us totally unequipped to deal with them; in these cases there are not only questions of morphology but also problems of structure and of large-scale form".

(7) Ibid, p.25
"Tessitura, in particular, is a deciding factor here. Vertical relationships can be conceived as basic material, as an intermediary factor in the elaboration of complex objects, or as a control in working with complex objects. The vertical dimension cannot be treated identically in all three cases, since each demands special treatment, according to the laws of organisation, which are derived, of course, from a basic but organically specific law. Similarly, horizontal functions have few direct links with the old contrapuntal laws; the regulation of vertical encounters does not observe the same relationships, and the responsibility of one sound in relation to another is established according to conventions of distribution and layout. As with vertical relationships, they can be divided into three groups; from point to point, from a group of points to another group of points, and finally the relationships between groups of groups".

(8) Ibid, p.133
"There is no need to describe the ensemble of constellations created by fixity and mobility; we shall merely draw attention to the immense crescendo leading from repose in all the organisations to movement in all the organisations, from the strictest order to a new reign of chaos".

(9) Ibid, p.13
"I am convinced that however perceptive the composer, he cannot imagine the consequences, immediate or ultimate, of what he has written; and that his perception is not necessarily more acute than that of the analyst (as I see him)".

(10) "Disposed Like a constellation
Absolutely without order and without choice
Without heaviness
With different densities

Registers from complete fixity to total differentiation

Effects of sonority [retrieve]
½ Ped - Harmonic without attack
Ped. more or less long after attack
Great differentiation of attacks”

(11) Private conversation, January 1996
(13) Peyser, J. 'Boulez: Composer, Conductor, Enigma', p.128
(14) Ibid, p.128
CHAPTER SIX

ANTIPHONIE

The curious history of 'Antiphonie' is perhaps the most tantalising aspect of the Third Sonata. In Boulez's performances of 1957-58, it was a brief, fragmentary statement only slightly more extended than the other two unfinished formants, 'Strophe' and 'Séquence'. However, unlike these two movements which were totally withdrawn, Boulez apparently continued to permit occasional performances of 'Antiphonie' - by Leonard Stein in the first American performances of the Sonata in 1962-63, and by Marcelle Mercenier in the 1970s. Even the source material is surrounded by mysterious circumstances. Whilst, as far as it has been possible to ascertain, the Paul Sacher Foundation holds the entire body of sketches, a manuscript copy of the original version of 'Antiphonie' is held by the Moldenhauer Archive in the Library of Congress, Washington: this is the only known copy of part of the original material relating to the Third Sonata to be held in a public collection. It was possible to obtain a photocopy of this material and to confirm that it is identical with the corresponding manuscript in the Basel Archive: the circumstances of the acquisition of this section of the Third Sonata by the Moldenhauer Archive remains a mystery.

However having withdrawn 'Antiphonie' for revision, Boulez proceeded to allow the publication of a short section, 'Sigle', in an anthology of contemporary piano music published by Universal Edition in 1968. This deepened the mystery, since 'Sigle' seemed to correspond closely to the structure described by Boulez in the article 'Sonate, que me veux-tu?' of five sections each in two versions and capable of being played in various arrangements. Yet 'Sigle' is a mere fragment, and in any case bore no direct relationship to the movement
performed by Boulez in 1957. Was it then meant to replace altogether the 1957 movement? Yet the commentary to 'Sigle' states specifically that it is only a section of the movement as a whole. Later on during the course of the 'Conversations with Célestin Deliège', Boulez made another reference to the unfinished formants, stating his intention of completing shortly one which had been in an advanced state for some time (1). Thirty years on, the movement remains unfinished and unpublished. A fair copy of a later stage in the composition was apparently made for Universal Edition, but was withdrawn in its turn, and is now housed in the Paul Sacher Foundation. It was not until the researches of Allen Edwards (2) that some light was finally shed on the present state of partial completion of 'Antiphonie', and the various stages of its composition.

The sketches for 'Antiphonie' are among the most extensive for any of the Boulez works in the Basel Archive, and outnumber in quantity the total number of sketches for the other four Formants. There were several stages to the sketching process, and it is clear that the composition of the available material must have been spread over a period in excess of six years. The first stage, prior to the performances of 1957-58, consisted of the drafting of the original version. It will be recalled that the design of the sonata at this stage called for a concise opening movement, a plan not contradicted by the terse structure of the first version. Internal stylistic evidence suggests that the movement, even in this primitive form, is likely to have postdated both the published formants: the manipulation of the series is by now so involved as to require a series of numerical grids to facilitate the planning of the various transformations which are to occur. Between these first performances and the article, 'Sonate, que me veux-tu?', Boulez evidently returned to 'Antiphonie', and taking the original five tiny sections as a basis, proceeded to compose five elaborations of the original material. These were entitled 'Répons I, II and III', and 'Versets I and II', and together with the
original unelaborated versions form 'Antiphonie I' and 'Antiphonie II'. From the comments in 'Sonate, que me veux-tu?', Boulez's intention at this stage was apparently to have the two groups of five complementary sections printed on reversible cards with four possible forms of organisation; there is as yet no suggestion that the two versions of each section might be regarded as alternatives in performance. In the meantime, 'Sigle' was composed, with the intention of its having an unspecified but mobile function within the overall structure. The presence of sketches for this section alongside those for 'Antiphonie II' suggests that it must have been composed shortly afterwards. Its form, mirroring that of the two versions of 'Antiphonie', echoes the comparison with Mallarmé's planned 'Livre', cited frequently in the article, 'Sonate, que me veux-tu?' of a series of developments related to the originals and capable of interacting with them: "supposez de pages-parenthèses, des cahiers mobiles, des constellations de formants!" (3). The next sentence of the article is however of even more significance bearing in mind the subsequent fate of 'Antiphonie': "Aussi bien est-ce l' divertissement du compositeur que de partir en vue d'un certain horizon et d'arriver dans des pays totalement inconnus, dont il n'a guère soupçonné l'existence au départ" (4). Prophetic words. It seems to have gradually occurred to Boulez that the first formant was expanding beyond his original conception. His explanation to Célestin Deliège, that the other formants needed reconsideration because of the expansion of the middle formant, 'Constellation', is not altogether convincing. This was from the outset conceived as the longest formant surrounded by four revolving formants of which 'Antiphonie' was to be one of the two shortest. Rather, internal evidence suggests that Boulez came gradually to realise the enormous potential for expansion offered by the serial processes engendered in 'Antiphonie', and proceeded to revise his original proportions in order to accommodate them.

A further series of structural drafts shows him attempting to give formal shape to
this vastly expanded concept, and it is at this point that the chronology becomes more uncertain. Of the many sketches for the revised shape of 'Antiphonie', the first to mention further material involving the unused rows B, C, and G is a short outline listing the row structure of the original movement, a description of the 'enrichissement' (i.e. 'Antiphonie II'), and underneath: "Pour les répons: B, C, G. Chacun reçoit sa developpement individuel puis les trois grilles sont superposées" (For the responses: B, C, G. Each receives its individual development then the three grills are superimposed). A (presumably) later sketch incorporates both a reference to 'Sigle' and to four further sections described first as 'Conduits', then crossed through and the word 'Trait' inserted. On a further sheet, there is even some detailed planning for the appearance of the score, with 'Sigle' to be printed in small format, and the two groups of larger sections, 'Traits', to be printed in reversible format, an idea which suggests that Boulez had no inkling at this stage of the dimensions which the 'Traits' were to assume. He evidently took the material with him on his trip to America in 1963, for a further series of sketches are to be found on the back of telegrams received during this visit. There are by now three elements in the overall design; 'Antiphonie I and II', 'Sigle', and the four 'Traits', each of which involves the principle of reversible format. The status of 'Antiphonie' itself has changed with 'Antiphonie I' to consist of the first two of its original five sections in either simple or varied form, and 'Antiphonie II' continuing the process by adding the remaining three sections in one of the two versions. The 'Forme définitive' (Ex. 6.1) reproduced in Allen Edwards's article is likely to date from 1963, judging from the evidence of related material. A more detailed structural description of the four 'Traits' is found on the back of a small invitation card dated March 8th, and dynamic and tempo sketches for the 'Trait Initial' are drafted on the reverse of telegrams received on Boulez's birthday, 26th March 1963. The final piece of chronological evidence is in the form
of a sketch on the back of a telegram which Boulez received in Darmstadt on 18th July 1963. He puzzlingly describes 'Antiphonie I and II' as "gedruckt" ("printed"), and is evidently about to dispatch 'Sigle' followed by 'Trait Initial'. A summarising structural sketch at the bottom of the page lists the remaining three 'Traits' as "fehlt" ("missing"), further evidence that 'Trait Initial' had been completed, and that it had been composed over a four month period in the spring and early summer of 1963. At this point, the composition breaks off, leaving an unfinished movement of already considerable proportions, and with a potential length so enormous as to dwarf the two published formants - indeed, 'des pays totalement inconnus'.

ANTIPHONIE I

Towards the end of the chapter, 'Technique Musicale' in 'Penser la musique aujourd'hui', Boulez attempts a definition of the various musical textures, with examples drawn from the Third Sonata and 'Pli Selon Pli'. After a consideration of polyphony, and prior to an extended discussion of heterophony, he makes the following aside: "Nous n'avons pas mentionné l'antiphonie, car elle est une distribution de structures polyphoniques déjà 'formulées', et non pas un critère de combinaison destiné à provoquer une 'formulation'. L'antiphonie est déjà un prototype formel" (5). The language is characterically precise and yet obscure at the same time, without any elaboration of the means by which polyphonic structures may be formulated and the precise ways in which they might be distributed. Nonetheless, this general definition of antiphony, when taken in conjunction with the comments in 'Sonate, que me veux-tu?' provides clues as to the structure and musical character of 'Antiphonie'. It also suggests reasons for both the quantity of sketches and Boulez's evident need to revisit and extend the
seemingly innocuous fragment composed in 1957.

Rigorous planning characterised the composition of 'Antiphonie' from the earliest stages, and it is evident with the benefit of hindsight that the 1957 version is an example of the 'formal prototype' defined by Boulez. Compared to 'Trope' and 'Constellation', there is a pre-compositional stage in the sketching consisting of a series of numerical grids to plot the pitches and rhythms. The reason for these is quickly apparent when one examines the basic pitch series (Ex.6.2). Unlike the two published Formants, where the corresponding stage simply consists of the twelve transpositions of the basic series and its inversions, the material for 'Antiphonie', although based on the same row as the published Formants, is immediately subject to transformations. The technique of obtaining these is simple in principle, and is succinctly described in 'Penser la musique aujourd'hui': "si j'affecte les hauteurs de durées directement - ou inversement - proportionnelles aux intervalles qui les lient, j'obtiendrai une autre forme d'engendrement sériel en reportant l'ordre de grandeur de l'intervalle sur l'ordre de succession" (6). That is to say, each note moves forward the number of steps which correspond to the intervals of the original series. Expressed in semitones, these are: 1,6,7,2 etc., and it can be seen that the first note, E-natural, changes its position accordingly in each of the subsequent series. The process can be followed more readily on the corresponding numerical grid (Ex.6.3). Unfortunately, the example supplied by Boulez in 'Penser la musique aujourd'hui' (his Ex.6.4), although drawn from the pitch series of 'Antiphonie', obscures rather than clarifies the technique. An examination of the sketches provides a logical explanation: the example is incomplete, consisting as it does of inversion M followed by inversions O, S, and T. It is necessary to insert the missing stages in order to make the example intelligible (The English translation compounds the problem by supplying a misplaced footnote at this point, referring to the previous example dealing with chord multiplication).
Even at this point, it is evident that the technique of intervallic displacement is capable of generating a vastly increased network of serial relationships.

The next stage in the sketching consisted of applying a corresponding rhythmic series to each note, expressed numerically in twelve chromatic steps from semiquaver to dotted minim. The process is seen most clearly in the two number squares (Ex.6.4). It will be noted that for the prime forms, A-L, which are to form the basic material of this first draft of 'Antiphonie', Boulez has also formulated a corresponding scale of dynamics. It is worth noting in passing that for both rhythms and dynamics the procedure is a scalar as distinct from a serial process: the only influence of the pitch series is in the correspondence of the starting number for each line of the rhythm/dynamic scale to the notes of the original row, viz: E-natural = 1/12, F-natural = 2/11, B-natural = 8/5, F-sharp = 3/10, etc. From each of these starting points, the numbers are read-off in sequence. The conjunction of pitch and rhythm is shown in a further two pages of sketches (Ex.6.5), which are simply a combination of Exs.2 and 4. Already the preliminary sketches are detailed, and with a potential to generate material of considerable complexity.

It seems to have been at this stage that the first modification to the plan occurred. The technique of transformation by permutation based on intervallic relationships is an extremely powerful device. As Boulez goes on to note: "Les possibilités sont infiniment vastes et aboutissent à des séries n'ayant qu'une relation fort lointaine avec la très primitive série de douze sons" (7). The passage has an added significance, written as it was at a time when Boulez was wrestling with the enormous range of possibilities engendered by the technique. Judging from the sketches, his next step must have been to apply the process used in Ex.6.2 to the next row, B, in the series. The results are dramatic, with a further series of transformations obtained by means of intervallic permutation (Ex.6.6). The resulting set of
twelve pitch groups are quite different in distribution to those produced in the first stage. Boulez evidently decided to apply a rather more straightforward rhythmic process to these groups than that planned in Ex. 6.5, and each note is assigned a rhythmic value which remains constant throughout the permutations. The results of applying these rhythms to their corresponding pitches is shown in Ex. 6.7, which adds vertical identifications consisting of the first twelve letters of the Greek alphabet, α-μ, creating a grid with a wealth of potential cross-references. These will have an important function in the next stage of the elaboration of the material, and indeed these sheets of pitches and rhythms contain in essence all the material for Boulez's work on 'Antiphonie'. For the present, however, it is the lateral series of transformations which form the material for the first version of 'Antiphonie' (A curious inconsistency may be noted here in passing: as already mentioned, Boulez decided to set aside the more complex rhythmic scheme of his first sketches as shown in the grids of Ex. 6.4. However he retains the parallel dynamic series generated here and proceeds to apply it to the pitches of Ex. 6.7. Thus a dynamic series generated at the first stage of the sketching process in conjunction with a rhythmic series has been taken out of its original context and applied to pitches generated at a later stage).

The link between this serially organised material and the 1957 version of 'Antiphonie' is supplied by two pages of sketches. They show that the first step was to identify each of the eight cells of row A with one of the remaining eleven rows in Ex. 6.7. Thus the first pitch cell consisting of the notes C-sharp and E-flat occurs within row I at points 0 and η, and the horizontal statement of the notes of I forms the pitch material for the opening of 'Antiphonie'. The process is clearly shown at the top of the sketch (Ex. 6.8), with the starting point, 0, of row I marked with the designation 'partant'. In order to obtain the next note of the original cell, C-sharp, it is necessary for the pitches of row I to appear in reverse order - again, clearly
indicated by the circular arrow at the beginning. The sketch further reveals that three of the single notes of row A, although each assigned to a separate row - E, L, and K respectively - are to be grouped into a single cell, thus reducing the total number of units to six. Three rows are not to be used at all at this stage - B, C and G: they will be the material for subsequent developments. However this is to anticipate, and it is a valid question to ask why Boulez chose to eliminate them from the basic material when there was as yet no plan for the enormous expansion which he embarked on after 1960. An analysis of the distribution of pitches within the groups of Ex.6.6 provides a plausible explanation (Ex.6.9). Within the eight rows used in 'Antiphonie', the distribution is fairly even, except for F-natural, which appears with only half the frequency of some of the other pitches. If the missing rows are included, this imbalance disappears, and since F-natural is assigned the longest note value (a dotted minim), it would be likely to dominate the texture. Thus Boulez's omission of these three rows creates precisely the kind of hierarchical arrangement that he sought within serialism, and is another facet of a technique which produced the concept of champs in 'Trope' and the chord multiplication of the Bloqs in 'Constellation'. Each of the rows in 'Antiphonie' in fact forms champs, although of a different kind to those employed in 'Trope'. As Ex.6.9 demonstrates, no row apart from A contains all twelve notes, and within some of the rows the distribution of pitches is so uneven as to create 'privileged' notes with the potential for a hierarchical arrangement within an atonal structure analogous to the tensions generated by the tonal system.

For ease of reading, the sketches have been assembled under the corresponding sections of 'Antiphonie', as shown in Ex.6.10, which is simply a re-ordering of Ex.6.8. Its three pages show, first, the evolution of the opening section from the pitches of rows I and H (Ex.6.10.i), secondly the interweaving of rows E, L, and K to form the more flexible
continuation, *plus allant, très variable* (Ex.6.10.ii), and finally the three brief concluding sections (Ex.6.10.iii). The compositional process is revealed as a logical development of the serial principles already established. Pitches, rhythms and dynamics are rigorously applied, although there are occasional inconsistencies rhythmically as compared to the serial tables - similar minor inconsistencies may be noted in 'Constellation'. As is frequently the case in Boulez's sketches, registers are not conclusively resolved until the final draft. The only complex section in pitch structure compared to the first sketches is the second one, combining rows E, L, and K: the technique used here of interlacing the pitches and rhythms recalls the 'Points' of 'Constellation' where an identical procedure may be observed.

The serial parameters having been set, there remains the most important stage in any attempt at musical analysis - the relationship between the technical means deployed and the musical discourse itself. Boulez joins his two opening cells based on rows I and H into a single statement - Section A of the five brief sections which together form 'Antiphonie'. The two rows are complementary in their pitch hierarchies: thus row I contains three C-sharps and three E-flats, and this characterising minor seventh interval dominates the opening three bars. The effect of this is balanced in the answering phrase of the opening section, with the three A-naturals and three E-naturals of row H appearing in each of the subsequent bars. Whilst it would be overstating the case to suggest that such procedures create pitch centres, it is noticeable that in the first three bars the dominating pitches of the answering phrase are suppressed as far as possible, whereas in the answering phrase itself, the E-flat and C-sharp are prominently placed, the C-sharp in the same low bass register as in the opening bar, thus creating a cadential effect. Similar hierarchies can be observed in the other sections. Thus in the second section (B), the pitch B-natural dominates the three rows E, L, and K on which the section is based, occurring a total of six times. This explains its importance within this...
section, where the texture is to a large extent governed by the dialogue between B-natural and its adjacent semitones, C-natural (four appearances) and A-sharp (three appearances). Conversely, the suppressed pitch of 'Antiphonie', F-natural, is only contained once within rows E, L, and K, and its solitary appearance in this second section is concealed as far as possible by being placed in the bass and sounded against the dominating ff B-natural. Whilst abrupt dynamic contrasts and registral extremes are common to both sections, the second section contrasts with the first both in its fluctuations of tempo and profusion of grace notes which create a rhythmically disruptive effect. Such contrasts are, of course, a constant feature of Boulez's music. 'Trope' is, on one level, an articulation of this principle, and within 'Antiphonie', the plus allant sections both contain within them elements of the troped insertion, and may be considered as a whole to function as tropes within the frame of the rigide sections. Section D not only reestablishes the opening tempo, but in so doing quotes the rhythmic and intervallic shape of the opening of Section A after its course had been interrupted by the freer structures of the intervening sections. In the final section, E, the more flexible tempo and grace note decorations reappear, but only to conceal a tightly organised structure which is a microcosm of that of the first two sections: it opens with a quotation of the end of section B before proceeding to a reminiscence of the opening of Section A. Thus the larger formal principles contained in 'Antiphonie' are reflected in its pitch resolutions, which impart a coherent design to the movement as a whole. We have seen how the first section establishes the dominant pitches of C-sharp and E-flat at the beginning. At the end of this section, the C-sharp in the bass is denied resolution by the subversive pitch of E-natural, which ends the section on the Boulezian equivalent of an imperfect cadence. This pitch is placed at the point of maximum accelerando and dynamic emphasis in the second section, and the resolution is again an imperfect one, onto a D-natural. It is only at the end
of the final section that the conflict is resolved, and C-sharp and E-natural, placed in the same
registers as at the close of the first section, are allowed to resolve unobtrusively onto E-flat
- a homecoming to the pitch which had opened 'Antiphonie'.

Boulez was sufficiently satisfied with 'Antiphonie' in this embryonic state to include it
in his performances of 1957-58. In a letter to Leonard Stein written in May 1959, he clarified
some performance issues concerning notation and the operation of choice, and proceeded to
outline the current situation concerning the unfinished formants. Already he had decided to
withdraw both 'Strophe' and 'Sequence' for thorough revision. Concerning 'Antiphonie', he
wrote: "Le texte de 'Antiphonie' (Formant 1) a été modifié dans sa présentation, et augmenté
par quatre chainons-formes d'interprétation. Là non plus, la photographie n'est pas encore
faite" (8). It is thus evident that the second stage of composition, corresponding to the
structure described in the article of 1960, was already complete the previous year. More
precise dating is speculative, but among the sketches in the Paul Sacher Stiftung is a sheet
of dynamic markings relating to the elaboration of 'Antiphonie'. This is written on the back
of a tax account/payslip dated 14.iv.58, thus fixing the composition of this second stage to
within a year, viz: between Spring 1958 and 1959.

ANTIPHONIE II

The musical sketches for 'Antiphonie II' consist of three sheets of manuscript of identical
paper quality, and twenty stave format, with sketches on both sides. On the reverse of the
third sheet are some sketches for 'Sigle', and a pencil score, suggesting that it was composed
immediately after the work on the second stage of 'Antiphonie'. The first sheet of sketches
consists of a series of vertical elaborations of each of the eight rows used in 'Antiphonie', the
original row being clearly identified by its blue coloration at the centre of a 'champs' of surrounding commentary. The staves above and below the original are identical in pitch content but vary in rhythm. The pitches, seemingly arbitrary at first sight, are derived from the simple principle of reading the original pitch chart (Ex. 6.7) vertically rather than horizontally, and the boundaries of each of the champs is set by rests: thus, depending on the vertical coincidences, some champs can include up to six groups before being cutoff by a rest, whereas elsewhere a pitch group may be totally lacking commentary when the vertically adjacent boxes happen to consist of rests. The precise means of elaboration for each of the eight rows is shown by comparing each of the annotated examples (Ex. 6.11) with Boulez's corresponding sketch (Ex. 6.12), and it can be seen that the technique gives rise to a set of pitch complexes of mobile density - to use a Boulezian phrase. If this procedure seems a somewhat mechanistic one, it should be noted that Boulez was prepared to modify it where practical considerations dictated. He evidently felt both in the case of rows F and D that the pitch content as it stood was insufficient. This is partly a consequence of the fact that the available pitches were duplicated in other rows - totally so in the case of row D, whose entire pitch structure is incorporated within row E (see Ex. 6.11). Accordingly he generated a greater range by the simple device of transposition of the original pitches - these additions are shown in red ink in the sketches, and form the basis for the pitch structure of the corresponding sections, 'Verset II' and 'Répons III'. With regard to the rhythms, those in the upper staves of the sketches correspond to the rhythms of Ex. 6.11, whilst those of the lower two staves are derived from the rhythms of the middle line - i.e. those of the original pitch cells. The precise method of 'equalisation' of rhythmic values is calculated in the numerical charts at the margins of the sketches, each of the numbers referring to multiples of semiquaver values, and the boxed values being those to which all the others conform. This
A detailed comparison of the 1957 version of 'Antiphonie' with the corresponding five
sections of 'Antiphonie II' shows how Boulez expands the serial connections and ambiguities already established. Thus the opening 'Verset I' is on one level a more vertically complex version of the opening of 'Antiphonie I', yet it also functions in a more dynamic way, both developing the potential of the existing material and suggesting new directions. The 'skeleton' transposition and inversion of the original material at the major 2nd, as shown in the first sketch, leaves the pitches of two notes unchanged - E-natural and B-flat. These notes alone retain their original dynamics, all the other pitches having their dynamic levels inverted. B-flat had been the pivotal pitch in the first version of 'Antiphonie', since it functions as an overlap, at the end of the third bar, between the two rows. Hence Boulez's designation of its tritonal pole, E-natural, as the 'pivot' note for 'Verset I'. The disruptive potential of this pitch has already been demonstrated in the opening section of 'Antiphonie I, where it had played a crucial role in the cadence figure. In 'Verset I', the E-natural is not only the top note of the final chord, but is used to enrich the opening chord of the section. Its opposite pole, B-flat, is also added to the texture in the first bar, and the two notes function as an axis throughout. The climax of the section is however in the middle of the fourth bar, with the $\textit{fff}$ appearance of the pitch C-sharp, accompanied by its 'enrichment' consisting of the notes of $\beta$ and followed by the notes of $\delta$. These are the only two vertical groups present in row I which are not duplicated in row H. This row, conversely, contains a vertical group, $\gamma$, not present in row I. An examination of the pitches of this group confirms that they contain the pitches of the climactic triplet chords of bar four. Hence this point forms a convergence of the (few) disparate elements resulting from the process of enrichment of the two rows H and I. It could be further added that the two most prominent notes of this climax, C-sharp and G-natural, form an interlocking tritone within the main axis notes. Boulez's world of harmony is, of course, far removed from that of Bartok, but as we have already noted when considering
the section 'Texte' in the second Formant, such use of the notes of the diminished seventh chord as reference points forms an important and underexplored facet of Boulez's style.

The combination of the three rows, E, L, and K as the basis for 'Répons I', the elaboration of the second section of 'Antiphonie', makes available an enormous wealth of material. As shown in Ex.6.11, the process of vertical enrichment opens virtually the entire range of possibilities. On what basis therefore to establish pitch hierarchies? A closer examination of Ex.6.11 shows that, remarkably, there is no overlap of material between the enrichment of row E and that of the other two rows. However rows L and K show an exact duplication in their vertical enrichments 0 and 1, a convergence which will dominate the pitch structure of 'Répons I'. Boulez seizes the opportunity to elaborate the already decorative writing of the original, and in so doing produces music of a textural complexity comparable to any of the published sections of the Sonata: indeed the five sections of 'Antiphonie II' are among the most pianistically demanding of the work. The 'skeleton' transposition/inversion of the original section is shown in my Ex.6.13: the coloration is reproduced from the sketch. As in 'Verset I', two notes, F-sharp and C-natural, again at the interval of a tritone, retain their original pitch and dynamics. In musical style, 'Répons I' takes as its point of departure both the rhythmically disruptive grace notes of the original and their tendency to coalesce into cells with identical pitch structures. Thus the uncompromisingly complex texture is given a sense of coherence by a number of repetitions which act as guideposts to the ear, as shown by the following examples in the annotated score (page 4 of Ex.6.13). In the first bar, the two cells (v) and (w) are heard in both linear and chordal form. Analysis of the pitch content of cell (w) shows that it consists of interlocking tritones, A-natural - E-flat, B-flat - E-natural, and C-natural - F-sharp, above a bass pedal, C-sharp. The last of these tritones forms the axis pitches for 'Répons I', and analysis of the appearances of these notes shows that they
invariably accompany one another, imparting an overall stability to the jagged linear writing. The second bar, which begins with a chord whose extreme notes consist of the tritonal axis, is unified by the sustaining of its middle notes (x) throughout. Boulez takes the melodic leap at the beginning of the third bar, itself an inverted repetition of the end of the preceding bar, and expands it by the addition of a top F-sharp, creating an enormous compound interval of over three octaves (y), which is repeated in retrograde form in the next bar. This F-sharp, accompanied first by its tritonal pivot, C-natural, rings bell-like over the texture, and is thrice repeated. The midpoint and climax of the section is reached over the next two bars. The jagged lines are derived from the pitches of group x and its enrichment. These pitches, as we have seen, are duplicated in rows L and K: the centre notes are B-natural and F-natural respectively, and it is the tritone formed from these pitches which is the basis of the crashing chord (z), obliterating the preceding rising major seventh interval. This gesture is repeated in the next bar; the upbeat grace notes are altered in order of appearance, but the concluding seventh is silenced even more abruptly than before. These repetitions not only give a sense of symmetry to the central part of 'Répons I', but in so doing demonstrate the inexorable compositional logic of exploiting the congruity of pitch which exists in the enrichments of rows K and L. Curiously, the repetitions are separated by an angular grace-note figure at the end of bar four. Its pitches consist of the remaining eleven chromatic notes following the E-flat, which forms part of the skeleton. This material is not found in the first sketch, which is otherwise quite close to the final version in its pitch content: it was evidently an afterthought, although the significance of the pitch sequence is obscure. A similar puzzle occurs at the end of the following bar, where the B-A-C-II pitch sequence (see annotation) is not found in the sketch. The process could be simply a reordering and transposition of the four grace-notes which open the bar, and an entirely unconscious use of a cipher which is a
recurring *leitmotif* in Boulez's music. However, reexamination of 'Antiphonie I' shows that the notes of the cipher occur in a permutated order at almost exactly the corresponding point to their appearance here. In addition, there is strong evidence from the sketches for 'Sigle' that Boulez was utilising the cipher in a quite conscious way in that section of 'Antiphonie'. Whether or not its appearance in 'Répons I' is coincidental or a part of the conscious compositional process, it is evident that this section is highly organised internally and rich in cross references: even the opening chord (v) can be analysed in terms of the cipher, its eight notes consisting of two minor third clusters, C-sharp-E-natural and F-sharp-A-natural. The skeleton itself is readily identifiable within the complex structure of 'Répons I', but the precise derivation of the pitch content of the commentary is to some extent conjectural, given the presence of three rows which are at times used simultaneously to weave the texture. My annotations give a likely indication of the process in the absence of more detailed sketches for the intermediate stages of the composition, and assuming a basically sequential use of the groups. In terms of its function within the larger structure, the section opens in a more continuous way from the preceding 'Verset I' than does its counterpart in 'Antiphonie I'. In 'Antiphonie II', the second section commences by repeating the closing note, E-natural, of 'Verset I', and likewise, its cadential figure consists of the notes E-natural - B-flat - the pivotal tritone of the previous section. Thus are 'Verset I' and 'Répons I' moulded into a larger single unit in accordance with the revised shape of 'Antiphonie', and reflecting the appropriation of the titles from the verses and responses of medieval responsorial singing.

By similar means, Boulez generates the three shorter sections, 'Répons II', 'Verset II' and 'Répons III' which together form the second half of 'Antiphonie II'. The commentary surrounding the skeleton becomes ever freer in its derivation from the original enrichments. Mention has already been made of Boulez's preliminary transposition of the material
generated from rows F and D to form the pitch content of 'Verset II' and 'Répons III' respectively, but an examination of the opening of 'Répons II' likewise shows him sacrificing the principle of rigid pitch derivation from the enrichment of row J to the more flexible one of transposition of cells. Thus the opening three-note figure, with its characteristic perfect fourth and minor third intervals (x), folds within itself a permuted form of the same figure. These intervals together with the major seventh govern the texture of 'Répons II' and strengthen its musical affinity with the corresponding section in 'Antiphonie I'. The major seventh interval is the basis of a recurring pitch cluster (*), the notes of which form the B-A-C-H cipher, the presence of which has already been noted in 'Répons I'. A further link with 'Antiphonie I' is the retention of the principle of fixity of register for each pitch in both 'Répons II' and the succeeding 'Verset II', to correspond with the registration of Sections C and D in the 1957/58 version. This rigidity of register balances the absence of any congruity of pitch between the skeletons of these sections of 'Antiphonie II' compared to 'Antiphonie I'. In contrast, the transposed skeleton of 'Répons III' contains two pitches, C-natural and F-sharp, which are identical in their position to those in the corresponding Section E of the original version. Following the procedure in the first two sections of 'Antiphonie II', these notes retain their original dynamics, and act as a tritonal axis for the closing section. As in 'Antiphonie I', this section serves as both coda and condensed recapitulation of the opening sections. Thus its opening recalls that of 'Répons I' both in rhythmic gestures and in the prominence of its identical pivot notes, whilst its close recalls the opening chords of 'Verset I'. The technique parallels the practice of reduced repetition of responses in medieval chant, and in so doing recalls the unifying processes used in 'Antiphonie I'.

Boulez went so far as to arrange 'Antiphonie' as five sections on reversible strips of paper, with the original version on one side and the 'enriched' version on the other. The
metronome marks of the 1957 version ('Antiphonie I') have now been modified slightly, presumably in the light of the more complex textures of 'Antiphonie II'. The sections corresponding to 'Versets I and II' are changed from m.m. = 60 to m.m. = 48, and the three 'Répons' sections, plus allant, très variable, are slightly adjusted from m.m. = 72/80/96 to m.m. = 76/84/96. This was the stage of the composition described by Boulez in his 1960 article, and Iwanka Stoianowa evidently had access to this material since it formed the basis for her brief discussion of the opening Formant (8). The quotation which appears at the end of her article without any supporting commentary can be identified as the opening section, 'Verset I', of 'Antiphonie II'. Already, however, before the date of Ms. Stoianowa's article, Boulez had completed, and indeed published, an additional section for 'Antiphonie'.

SIGLE

The first mention of 'Sigle' occurs in the earliest drafts for the Third Sonata, at which stage the work was to be framed by a 'Sigle Initial' and 'Sigle Final'. As the structural plan was modified, 'Sigle' became one of the mobile elements in the opening Formant, however its placing within 'Antiphonie' underwent further modification as the project expanded. Although the section remains the only part of 'Antiphonie' to have been published, internal evidence suggests that it was completed as much as a decade before its appearance in print in 1969. Not only are sketches found on the reverse of the sheet containing those for 'Verset II' and 'Répons III' of 'Antiphonie II', but the choice and treatment of material complements that used in 'Antiphonie II'. A separate table of the pitch content of 'Sigle' shows that, leaving aside rows B, C and G of Ex.6.7, the section is based on the one remaining row not used in 'Antiphonie II' - row A itself. Again the compositional logic is
inexorable: the 'signature' of the Formant as a whole is to be derived from the original note row which generates all the other relationships. The simple horizontal form of row A is treated to the same process of vertical enrichment used to generate the pitch content of 'Antiphonie II' (Ex.6.14), and the precise derivation of material from Ex.6.7 is as in my Ex.6.15. The sketch (Ex.6.14) shows how row A is segmented into five sections which mirror those of 'Antiphonie I and II' in their internal arrangement: groups of two and three cells are followed by three groups each of a single cell. The rhythmic values of the vertical combinations are equalised to correspond to those of the segments of the original row, and in the case of three of the sections, B, C and E, the available pitch material is augmented by means of transposition and inversion. An examination confirms that the intervals of transposition - minor sixth, perfect fourth, and major second respectively - correspond to those which link 'Antiphonie I' with 'Antiphonie II'. The inversion of the material of 'Antiphonie I' in 'Antiphonie II' is paralleled in the pitch sketch for the complementary groups of 'Sigle'. An extraordinary feature of this sketch is the treatment of group C and its corresponding group c: in the latter, the pitches of the original group are arranged in the order G-natural, F-sharp, A-natural, and G-sharp - a transposition of the BACH cipher - and bracketed together. Closer inspection reveals that the B-flat, which has been allowed to insinuate itself between the groups as the starting note of the transposed pitches, allows the possibility of ordering the cipher at its original pitch by means of permutation. A comparison with the finished score shows that this is exactly what does happen, and moreover at precisely the point where the page is cut into two (Ex.6.16). The end of section c is a cadential flourish based on the BACH motive in its original and transposed form: the 'signing-off', the signature, is identical to that which had concluded the Second Sonata and in so doing acted as a final exorcism of the form of the Viennese classical sonata. Interestingly, the second sheet of sketches shows
that Boulez originally sketched the chords which conclude section c at the extreme top right-hand corner of the page, separate from the preceding grace note flourish, suggesting that their eventual placing was carefully calculated (Ex.6.17). This dispersal contrasts with the generally ordered character of this sheet of final sketches, which frame the pencil score. The final stage of the sketching for 'Sigle' evidently proceeded directly from the pitch tables of Ex.6.14, and the pencil score itself is identical both to the subsequent pen score and to the published score in its appropriation of the descriptive titles for the five sections already used for 'Antiphonie'. The difference is that 'Sigle' mirrors rather than repeats the structure of 'Antiphonie II'. Thus 'Verset I', 'Répons I', and 'Verset II' each consist of the elaboration of a single cell corresponding respectively to E, D, and C of the sketches. 'Verset' III (B) and 'Répons II' (A) consist respectively of the three-note and two-note cells of Ex.6.14. The musical character, alternating sections in strict tempo with those of more flexible character, echoes that of 'Antiphonie I and II', and the metronome marks correspond exactly to the revised ones fixed during the composition of 'Antiphonie II' - further internal evidence that 'Sigle' was composed shortly afterwards.

A more detailed examination of the sketches shows that it is the two sections in strict tempo, A and D, which lack transposed forms (refer to Ex.6.14). Both, however, have a more rigorous internal rhythmic structure in order to compensate. The numerical grids above each pitch sketch refer to rhythmic values, and the precise method of 'equalising' these values is shown in my supplementary grids which convert the numbers to units of rhythm based on the semiquaver. Thus section D will contain only the three rhythmic values in the rectangular box, consisting of two, five, and nine semiquavers respectively. All other values, reading vertically, will be 'equalised' to one of these: e.g., any notes of value equivalent to eleven, eight or six semiquavers will become a minim tied to a semiquaver (= nine semiquavers).
A comparison of this with the sketch for section D in Ex.6.17 shows the results of the process of rhythmic equalisation applied to each of the available pitches of Ex.6.14. The three chordal groups are dispersed into counterpoint in the final draft, but the total rhythmic value of each strand is identical to that of the chordal sketch. The idea of reversal of functions is extended to the internal organisation of the cells: thus the sketches for section A, found at the top left-hand corner of the final sheet (Ex.6.17), group the pitches of Ex.6.14 into chords corresponding in value to the rhythmic grids above the stave, and then proceed to retrograde the result (the final sketch confirms a misprint in the published edition: in the second bar of section A ['REPONS II'], the pitch F, without an accidental, in the middle of the triplet, should be omitted, and the C-natural realigned). Sections A and D, together with their corresponding a and d, contrast with the other sections not only in their unvarying metronome mark but in their more rigide rhythmic character which excludes grace notes: the eponym 'Répons' for these strictly metronomic sections is again a reversal of functions compared to 'Antiphonie I and II', where the 'Répons' are characterised by comparative rhythmic freedom.

The three remaining sections, B, D and E borrow the term 'Versets', and are distinguished from the other sections of 'Sigle' not only by their expansion of the available pitch material by means of inversion, but by a more flexible rhythmic structure. This is loosened both by the presence of grace-notes which decorate virtually every principal note, but by the many rests which, coupled with the enormous range of the tessitura, impart a fragmentary character to each of the tiny sections. The principle of retrograde motion used throughout 'Sigle', is shown by the reverse arrows above each of the identifying letters in Ex.6.17, and it can be sensed aurally in the tiny sections C and E. This opening cell, encompassing virtually the entire keyboard, establishes the limits of register for 'Sigle' as a whole, and its two pitches, C-sharp and B-natural, form important reference points for the
other sections. Boulez’s crossing through of the perfect fourth F-natural – B-flat in the pitch sketch (Ex.6.14) is explained by his decision to use these notes for Section C, which complements Section E both in its restriction to a single intervallic cell and in its disjointed rhythmic structure. Indeed, in context, Section D functions as a miniature trope separating these tiny statements. Section B reverses the ordering of the three original single note cells, A-flat, C-natural, and F-sharp, and decorates them with grace-notes. In so doing, however, it not only provides contrast to the ensuing rigide Section A, but integrates further the pitch material of the three 'Verset' sections since the four grace-notes used are none other than the four pitches which comprise Sections C and E, stated at the same register as in their first appearance. The complementary sections on the right hand side of the page take the form of enrichments of the original material. If the original versions had exploited the pitch relationships implicit in the three 'Verset' sections, here it is the two rigide sections which are shown to have potential convergences, and 'Répons 2' shares much of the pitch content of 'Répons 1' in freely retrograded form. The former sense of unity between the Verset sections imparted by the four linked pitches is disguised in the 'enrichments' by the greater use of grace-notes to embellish the texture. Each of the 'VERSETS' mirrors the structure of the original 'Versets', most obviously in the tiny sections E-e and C-c, where the relationships between grace-note and principal note is reversed, but also in sections B-b, where the final fff flourish of 'VERSET III' retrogrades the corresponding pitches of 'Verset 3', and the four grace-notes of the original are retained within the more elaborate pitch structure of the 'enrichment'. It is curious to note in passing the frequency with which these four notes at their original register occur in 'Sigle': each of the ten sections contains at least one such pitch, imparting a further sense of consistency to the pitch relationships. In so doing it establishes tangible pitch connections with 'Antiphonie I' where the low C-sharp functions
almost as a pedal note. In fact 'Sigle' both echoes and complements the serial structures of 'Antiphonie I and II', and even went through a stage where it was to be folded within the design of those two sections.

It must be said that the movement in this format, although brief, was balanced in structure. If, in the light of the subsequent history of the Sonata, there might be some regret that he chose not to let 'Antiphonie' rest in this form, Boulez's evident refusal to regard the Formant as complete is nonetheless consistent with his expressed desire to continue working until all the creative possibilities of the material are exhausted. The problem with this approach in relation to 'Antiphonie' is that the principle of intervallic mobility within the series offers almost limitless opportunities for further development. It is likely that at this stage work on the piece was interrupted although no doubt Boulez continued to develop his thoughts at a time when he was occupied with the composition of 'Pli selon Pli' and 'Structures: Deuxième Livre'. Accordingly, when eventually he resumed work on the opening Formant of the Third Sonata, it was with the intention of realising a vastly expanded concept.

**TRAIT INITIAL**

The final series of sketches for 'Antiphonie' relate to the projected 'Traits'. The overall structure of all four of these was planned, but only the first two proceeded beyond the preliminary sketching stage, and of these, only the first, the 'Trait Initial' has reached its (presumably) final form. By examining the considerable quantity of sketches, it is possible to follow the evolution of 'Trait Initial', and to trace the compositional process. Whilst this examination of an incomplete movement might be regarded as at best a speculative venture and at worst a futile exercise, in fact the piece raises some important issues concerning the
development of Boulez's style and his compositional methods. In addition, a thorough examination of the existing sketches enables one to speculate with a reasonable degree of accuracy concerning such matters as the intended scale and structure of the movement and its musical character - details which have an important bearing on the enigmatic history of the Third Sonata.

The pitch structure of 'Trait Initial' is based on the three rows not used in the composition of 'Antiphonie I and II' - rows B, C and G of Ex.6.7, and the first step is to apply the same principle of pitch mobility related to intervallic succession to each of these. As in the sketching of the 1957 version, Boulez plots the pitch progressions in numerical form at first. The blue paper used for this is similar in colour and size to the paper used in the grids for 'Antiphonie I', but is of slightly thinner quality, supporting the supposition that the entire conception of 'Trait Initial' postdates the 1957 performances. Each of the three grids is now written out in staff notation, with the addition of rhythms. The derivation of these is by no means obvious, but a re-examination of the early sketches for 'Antiphonie' reveals the source: Boulez has borrowed the rhythm table first generated in association with the original pitch series (Ex.6.4), and discarded from the earlier versions of 'Antiphonie'. Again, a musical parameter which has been evolved in connection with one set of ideas is removed from its original context and applied elsewhere. The three pitch series are now superimposed onto a single sheet (Ex.6.18) which combines the pitches and rhythms of rows B, C and G, and adds corresponding dynamics marks again drawn from Ex.6.4. A further addition is the series of vertical identifications in the familiar form of the Greek letters α to µ.

A later stage shows how the pitches of Ex.6.18 are to be used to generate the pitch structure of 'Trait Initial'. The vertical orders of pitches are to form the basis of the 'Déroulement horizontale', and Boulez's annotations of Ex.6.19 show the pitch derivations
throughout the projected ninety-two 'bars' of the section. My addition of red arrows to Ex.6.18 allows the sequence for each letter to be read off in order (always remembering that the sequence is vertical). It will be seen that the extent to which individual groups are used varies considerably with, for example, all the notes of both $\alpha$ and $\theta$ being used and $\lambda$ being omitted altogether. A similar seemingly arbitrary decision concerns the arrangement of the groups in Ex.6.19: the entries of the eleven groups which form the 'déroulement' are staggered. At first sight there seems to be no apparent logic to either of these decisions, but in fact both the extent of use and the timing of entries for each group are governed by a fundamental structural feature of the section. Underpinning it is a series of pedal points, frequently articulated by trills, which form a constant backcloth. These 'c.f.s' (cantus firmi), as Boulez describes them, are based on row J of Ex.6.18, reading horizontally beginning from the final note of the series (as marked by my green bracket). His preliminary sketch for this is found on the fourth line of Ex.6.19, and each of the eleven groups of row J forms one of the pedal points in the subsequent 'déroulement'. The draft underneath, of all ninety-two 'bars' (lines 7-15 of Ex.6.19), shows the distribution of the eleven c.f.s, numbered and marked with an $\infty$, and continuously present throughout the section from the first appearance in 'bar' 18. Their spacing governs the entries of the eleven vertical groups, each of which contains one cell of row J: thus the entries must be so spaced as to allow a continuous unfolding of these c.f. points. This arrangement accounts for the omission of vertical group $\lambda$, the only one which does not contain a cell of row J (see Ex.6.18). The extent to which other groups appear is based on exactly the same principle that Boulez had used earlier in 'Antiphonie II' to derive the enrichements of the original cells: each vertical group uses J as its departure point and is extended upwards and downwards until cut off by a rest.

The overall design of the section thus fixed, one is able to consider the other
fundamental characteristic of 'Antiphonic', and indeed of the Third Sonata as a whole - the principle of the troped insertion. As we know, it was Boulez's intention that the previously composed sections of the movement - 'Antiphonie I and II' and 'Sigle' - would function as tropes within the expanded design of the opening movement. However the principle is extended to the revised structure on a more local level and the presence of 'interruptions verticales' was evidently to be a feature of all four 'Traits'. This is revealed by the series of diagrams (Ex.6.20) on the back of the invitation card dated March 8th, 1963, referred to above in the general discussion of chronology. It shows that Boulez had already fixed the pitch material for each of the four 'Traits', arranged in complementary pairs, and to be printed on both sides of single sheets. (The continuing ambiguity of the term 'Répons' may be noted in passing, with Boulez using it as a general description of 'Antiphonie I and II' and of the four 'Traits'). Clearly there were to be contrasts of character between the horizontal and vertical material in each of the four sections. A more precise description of the relationship between the 'interruptions verticales' of 'Trait Initial' and its 'déroulement horizontale' is described by Boulez in a further verbal sketch in the following terms: "La structure verticale K interrompt la structure horizontale J en lui imprimant sa propre dimension temporelle" ("The vertical structure K interrupts the horizontal structure J imposing on it its own temporal dimension"). A footnote adds the following: "Interruption de la structure horizontale aux points où elle se serait superposés avec la structure verticale. Le temps d'interruption est égal au temps horizontal qui sépare deux interruptions successibles" (" Interruption of the horizontal structure at the points where it would be superimposed with the vertical structure. The duration of the interruption is equal to the horizontal duration which separates two successive interruptions"). The first sketches for the the 'interruptions verticales' for 'Trait Initial', based on the horizontal use of row K (see my blue bracket in Ex.6.18), are found in line 5 of
Ex. 6.19. Underneath the 'déroulement' on the same page, Boulez lists both the pitch content and position of six insertions, beginning just after the midpoint of the movement. The pitches are based on the available vertical cells coinciding with each of the cells of K and the position of each is determined by the note lengths of K. The compositional principle evokes that of 'Trope' itself, where its operation confers a sense of unity between the demands of overall form and local structure.

The next stage in the sketching of 'Trait Initial' was to convert each of the pitches in Ex. 6.19 to a chord. The way in which this is accomplished is indicated by a series of verbal descriptions on the right of the sketch, listing the intervals to be added to each of the ten groups of notes. By this simple means, Boulez is able to generate a chord structure for the entire section, sketched as shown in Ex. 6.21, with the derivation of each chord clearly indicated by horizontal arrows to indicate the original single-note. With the exception of κ, whose solitary G-sharp remains unembellished, the density of the chords varies from two to a maximum of five notes. The result, consisting as it does of groups of identical chords in transposed form, is very similar to the technique of chord multiplication used in the Blobs of 'Constellation', although the means used to derive the chordal groups of 'Trait Initial' appears simpler and less organic than the complex 'crossover' technique of 'Constellation'. The tendency to simplification of the serial processes is again seen in the accompanying dynamics, with the chords of each group maintaining one or two consistent dynamic levels throughout: these are governed by the dynamics of the opening notes, which in their turn are based on those of the grid in Ex. 6.4. However Boulez evidently had second thoughts about these dynamic levels, revising them all downwards, as shown by the additions in red ink to Ex. 6.21. A further refinement to the planning stage of the piece is the presence of indications for the internal rhythmic structure and texture of each of the chordal groups in Ex. 6.21, as
illustrated on the right-hand side of each page. The musical parameters having been planned in considerable detail, Boulez is now able to proceed to the final sketching stage of the 'déroulement', the resolution of the chord tables of Ex. 6.21 into a more precisely ordered sequence. This is shown in Ex. 6.22, which corresponds precisely with the pitch structure of 'Trait Initial'.

It will be noted that the 'interruptions verticales' are simply indicated in Ex. 6.22.ii by the presence of vertical blue arrows. The later stages of the sketching for these sections evidently proceeded independently - a necessity in view of their contrast of character and material. Their freer, more improvisatory character (Ex. 6.23) is reflected in the sketches, where the basic material is subject to a variety of pitch treatments. Thus the tiny three-note cell of ξ is transposed on to each of its notes in turn (Ex. 6.24), and the resulting pitches freely permutated. In the case of θ, the lengthiest of the 'interruptions', and the richest in its 'combinaisons verticales', the elaboration is based on the inversion and regrouping of the intervals (Ex. 6.25). The original rhythms are largely suppressed in the 'égalisation des valeurs' which characterises the 'interruptions', but the derivation of group η yields a particularly ingenious instance of a regrouping of pitch cells based on the original rhythms. The relevant sketch is shown in Ex. 6.26, which indicates that Boulez was working on the 'interruptions verticales' for both the 'Trait Initial' and 'Premier Trait Médian' simultaneously. The permutations used in this example are extremely free, but the sketch shows how the chords used in η are derived from the intervals of the three-note chord and then transposed on to other available notes. By means of this range of serial techniques, Boulez is able to generate a series of contrasting pitch groups. A final stage in the sketching process is to apply a characterising rhythmic pattern to each of the groups. These are listed in a separate preliminary sketch (Ex. 6.27), and the descriptions here form the basis for the distinctive
rhythmic shape of each of the 'interruptions'.

In the light of this examination of the considerable quantity of sketches for 'Trait Initial' it is now possible to consider the manuscript sources. If the sketches themselves were not sufficient evidence, the existence of no less than four manuscript versions of this section are an indication of the amount of time and trouble which Boulez lavished on 'Antiphonie'. As always, a complete pencil draft was produced, but unusually, three pen versions followed. The pencil draft, in Boulez's characteristically miniscule hand, is accommodated on a single large sheet: perhaps Boulez still entertained the possibility of reversible pages with the 'Premier Trait Médian' occupying the reverse. When he came to make a pen version of the 'Trait Initial', this plan had been abandoned, and the section is spread over several sheets. Corresponding with this physical alteration in layout, the note values of the pencil version are increased eight-fold. Thus the opening chord, notated as a dotted minim in the final sketch (Ex.6.22) and in the pencil manuscript, is lengthened to six tied semibreves in each of the pen manuscripts, with all subsequent values lengthened proportionally, as shown in my copy of the final pen manuscript (Ex.6.28). Otherwise, the pencil and first pen manuscript correspond except for the addition of bars and time signatures in the first pen manuscript. These, together with the adoption of a crotchet unit of beat, give 'Trait Initial' a much more traditional notational appearance than the published movements of the Third Sonata with their absence of bar lines and rhythmic movement based frequently on the semiquaver (and even the demisemiquaver in passages of 'Constellation') as the metrical unit.

Having followed the gradual shaping of the musical material through the course of the sketches, it is possible to make a detailed analysis of the pitch and rhythm structure of 'Trait Initial' by comparing it with the later stages of sketches, in particular the chord tables of
Ex. 6.21, and their resolution into chord sequences in Ex. 6.22. A closer examination of Ex. 6.22 indicates that it contains a rhythmic element as well: the varied note-lengths of Ex. 6.21 are articulated by means of repetition, and such repeated chords in Ex. 6.22 are indicated by square brackets in my numerical annotation. The manuscript drafts for the movement resolve the question of registers, but the other musical parameters have already been so meticulously planned that the actual process of moving from final sketches to completed draft must have been a fairly straightforward task - a suggestion consistent with the restricted time-scale within which Boulez must have completed the process. My annotation of the entire section (Ex. 6.28) in relation to the final sketches shows the how the pitch and rhythm structure proceeds to ever greater complexity from fairly simple beginnings.

In particular, the flexible technique employed in the final section from bar 78 onwards, with continual interweaving of the various strands recalls sections of 'Constellation' where three rows are being employed simultaneously and the principle of the troped insert is exploited on a local as well as on a more fundamental structural level.

Both second and third pen manuscripts omit the time signatures and bar lines, but more significantly, alter the order of the 'interruptions verticales' from that in the pencil and first pen manuscripts. The variants are as follows:

Pen Manuscript I: \[\gamma \delta \varepsilon \zeta \eta \theta \iota \kappa \lambda \mu \alpha\]
Pen Manuscript II: \[\gamma \delta \varepsilon \eta \theta \iota \kappa \lambda \mu \alpha\]
Pen Manuscript III: \[\gamma \delta \varepsilon \theta \iota \kappa \zeta \eta \mu \alpha\]

Thus Pen Manuscript I contains all eleven components of \(K\), in their original order beginning with \(\gamma\). Manuscript II retains this order, but omits 'interruption' \(\zeta\). In the final pen manuscript Boulez refines the original order, this time omitting group \(\lambda\). This was the version which Boulez evidently sent to Universal Edition, Vienna for printing, although so
far, the publishers have denied all knowledge of its existence and indeed of any other parts of 'Antiphonie' (see, however, the final chapter of this study). It was possible to examine a microfiche of this manuscript at the Paul Sacher Stiftung, and working on the assumption that it is the final version, my own transcript has been based on it, whilst referring back to the other copies in cases of doubt. A study of the order of 'interruptions verticales' and the way in which they are grouped resolves an apparent incompleteness at the sketching stage. In Ex.6.19, of the eleven possible insertions, only six were sketched. The explanation is that in each of the three versions, Boulez arranged the 'interruptions' into six groups, the spacing of which corresponds in each of the three drafts to that of the insertions indicated in Ex.6.22.

The grouping in Manuscript III is as follows:

γ δ ε θικζ η μ α

An examination of this arrangement shows that that Boulez simply grouped together into a larger unit four 'interruptions' of similar musical character. Thus the first three of the group are at a low dynamic level and each incorporates double trills in the middle register of the instrument, marked murmure, imperceptible, creating a uniformity of musical texture in which the original groups merge into one another.

One other detail remains to be considered in relation to the 'interruptions verticales': the reference, in a verbal sketch quoted above, to the way in which the insertions would impose their own temporal dimensions. Boulez's working method was to add metronome marks at the final stage, even though they may well have been part of the original conception - as we have seen, one of the earliest sketches for the Third Sonata consists of a series of tempo jottings for Formants I and II. Boulez evidently worked at these parameters for both 'Trait Initial' and 'Premier Trait Médian' either during or after the American visit in spring 1963. A sketch on the blue notepaper of Harvard University Library (Ex29) consists
of proportional tempo scales for both sections, showing that the symmetrical relationship of material between the sections would be mirrored in the tempo relationships. Underneath is a sketch arranging the tempo scale of 'Trait Initial' into a symmetrical order for each of the eleven 'interventions', with the quickest pulse, m.m. = 160 at the centre, and the two slowest, m.m. = 84 and 88 at the extremes. (It is worth observing in passing that this arrangement mirrors the visual appearance of some of the chordal shapes sketched for the movement, and of course reflects the overall design of the Sonata with proportionally related Formants revolving round a fixed centre). This scale corresponds exactly to the metronome marks assigned to each 'interruption' in the order in which they appear in Pen Manuscript I, with 0 and its accompanying metronome mark of 160 occupying a pivotal position as not only the central insertion but the only point where the metronome marks of the 'déroulement horizontale' and 'interruptions verticales' coincide. With the alterations in the ordering of the 'interruptions' in the later pen copies, the symmetrical arrangement of metronome marks in Manuscript I is broken, but the structural concept of gradually increasing disruption of the temporal and textural uniformity of the horizontal structure is enhanced, particularly in the final pen manuscript. The original highly cerebral plan to relate the temporal proportions of the insertions to those of their spacing within the 'déroulement' appears to have been dropped by this stage, or at least considerably modified under the pressure of other self-imposed structural constraints.

Any attempt at critical evaluation of the 'Trait Initial' in relation to the published Formants and to the other completed sections of 'Antiphonie' is likely to commence, as does Allen Edwards, with an expression of surprise at its musical character. This is indicated in verbal terms by Boulez at the top of a page containing the final stage of sketches (Ex.6.22): "mouvement continu pour contraster avec le discontinuité du reste". Thus the 'déroulement
horizontale' is remarkable for its continuous flow at a constant crotchet pulse of m.m. ≈ 160, and a restricted dynamic level which never rises above mezzo forte. Equally remarkable is the restricted compass of register which extends symmetrically for two octaves and a semitone either side of middle C - that is, from B-natural in the bass to the C-sharp four octaves above. It is thus enfolded within the compass of the tiny, but explosively eventful 'Sigle', which extends from the lowest C-sharp to the highest B-natural, virtually the entire range of the instrument. The musical texture reflects this impression of comparative continuity and uniformity, with the various c.f. points sketched by Boulez providing a constant background of extended trills and pedal notes. The varied treatment of these is described on a separate sheet (Ex.6.30), which is of interest not only for its listing of the various possible c.f. treatments followed by their numbering in sequence 1 - 11 to correspond with those of the 'Trait Initial', but also for its indications of Boulez's changes of mind. The two erased lines in the sketch show that he originally intended to use both unarpeggiated chords and silently held chords as textural elements in the section, a plan corroborated by a jotting following the above quotation, and summarising the musical character:

C.F. en trilles

en empreintes (avec Sost. Ped.) (appuyées d'abord)

(muettes d'abord)

en pointillés (triller ou lisser)

[C.F. in trills

in held notes (with Sot. Ped) (played at first)

(silent at first)

discontinuous (trill or legato)]

He evidently decided to withhold this device incorporating the use of the sostenuto pedal.
The (presumably) later annotations in red pen to Ex.6.30 show that he intended to make such textures a feature of the 'Premier Trait Médian': perhaps he felt that their capacity to evoke the variety of extraordinary resonances found in 'Constellation' would be out of place in the comparatively uniform context of 'Trait Initial'.

It is curious to observe how similar some of the shapes of 'Trait initial' are to those of other sections of the Third Sonata, particularly sections of the Points in 'Constellation', and yet be so different in their expressive content. The c.f. notes provide a constant textural backcloth to the musical texture of 'Trait Initial' which is lacking from the two published Formants composed in the previous decade. No commentary on Boulez's stylistic evolution could fail to note, first, how such reference points are excised from his first published works, are then totally eliminated from the musical concept in the 'pure' serialism of the 1950s, and gradually reemerge in a serially integrated form in the subsequent decades. The culmination of this process in the music of Boulez (so far) is 'Répons', whose title is borrowed from 'Antiphonie II'. Its musical structure and instrumental texture contains echoes of the Third Sonata, not only in its troped interludes, where the 4X computer is analogous to infinitely resonating piano harmonics, but in the texture of the main instrumental group which proceeds by a series of pedal points decorated with trills in a manner which evokes that of the 'Trait Initial'. Hence the importance of this unpublished music in any consideration of Boulez's musical evolution.

PREMIER TRAIT MÉDIAN

The total performance time of 'Trait Initial', assuming adherence to the composer's very rapid metronome marks, would be approximately four minutes: a considerable quantity
of music, but hardly sufficient to warrant the description 'very lengthy' by Allen Edwards, whose calculations were perhaps influenced by the physical appearance of the score with its representation of rhythmic values in terms of a crotchet pulse. At this point the composition breaks off. Was Boulez dissatisfied with what he had produced so far? Hardly likely, given the fact that he had made three copies of the score, one of which had been sent to the publisher. Are there then clues to the fate of the piece in the surviving sketches? As indicated earlier, the composition of the first two 'Traits' proceeded along similar lines and Boulez evidently evolved some elements of them simultaneously. We have seen, for instance, that 'interruptions verticales' for both sections appear within the same sketch. The internal evidence suggests that the sketching procedure was identical for the two sections and indeed the drafting of the 'Premier Trait Médian' had reached an advanced stage before Boulez apparently abandoned work on the project. Two of the three major sketching stages out of which 'Trait Initial' evolved are duplicated for its counterpart. A large single sheet contains a preliminary draft for the 'déroulement horizontale' based on row K, and annotated with eleven c.f. points (Ex.6.31). In the middle of the sheet is a large box on the left hand side showing the 'antiphonies verticales' - that is, the troped insertions - based on row J. The structure mirrors the serial relationships of 'Trait Initial', and the sketch is a duplication of the procedure used in the first section and illustrated in Ex.6.19. The paper size and grade is identical, raising again the possibility that the two sections were sketched simultaneously. If this was indeed the case, the process went at least one stage further. The Basel archive also contains a complete series of chord sketches (Ex.6.32) for 'Premier Trait Médian' based on the previous example, and again duplicating the procedure used in the first section (Ex.6.21). Not only is the procedure the same, but the paper type is again identical, and the similarity in layout and use of identical inks suggests that the sketches could well have evolved
simultaneously on either side of two large sheets which were subsequently divided down the middle. As already noted, the troped insertions for both sections seem to have evolved simultaneously, and indications of those for 'Premier Trait Médian' are found on the lower half of the sheet containing those for the 'Trait Initial' (refer to Ex.6.23). The two sets are identical in pitch content, although Boulez evidently planned some rhythmic and textural differences: a curious feature of the sketches is that those for the second section show signs of incompleteness and yet contain dynamic marks, missing from those for 'Trait Initial' and only added at the final draft. As it is, these dynamic indications with their \textit{mf} - \textit{fff} range afford a tantalising glimpse of the contrasting character of 'Premier Trait Médian'.

At this point the sketches break off except for one puzzling fragment consisting of a single system (Ex.6.33). The metronome mark of demisemiquaver = 160 suggests that it is part of the 'déroullement' for the section, and the jotting on the extreme left of the page indicates a plan to lengthen the proportions at some point, recalling the adjustments made at the pen manuscript stage of the 'Trait Initial'. Could it be that this is the only surviving section of a projected pencil draft for the section? Closer inspection reveals that it is indeed a draft of the opening, corresponding to the sketches comprising Exs.31 and 32. The plan as drafted in Ex.6.31 was to precede the 'déroullement horizontale' with the first 'antiphonie verticale' based on $e$ of Ex.6.23. The fragmentary Ex.6.33 begins with a \textit{fff} gesture derived from $e$, and follows it with a contrasting \textit{ppp} figure, in the middle of which the first chord of the 'déroullement' is stated in the shape of a pedalled quintuplet figure. Even this tiny fragment contains information which helps to explain the musical concept sketched for 'Premier Trait Médian'. Ex.6.20 had projected 'valeurs égalisées' for the vertical material with 'valeurs originales' for the horizontal statement, and the opening fragment provides indications as to the manner in which this would be realised. This helps to explain the note at the top
right hand corner of the chord sketch (Ex.6.32): "Renversement de fonctions du TRAIT INITIAL" ("Reversal of functions of TRAIT INITIAL"). More precise information is contained in a verbal sketch already quoted in relation to 'Trait Initial', and containing the following details regarding the structure of 'Premier Trait Médian': "La structure verticale J interrompt la structure horizontale K en salissant la dimension temporelle de cette dernière" ("The vertical structure J interrupts the horizontal structure K as the same time modifying the temporal dimension of the latter"). The disruptive effect on the metre of these interruptions can be glimpsed in the fragmentary Ex.6.33. The verbal outline adds a footnote: "Chaque élément de la structure horizontale est lié à un élément de la structure verticale dans l'ordre d'apparition du c.f. - l'élément vertical précède et suit (signale) l'élément horizontal; se combine avec les autres séquences dans le milieu" ("Each element of the horizontal structure is linked to an element of the vertical structure in the order of appearance of the c.f. - the vertical element precedes and follows [signals] the horizontal element; combines with the other sequences in the milieu"). The listing of the 'antiphonies verticales' in Ex.6.31 shows a series of twenty-two such interjections, marking the beginning and end of each of the eleven groups used for the horizontal structure, and the precise placing of each is indicated in the chord sketch (Ex.6.32). The verbal instructions conclude with an explanation for the puzzling absence of antiphonies V, XII, XIII, and XVII: "L'élément vertical ne signale pas le début, lorsque l'élément horizontal commence par le c.f. (γ,λ)", and conversely, "L'élément vertical ne signale pas la fin, lorsque l'élément horizontal se termine par le c.f." In other words, the antiphonies are omitted when they would coincide with a c.f. point. The chord structure sketched for 'Premier Trait Médian' is much denser and more complex than that for 'Trait Initial', and again indicates that the musical character for this section would be a much more dynamic one than that of the opening 'Trait' with its surprisingly bland textures.
The parameters of the structure having been planned in great detail, the fragmentary draft of 'Premier Trait Médian' breaks off after one system, followed only by a few indistinct jottings on the stave below.

The starting point of this investigation was an examination of the present state of completeness of 'Antiphonie' in the hope that it might shed some light on the work's fate. From this necessarily superficial survey it is at least possible to provide a context for what must remain a speculative debate. The vastly expanded conception of the Formant is indicated by the fact that the structural sketches for 'Premier Trait Médian' consist of some one hundred and sixty 'bars' - approaching double the length of those for 'Trait Initial'. Assuming (conservatively) a performance time of six minutes for the completed section, the total performance time just for these first two of the four projected 'Traits' would be in excess of ten minutes. Could it be that Boulez decided to abandon the project at this point when the scale of 'Premier Trait Médian' became apparent? It is certainly the case that fitting a section of this size onto one side of a reversible sheet would be practically impossible. Yet the proportions of the section were established in Ex.6.31 after which Boulez continued sketching, producing a chordal draft of considerable complexity. In addition, three pen scores of 'Trait Initial' were produced, all of them abandoning the single sheet format. A curious feature of the sketches is that the original 'déroulement' notes of Exs.6.19 and 6.31 are clearly identified in the subsequent chord elaborations, Exs.6.21 and 6.32, by horizontal arrows. These arrows are retained in each of the pen copies of 'Trait Initial', giving the scores are somewhat didactic appearance. Did Boulez use some of this material in his teaching during this period, and if so, did this produce a creative block inhibiting the completion of the project? Or, more simply, was the piece a casualty of Boulez's expanding conducting schedule? This must certainly have played a part in the diminution of his output over the next decade, but there
are other internal musical factors to ponder concerning the planned expansion of 'Antiphonie'.

To have completed all four of the 'Traits' would have produced a movement the scale of which would dwarf that of the already published formants: execution of the plan for 'Antiphonie' in its 1963 form would involve the revision of the entire Sonata. Yet the two published Formants are perfect in their proportions, generated by a serial universe which affects the musical structure on all levels. Any alteration would destroy the delicate balance of forces within each movement, with their hermetic structures able to accommodate the seemingly contradictory element of performer choice. The question of incompleteness goes to the heart of the changes in Boulez's serial thought over the six years during which he worked intermittently on 'Antiphonie'. The angular, pointillist textures of 'Antiphonie I' are transformed into the "instrument of frenzy" of 'Antiphonie II' without compromising their concentrated approach to serialism. By the time that Boulez resumed work on the Sonata in the 1960s, the technique of pedal points linking a series of c.f.s., which he had developed during the intervening years, enables him to create in 'Trait Initial' a textural background which allows the musical discourse to flow in a more measured way. The effect is analogous to that of the pedals and trills which form a textural backcloth to much of Debussy's piano music. Mention was made earlier of the links with 'Répons', and it is interesting to note that here the 'background' effects are provided not only by the pedal points in the main ensemble but also by computer generated sound controlled by the soloists and described by Boulez as 'musical wallpaper'. 'Répons' is in a state of seemingly limitless expansion, but there are not the constraints of perfectly shaped pre-existent structures which make the completion of 'Antiphonie' in its projected form so problematic.

However... If the Third Sonata has been finally abandoned, the existing completed material for the opening movement would form a design of satisfactory shape with
'Antiphonie I' and 'Antiphonie II' framing 'Trait Initial', and 'Sigle' interrupting its progress. In this form the movement would last some six minutes, approximately the same length as 'Trope'. These two Formants could thus form part of a well balanced three-movement structure if placed either side of 'Constellation'. Such a shape could leave both outer Formants free to exchange places as in the original plan for the Sonata, whilst within 'Antiphonie', the two eponymous sections would be interchangeable. This presumes that both 'Strophe' and 'Séquence' in their present undeveloped state would be discarded, leaving a total playing time for the three-movement Sonata of approximately twenty-five minutes. I have experimented playing the work through along these lines, and feel that the suggested three-movement shape not only allows us to experience some previously unknown music by Boulez but makes for a better balanced work than the two published Formants heard in isolation. But this is mere speculation: as it stands, 'Antiphonie' remains one of the major unfinished projects, the completion of which would allow a unique insight into Boulez's compositional processes and his capacity to continually revisit material in the light of the continuing development of his technical resources and ever-increasing clarity of creative focus.
REFERENCES

(1) Boulez, P. 'Conversations with Celestin Deliège', p.83
(2) Edwards, A. 'Unpublished Bouleziana at the Paul Sacher Foundation'
(3) Boulez, P. 'Points de repère I: Imaginer', p.443
"just imagine parenthesis-pages, mobile cahiers, constellations of formants".
(4) Ibid, p.443
"And, in fact, it is the composer's delight to set out towards a horizon and to find himself in a totally unknown country, of whose existence he was hardly aware".
(5) Boulez, P. 'Penser la musique aujourd'hui', p.138
"Antiphony has not been mentioned because it is a distribution of already 'formulated' polyphonic structures, and not a criterion of combination that might itself create a 'formulation'. Antiphony is already a formal prototype".
(6) Ibid, p.41
"if the pitches are accorded durations directly (or inversely) proportional to the intervals which separate them, another form of generation will result from the order of the size of interval being brought to bear on the order of succession".
(7) Ibid, p.41
"The possibilities are infinitely vast and end in series having only a very distant relationship with the primitive series of twelve sounds".
(8) Private correspondence, quoted by kind permission of the owner, Leonard Stein.
"The text of 'Antiphonie' (Formant 1) has been modified in its presentation, and augmented by four linked forms of interpretation. Once again, there is as yet no photocopy".
(9) Stoianowa, I. 'la Troisième Sonate de Boulez et le projet mallarméen du Livre'
CHAPTER SEVEN

STROPHE and SÉQUENCE

The sheer quantity of sketches for 'Antiphonie' suggested that an examination of them would reveal important information concerning the chronology of the Third Sonata, and help account for the curious history of the piece. In turning to the sketches for the fragmentary fourth and fifth movements of the work, it was more a gesture of scholarly thoroughness rather than in the anticipation that they would reveal any significant details about the compositional process. After all, the two movements as performed by Boulez in 1957-58 were together only slightly more extended than the original two-minute span of 'Antiphonie', and all three of these fragmentary Formants, when played sequentially, formed a brief interlude between the extended structures of 'Constellation and 'Trope'. The fourth Formant, 'Strophe', seemed the least developed of all, existing only in the form of a pencil manuscript which contained four short sections of music playing for under a minute. A cursory examination of the sketches was no more promising: both for this movement and for the slightly more extended 'Séquence', the sketch material preserved in the Paul Sacher Stiftung consisted almost entirely of row tables, representing the earliest stage in the compositional process. My assumption was that Boulez had worked on these movements after the completion of the two published movements, and that, pressed for time, he had hastily produced a fragmentary version of each for the first public performances.

Hence my consternation, when, at the suggestion of Robert Piencikowski, I examined a volume of birthday tributes to Heinrich Strobel produced in 1955. It contained a contribution from Boulez, consisting of a short dedication, followed by an untitled section
"from a 'work in progress'" (Ex. 7.1). The piece in question is none other than 'Séquence', and the tribute is dated 9th October 1955. Strobel's intervention earlier that year had been crucial in securing the première of 'Le Marteau sans Maître' under Rosbaud at Baden-Baden on 18th June. What could be more natural than a desire on Boulez's part to reciprocate the favour by dedicating to Strobel an extract from his next major project? In other words, Boulez had composed this first draft of what was to become the final movement of the Third Sonata nearly two years before the work was first heard in public, and in the year prior to those quoted in the various monographs as being the dates of composition (1956-57) of the sonata.

Further examination of the material in Basel compounded the puzzle concerning the chronology of the Third Sonata. Apart from the published dedication to Strobel, there are three manuscript sources of 'Séquence', consisting of the usual pencil draft and two pen copies identical to the copy in the Strobel volume. As Allen Edwards has noted, the pencil manuscript of 'Séquence' continues the movement a little way beyond the version performed in 1957-58, but with no internal evidence to suggest that the additional material was added later: the unbroken flow of the musical handwriting suggests that all the material is likely to have been notated around the same time. The thirty-two stave format of the sheet is identical to the type of paper used for the pencil sketches of 'Trope' and 'Constellation', although given Boulez's rather haphazard tendency to use whatever paper came first to hand, it would be unwise to draw chronological conclusions on this basis alone. The chronology of the two pen manuscripts is however more certain: one is an independent copy on an otherwise blank four-sided sheet, but the other copy, found on the reverse of the pencil score of 'Constellation', contains tempo indications in faint pencil, suggesting that it was the first of the pen manuscripts to be notated.

The question of the order of composition of the various Formants becomes a more
complex one. Are we to make the facile assumption that 'Constellation' had already been virtually completed as early as the autumn of 1955, or could it be that Boulez, as so often, simply used whatever pieces of manuscript happened to be available and that there is no relationship between the dates of composition of 'Séquence' and 'Constellation'? An examination of the technical procedures used in the two Formants will provide further evidence concerning the likely order of composition, however this is to anticipate the discussion below. In the meantime, whilst it is important not to jump to hasty conclusions concerning the chronology of the various movements, the internal evidence begins to support the proposition that at least some of the Formants evolved around the same time, certainly in their initial drafts, and that the dates of composition are rather earlier than the generally accepted ones.

An examination of the sketches for 'Strophe' supports this theory, and further undermines the view that the composition of the subsequently withdrawn Formants was a hasty process undertaken shortly before the performances of 1957. A fragmentary sketch (Ex.7.2), unambiguously devoted in part to a detailed disposition of the row structure and general design for the four sections of 'Strophe', also contains a jotting defining the proportions of the five Formants of the Third Sonata as an arch shape (Bref-Moyen-Long-Moyen-Bref). Other sketches also list these details, but their presence in this context suggests that detailed planning for 'Strophe' took place at an early stage in the genesis of the Sonata. Further circumstantial evidence to support this hypothesis is provided by two other structural drafts for the movement, written on small white card and blue postcard, of a type and size identical to that used for the earliest structural plans for the Third Sonata. Whilst the exact chronology of the various movements must remain a matter of conjecture at present, the likelihood is that the subsequently withdrawn Formants were in their essentials conceived at an early stage in
the gestation of the Third Sonata, and that a knowledge of their musical content will provide a context for the two published Formants.

STROPHÉ

The detailed planning for 'Strophe' proceeded along the lines of that for the other Formants, with a set of four twelve-times-twelve number squares (Ex.7.3) forming the basis for the subsequent pitch tables (Ex.7.4). In the case of each number square, the top line is a numerical equivalent of the prime form of the row (Or. and Rtg.) or its inversion (Rv. and R.Rv.). The long diagonal then forms the basis of an ascending or descending number series, a simple principle which is then applied to all the other shorter diagonals to form a square. The technique produces a distinctive pattern not found elsewhere in the Third Sonata, since in each case, congruity occurs between the first and twelfth lines, effectively reducing the number of horizontal options to eleven and creating an imbalance in the square. Boulez seize on this asymmetry as the basis for an unequal splicing of the square into a seven-plus-five division, both horizontally and laterally. The two unequal sections are each further divided into three numerical groupings, of three-plus-three-plus-one and two-plus-two-plus-one, respectively. Two consequences are immediately apparent from this manipulation of the series. First, there is the striking parallel with the row segmentation of 'Constellation' with its sixfold division into double groupings of three, two, and single notes: in theory, at least, the process is a simpler one in 'Strophe' since it lacks the continual permutations which are a central feature of 'Constellation'. However, this is to overlook a second feature of 'Strophe'. When the numbers of Ex.7.3 are converted to the pitch tables of Ex.7.4 (omitting the redundant twelfth line), it can be seen that Boulez has created by relatively simple means the
potential for similar pitch hierarchies within serialism to those found in the other Formants: the diagonal numerical technique applied here results in some series containing the same pitch twice with one note omitted as a consequence. The creative possibilities offered by such asymmetries lie at the heart of his compositional processes.

The structural basis for 'Strophe' is found on a sheet containing the diagram reproduced in 'Sonate, que me veux-tu?' (Ex.7.5). The article supplements the diagram with the following explanation:

"Quatre strophes de différentes longeurs sont écrites à l'origine (appelons-les respectivement, A, B, C, D), chacune susceptible d'un développement indépendant, mais similaire, basé sur le principe suivant: le développement 2 contiendra le développement 1; le développement 3 contiendra 1 et 2; le développement 4 contiendra 1, 2, et 3 - chacun de ces développements ajoutant naturellement une nouvelle structure à celles qu'il englobe" (1).

Already, the sketch shows that Boulez was planning the physical layout of the Formant in accordance with these developments. The pages would be cut into four independent strips and arranged 'en tourniquet'. The article continues:

"Ainsi, je pourrai lire: A1, B1, C3, D4 ou A1, B3, C2, D4, etc. Ces enchaînements ont une conséquence directe et obligée sur le registre: pour pouvoir enchaîner, en effet, n'importe quel état d'une strophe avec n'importe quel état de la strophe suivante, il faut un registre commun à la fin de tous les états de cette strophe, et au début de tous les états de la strophe suivante; ce seront les noeuds de registre, les ventres de registre étant le courant de chaque strophe, où aucune obligation ne s'impose. Seuls le début de A et la fin de D pourront être noeud ou ventre"(2).
This rather convoluted explanation of the diagram, with its resort to the language of acoustics, means in essence that in order for the individual sections to link with one another coherently there must be congruity of register between the beginnings and ends of sections.

Interestingly, Boulez makes no reference in the article to another aspect of the original plan. A verbal sketch on a small white card makes the following commentary on the links between individual sections: "À la fin d'une strophe définir le Tempo? [sic] et la dynamique de la suivante". There follows a series of examples as to how this arrangement might be effected. The concept of deriving the tempo and dynamics of the following section from that placed at the end of the preceding section was comprehensively exploited by Stockhausen in his 'Klavierstück XI' of 1956. The piece, a landmark in the adoption of chance procedures by European composers resulted in a rift between Boulez and Stockhausen lasting many years. Assuming, as seems likely, that much of the Third Sonata had reached an advanced stage in planning by the time of the Stockhausen première, could it be that part of Boulez's sense of betrayal also related to the (mis)use of a structural idea which had been discussed and shared between them?

The link between the row tables and the pencil score of 'Strophe' is provided by Ex.7.2 and its description of '4 Principes Strophiques'. The listing underneath of the various rows to be used shows that Boulez was applying the principle of unequal segmentation throughout, 'a' consisting of the larger seven-note grouping and 'b' of the smaller five-note remainder of each of the rows. This explains an otherwise puzzling reference in the general sketches for the Third Sonata of a Formant consisting of 'séries raccourcie avec figurations groupées' - that is, a shortened series with grouped figurations - clearly a reference to 'Strophe'. Interestingly, Boulez at this stage groups the row segments of Ex.7.2 into four larger divisions labelled 'Quatrain' I and II, and 'Tercet' I and II. This likening of the structure to that of the Sonnet
not only accounts for the title of the Formant (and Boulez at one stage used the plural form, 'Strophes'), but is an additional link with the world of poetry, and specifically that of Mallarmé, whose example is constantly cited by Boulez in his commentaries on the Sonata. A small sketch to the right of the pitch description shows the principal rhythmic groupings of the Formant with permutations of the numbers 1, 2, 3 (for segment b), and 4, 6, 10 (for segment a), to form its rhythmic basis.

The annotated copy of the pencil score of 'Strophe' (Ex. 7.6) shows how the pitch groups form the basis of the four short sections in conjunction with the rhythmic cells. Boulez has listed these on the left hand side of each stave, making identification a simple matter. The tempo direction, 'Très animé et d'une mouvement très constant, par opposition aux autres' ('Very animated and of a very constant movement, in opposition to the others') emphasises the individual character of 'Strophe' as compared with the other Formants. Its predominantly medium to low tessitura is a further contrast to that of the other Formants in their 1957-58 version. Yet within the four tiny sections there are considerable contrasts of texture. At no other point in the sonata does Boulez reveal the basic row structure to the extent that it is presented at the opening of 'Strophe', and yet the following section, whilst in some ways preserving the shape of this opening, proceeds to complicate the pitch structure by the addition of clusters - a rare use of this texture in Boulez's piano music, and complementing its introduction in 'Glose'. The two row segments (Rv. L and V) which comprise the pitch content of the second section are disposed so as to produce complementary clusters from their three-note cells. The pitch and rhythmic structure is as shown in the annotated score. This use of the rhythm cells 1, 2 and 3, is described by Boulez as 'durées non harmonique' (Ex. 7.2) in relation to the notes of the first section. Of interest throughout is his experimental use of numerical dynamic indications, with the comment at the top of the
score 'Très petites dynamiques 1 à 3' - again a contrast of musical character to the dynamic extremes of the surrounding movements. The remaining two groups are slightly more extended, and complement one another in a manner similar to the pairing of the shorter groups. Both of them introduce 'chromatisme de complémentarité' (Ex.7.2) - that is, a field of pitches based on the transposition of cells. The basic pitch structure and its complementary rhythmic structure can be identified with certainty for the third strophe, as shown in the annotation. It has the most continuous musical flow of the four 'strophiques', at least in this early stage. The final strophe, although complementary in length to the previous one, and continuing its use of rhythmic cells based on triplets and quintuplets, reverts to the more disjointed texture of the first two strophes with their terse motivic fragments separated by rests. The description of this strophe in Ex.7.2 as containing cluster tones suggests that the extant material represents only a point of departure for developments which remain as yet unrealised.

Boulez's evident intention was to develop each of the four tiny sections of this 1957 version of 'Strophe' by adding a further three sets of four sections, each being based on the original four sections but elaborating and incorporating the original material - a tantalising prospect, given the transformation he was to effect on the original comparatively simple five sections of 'Antiphonic I'. However, the most striking relationship regarding 'Strophe' is that which exist between it and one of the completed Formants, 'Trope'. The two movements were originally intended to be complementary is length (moyen) and interchangeable in position, a logic which becomes clear as one understands the projected design of 'Strophe'. Both Formants contain four sections, and the spiral binding arrangement of the planned layout is quite similar. In addition, the skeletal opening of 'Strophe' corresponds to the opening of 'Texte', which uses the identical notes as its point of departure. As already noted, the clusters
of the second section relate to those of 'Glose', whilst the introduction of 'fields' of related frequencies in the third and fourth sections of 'Strophe' suggest conceptual links with 'Parenthèse' and 'Commentaire'. Such comparisons are facile, but do perhaps help to shed some light on the precise manner in which the two Formants would have balanced one another in the overall design of the Third Sonata.

SÉQUENCE

Returning briefly to the article, 'Sonate, que me veux-tu?', Boulez is most 'laconique' (to quote his self-description) about the final movement: "...il me pose trop de problèmes encore sans solution pratique; car une nouvelle élaboration, pour le hisser au niveau des précédents, réclame, en effet, des innovations radicales dans la transcription des hauteurs variables, cette variabilité étant incompatible avec la notation telle qu'elle est pratiquée couramment"(3). The mention of "a new elaboration" focuses attention back to this movement and its various drafts, the chronology of which was discussed above.

The sketches for 'Sequence' follow the pattern of preparatory work on the preceding Formants with a series of row tables and charts from which the pencil score is evolved. Mention has already been made of the circumstantial evidence linking the composition of this movement with that of 'Constellation'. A comparison of the compositional procedures confirms the close relationship between the two Formants. The earliest pitch sketches for 'Séquence' (Ex.7.7) show an identical sixfold division of the row (1-3-3-2-1-2) and its inversion (2-1-2-3-3-1) to that used in 'Constellation' (rows A and M). Whereas this division is used as the basis for a complex series of permutations in 'Constellation', in 'Séquence', the same segmentation is retained throughout the sketches. Just as in 'Constellation', the twelve
transpositions of the row are ordered in groups (1-3-3-2-1-2), which are identical to the cell groupings of the row itself, and this grouping is retained for the twelve inversions - again a simplification of the process in 'Constellation'. The technique of chord multiplication used to derive the chords of Ex.7.7 is a simpler and more consistent one than the complex crossover technique employed in 'Constellation', where the density of chords ranged from the minimum (two notes) to the maximum (eleven notes). The method used in 'Séquence' is shown in my Ex.7.8, where the components of all the chords derived from the prime form of the row in Ex.7.7 are analysed. As can be seen in Ex.7.8, in each line, all the pitches of the transposed row are multiplied by the same intervals, derived from the original segmentation. The result is that the first and fifth lines of Ex.7.7, being multiplied by only a single note, retain their original simple shape, whilst the greatest vertical density is found in lines two and three, where the multiplication is by a three-note cell. Even so, the chords produced are comparatively uniform compared to the enormous range of possibilities generated in 'Constellation'. It is scarcely conceivable on technical grounds that this comparatively straightforward elaboration was drafted after the complexities of 'Constellation'. Again one is confronted by evidence pointing to the original version of 'Séquence' as being among the earliest sections of the Sonata to be drafted. The chord sequences are complemented by charts for rhythms and intensities identical to those produced in the sketches for 'Constellation': the assumption must be that Boulez incorporated these procedures within the limited span of 'Séquence' before applying them on the more extended canvas of 'Constellation'.

The relationship between these various sketches and the first and indeed only performed version of 'Séquence' is shown in my annotated copy of the pen score (Ex.7.9). All of its pitch material is derived from the first sheet of Ex.7.7, the chords built on the prime
form of the row. Boulez's labelling of the groups by letters, A-K, and internally within groups, a-f, unlocks the pitch content of the entire section: the groups and the internal ordering of their cells are simply laid out in sequence. This opening section of what was projected to be a longer movement, with its glittering high register and cascades of grace notes, Librement, senza tempo, is a remarkable contrast to 'Strophe'. The brittle style is emphasised by the restriction to three dynamic marks, $f$, $ff$, $fff$, which mirror those of 'Strophe', but at the other end of the dynamic scale. They are serialised in accordance with their listing in the chart of dynamics (Ex.7.10), although Boulez has allowed himself some flexibility in the shape of a freely circular permutation of the various number sequences.

The chord sketches are extended considerably beyond those used to generate the brief fragment performed in 1957-58. Not only are chords derived from the inversion of the row, but a further series of sketches exhausts all the possible permutations of the original two- and three-note chords contained in the prime form and its inversion, and then proceeds to apply the same process to the retrograde form of the inversion (Ex.7.11). The pencil manuscript continues the composition a little further before breaking off abruptly (Ex.7.12). Its pitch content is drawn from the extensions of the chord multiplications sketched in Ex.7.11, still using only the prime forms of the row. Boulez has identified the pitch content in his draft, so it is a simple matter to reconstruct the disposition of the various cells, as shown in my annotation of Ex.7.12. Although dynamic markings are absent from this draft, Allen Edwards is right to draw attention to its contrast of register compared to the uniformly high tessitura of the opening section. Puzzling questions however remain. As already discussed, the pencil sketch is uniform in its handwriting and appearance with no suggestion that the continuation was an afterthought. Why then does it break off so suddenly when such a wealth of sketch material was available?
Boulez's explanation of his conception deepens rather than clarifies the mystery. After his throwaway comment concerning "a new elaboration", the article continues: "Pour ne pas laisser complètement dans l'obscurité ce dernier formant, je dirai que son principe directeur est basé sur la lecture par grille - sorte de décryptage - permettant de choisir la séquence que l'on désire interpréter"(4). This tells us very little, and in fact even less than at first appears, since in a lecture at Darmstadt in 1960 entitled 'Notation et interprétation', Boulez had described the general problems between notation and realisation in almost identical terms: "On peut même se servir consciemment de la discrépance entre notation et réalisation, c'est à dire se servir de cette grille codée qu'est la notation pour donner un jeu entre le compositeur et l'interprète, je veux dire que l'interprète réalise à son tour consciemment ou inconsciemment"(5). Whereas in the case of the two other unfinished Formants, the article, 'Sonate, que me veux-tu?' enables one to reconstruct the proportions and likely shape (although in the case of 'Antiphonie' there was to be a fundamental shift in Boulez's thinking after the article was written), there is no indication from the existing sketches or drafts that choice was to play an important part in the plan of 'Séquence'. Could it be that his imprecise references to choice stem from a dissatisfaction with the evolving shape of 'Séquence' as projected in the sketches - that in its present form it had been subsumed into the structure of 'Constellation' which, starting from similar technical procedures, had developed into an exhaustive exposition of the possibilities of cellular permutation and its capacity to influence the musical structure on every level? His remarks on the formant conclude with the baffling observation: "Ce formant sera donc le plus éloigné d'une forme prédéterminé, l'Antiphonie étant, par opposition, celui qui s'en approche le plus"(6). The link, so it would seem, between the two outer movements was to be one of contrast between relatively strict formal parameters and comparative freedom.
There is however another curious and seemingly superficial link between 'Antiphonic' and 'Séquence' which may well provide clues as to the envisaged elaboration of the latter, namely the reintroduction of barlines in the two outer Formants of the Third Sonata. It was again Robert Piencikowski (7) who focussed my attention on this neglected feature of Boulez's notational practice, and the possible significance of its absence from the three central Formants of the Third Sonata. Leaving aside its practical function in orchestral scores as a means of facilitating reading and alignment of parts, the barlines in Boulez's music frequently function as upbeats, as an intake of breath, before the next musical event. (Their omission from the notation of both 'Trope' and 'Constellation' parallels the omission of punctuation marks in Mallarmé's 'Un Coup de Dés', and fulfills a similar purpose: to invite the reader/performer to engage in a more fluid, less fixed relationship with the text). A further examination of the two pen scores of 'Séquence' shows that Boulez has altered details of the barring from the otherwise virtually identical version printed in the Strobel tribute (compare Exs. 7.1 and 7.9). Not only are bars subdivided in the later copy, but double barlines and fermata are employed to isolate single bars within the movement. Such fermata signs were employed in the original version of 'Antiphonie', not as a means of indicating a pause, but of marking the beginnings of new sections. The significance of these fermata marks only became apparent when 'Antiphonie II' was completed, and the operation of choice became clear. Could it be that the addition of fermata to the later pen score of 'Séquence' represents a series of markers indicating the operation of choice in some as yet unspecified manner?

In the absence of any further sketches, it is futile to speculate on the possible form such an elaboration of 'Séquence' involving the intervention of choice might take. However, in surveying his subsequent retreat from the use of choice procedures, his elimination of such choices in the revised version of 'Improvisation III' from 'Pli selon Pli', and the ever greater
notational precision of the revisions of the Char cantatas of the 1940s, one must draw one's own conclusions as to the likelihood of Boulez ever completing 'Séquence' in accordance with the procedures postulated in 'Sonate, que me veux-tu?'. Perhaps the reality, as hinted above, is that Boulez began to lose interest in a movement whose technical processes had been elaborated with transcendental mastery in the central Formant of the work. Or was it that the enormous possibilities opened up by the more flexible expansion of serial technique in 'Antiphonie' led Boulez to reconsider the design of the Third Sonata as a whole, in some as yet unspecified form, subsequent to his explanations in 1960? One is left with the tantalising thought that both 'Strophe' and Séquence' have been abandoned in the light of changed circumstances, and that two perfectly crafted and complementary miniatures will remain withdrawn and unavailable for performance in the foreseeable future.
REFERENCES

(1) Boulez, P. 'Points de repère I: Imaginer', p.441
"In the first place there are four strophes of different length (we will call them A, B, C, D), each capable of being developed independently but on similar lines, and according to the following principle: development 2 will contain development 1; development 3 will contain 1 and 2; development 4 will contain 1, 2 and 3, each of these developments naturally adding a new structure to those that it subsumes".

(2) Ibid, p.442
"In this way it will be possible to read A2, B1, C3, D4 and so on. These links affect the register in a direct, obligatory manner: in order to be able to link any 'stage' of any one strophe with any one 'stage' of the next there must be a register common to the end of all the stages of this strophe and all the stages of the strophe following. There will be register nodes, the antinodal loops of the register being the current of each strophe, where there is no obligation. Only the beginning of A and the end of D can be either a node or an antinodal loop".

(3) Ibid, p.442
"...it presents the most problems, to which I have still found no practical solution. Any new elaboration comparable in quality to that in the preceding Formants demands, in fact, radical innovations in the transcription of variable pitches, this variability being incompatible with our existing system of notation".

(4) Ibid, p.442
"To give the reader some idea of what I mean I will simply say that the guiding principle is based on reading through a grid - a kind of decoding, in fact - which allows the performer to choose the sequence that he wishes to play".

(5) Ibid, pp.370-71
"It is even possible to make conscious use of the discrepancy between notation and realisation - i.e. use this coded grid, which is what notation is - in order to initiate an interaction between composer and performer, whether the performer is conscious of this or not".

(6) Ibid, p.442
"This Formant will therefore be the furthest removed from predetermined form, while 'Antiphonie' will approach it most closely".

CHAPTER EIGHT

THE PUBLICATION OF THE THIRD SONATA

An unexpected development occurred at a late stage in this project, when Universal Edition responded positively to my request to inspect the material in their possession relating to the Third Sonata, and I was able to spend two days at their archive in Vienna in the autumn of 1996. Various stages of the proofs for the publication were still available together with records relating to the production process, and some correspondence and details of telephone conversations with Boulez. It was thus possible to piece together the chronology of publication, the details of which shed further light on the circumstances relating to the apparent abandonment of the Third Sonata.

The first stage in the publication of the work was the preparation of proofs for 'Trope'. The first entry, on 24th July 1958, lists an amount of S. 182 for the production of photocopies, which were sent a few days later on 28th July to the proof reader, Roman Haubenstock-Ramati, for correction. The publication of this Formant was a protracted process, with two proofs preceding a final corrected proof dated 7.2.61, and publication following later the same year. There appear to have been few problems concerning the text, with only a few minor discrepancies in the proofs, and the printed edition contains almost no deviations from Boulez's manuscript. One interesting detail concerns the titles of the four sections, which seem only to have been inserted at a comparatively late stage: the first listing is in June 1960, at a stage when the engraving process had already begun. It will be recalled that Boulez's manuscript had simply listed the sections as α β γ δ . The issue of descriptive titles seems only a minor matter, until it is remembered that two of them, 'Commentaire' and
'Parenthèse', describe sections where the principle of formal mobility is applied. Again we are confronted with the vexed question of performer choice in the Sonata, and the issue as to whether it was integral to the conception of the piece. Jean-Jaques Nattiez, in his introduction to the Boulez-Cage Correspondence, raises the point in relation to the publication of excerpts from Mallarmé's 'Livre' in 1957:

"...it is not at all impossible that he [Boulez] had the idea of making the components movable after reading Schérer: since chance would only affect the ordering of blocks whose text would be otherwise entirely fixed, a few elements would suffice to make them mobile. It remains an open question"

(1)

Quite so, although Nattiez's subsequent suggestion that Boulez misrepresented the chronology of the composition of the Third Sonata and his acquaintance with the 'Livre' is an unworthy one.

In contrast to the comparatively straightforward production of 'Trope', that of 'Constellation-Miroir' was a fraught process. The demands made on the engravers by a score of such complexity was unprecedented, and although the production overall took less time than that for 'Trope', from a first entry in April 1961 to the publication of the score some two years later, the process must have been an exhausting one for all the parties involved, not least Boulez himself. The first proof was produced in the Spring of 1961, and sent to Boulez for correction. It contained an enormous number of errors, which Boulez meticulously corrected. These consisted not only of errors of pitch and rhythm, but misplaced and imprecise pedal marks, and errors of layout when three staves were used. Under the circumstances it is not surprising that occasional inaccuracies, including the notorious final B-flat, escaped even his eagle eye. But perhaps the most significant emendations, especially
in the light of the discussion in the previous paragraph concerning the concept of formal mobility, relates to the directional arrows. Here, Boulez made numerous changes, which resulted in a much more flexible arrangement governing the choice of ordering of sections. Thus, whilst in Points 2, the proof is identical to the published score in this respect, the more flexible ordering available in Points 3 was a comparatively late addition. Here, the proof shows that, originally, group 6 was to be followed invariably by group 8. The addition of arrows at this stage allows the choice of interpolating group 7. A new arrow shape, , is invented, in order to link together groups 8, 9, and 10, whilst the possibility of returning to group 3 is closed by eliminating the arrow shape from groups 8 to 10. Thus the function of group 3 as a filter, restricting the available orders, is a comparatively late decision. A similar adjustment is made in Blocs I, where the pivotal role of group 7 is established by the addition of directional arrows at the end. The uncorrected proof shows little evidence of flexibility in the ordering of this section. The choice of following group 4 by any one of groups 5, 6 and 7 was already available, but not the sequences 5-7, 6-8, or 3-7. These options were all added to the proof by Boulez, as was the troping and interchanging of groups 8 and 12 in relation to the grouping 9-11. However, it is in the twenty groups comprising Blocs II that the most adjustment is made at this stage, starting with the additional arrows to permit the option of commencing with group 6. The possibility of troping group 3 between groups 1 and 2 is now made available, and the crucial arrows linking group 7 to either the "star" cluster (groups 8-12) or to group 13 are added in Boulez's hand to the proof. All the possible permutations within the "star" itself are defined at this stage, emphasising its pivotal role as a microcosm of the freely rotating form of the Sonata as a whole. Having made these adjustments, Boulez evidently considered the possibility of improving the clarity of his intentions by introducing different sizes of arrows. A note addressed to Haubenstock-
Ramati appears on the bottom of the first two sheets of the proof:

"Cher ami,

Tous les signes de Blocs et Points réciproquement en très gros caractères.
Les signes de parcours importants à l'intérieur d'une Partie importante des Points et de Blocs; en caractères moyens.
Le reste, de ligne à ligne, (petites parties), en petits caractères.
Je crayonnai sur la prochaine épreuve ces signes que j'ai beaucoup changés -
Si cela fini [?] faits / corrigez d'abord le texte;
ensuite envoyez-moi une épreuve, je mettrai tout à fait au propre ces signes de parcours - je crois que ce sera finalement plus simple.
Amicalement,
P.B." (2)

Within weeks of these corrections being received, along with Boulez's afterthoughts concerning the differentiation of arrows within sections, the proof was dispatched to Universal Edition's manufacturer, the Vienna Printing Company, on 4th October, 1961, with corrections marked on the laminated plate proofs. A second black and white proof was duly produced and sent to Boulez for inspection, and a further series of corrections are dated 24th March 1962. Already the process must have become frustrating in a number of ways. Even on textual issues, errors continued to delay the production. Boulez painstakingly listed corrections he had already marked on the first proof, principally with regard to the directional arrows: presumably the significance of these new notational symbols and the need for absolute precision simply escaped the understanding of the producers. Less easily accountable are the continuing inaccuracies in other areas. Thus at this stage, Boulez asked for the grid of tempo indications in Points 2 to be separated more from the directional arrows. His
written emendation, "Séparer celle indication de temps de celle de parcours", was duly interpreted as an instruction to the performer, and found its way into the engraved 1963 edition. Although many of the errors of pitch had been corrected in the second proof, small discrepancies continued to frustrate all his painstaking efforts. Thus in the final section of Blocs I (B12), an incorrect F-sharp is corrected by Boulez to D-sharp in the first proof, only for the engravers to fail to register the correction in the second proof. Boulez himself missed the discrepancy at this stage, and the error persisted through to publication (Ex. 8.1.x). Even more frustrating must have been the failure to notate accurately the repeated left hand chord somewhat earlier in the same section (Ex. 8.1.y). In both proofs, Boulez corrected C-sharp to C-natural in the second chord, so that it corresponded to the first chord. The response to this was to omit the C altogether from both chords in the final colour proof. Boulez spotted the error once more, and asked for the restoration of the C-natural in both chords. The printer's solution was to revert to the original error, adding C-natural to the first chord, and C-sharp to the second.

The timing of the production was now becoming urgent on another count: Universal Edition was to participate in an exhibition at Darmstadt, and was anxious to produce a copy of 'Miroir' for display purposes in the music sales room. An additional copy of the first correction was dispatched to Boulez on 23rd May 1962, with a covering letter from Alfred Schlee, the Director of the publishers: "As your manuscript is still with you for correction, we do not have a copy. Today I will send you an old proof which will serve no purpose except that one of your pupils can insert the colour groupings in coloured pen". A reply from Boulez a month or so later indicates that the proof with indications of coloration had been dispatched, and a letter from Schlee dated 30th July requests clarification regarding minor details concerning the typeface for indications of tempo and performance directions.
Boulez's reply, dated 23rd August, clarifies these matters, and includes a request to be sent eight copies of this stage of the proof, as various friends had expressed interest in the work. In the meantime, on 17th August, the corrected second proofs were dispatched to Ernst Friedrich of the printing department. The following month, a third stage of corrections was with Haubenstock-Ramati, and on 20th November, Schlee was able to write to Boulez informing him that 'Miroir' was ready to go to press, and that an introduction was needed, giving performance indications, including an explanation of the arrows. Further requests were made, detailed in memos dated 30th November, 28th December, and 16th January 1963: on both the latter occasions, Boulez evidently promised the information "morgen" (tomorrow).

The publication records show that the details were finally received by the manufacturer on 25th March, and it was immediately dispatched to the translator. The following month, the proofs were finally sent from Haubenstock-Ramati to Dr. Blaukopf, head of the production department for the final stage in the production process, and Schlee was able to inform Boulez in late June that the movement had been printed.

Already however, over a year earlier, Boulez had evidently been expressing concern regarding another question. What progress were Universal Edition making with his original design of producing both versions of the Formant, 'Constellation' and 'Constellation-Miroir' on reverse sides of the same sheets, as in his manuscript? A letter from Schlee, dated 15th May, 1962, is at the same time disarming and highly frustrating:

"Dear Friend,

I had forgotten to answer your questions on 'Constellation': we have not wished to tackle the engraving of this part of the Sonata before 'Miroir' is completed, and it is the case that we expected that in the course of corrections to 'Miroir', alterations would come to light which could be taken into account
in the new printing. In this way, we wanted to spare you the correction costs. In fact this has proved to be the case.

However, I must now ask you to mark in the new type of arrows (whose alteration in 'Miroir' have cause us so much trouble) in the engraving copy of 'Constellation' which you still have. As soon as 'Miroir' is corrected, it will be pressed. Because of the possibility of the pages sticking to one another, it is not possible to print 'Constellation' on the reverse side of 'Miroir', but both versions will appear without pressed reverse sides.

Warmest greetings,

Alfred Schlee"

This letter, together with the other circumstances surrounding the production of 'Miroir', provides clues as to the reasons for the failure to publish the other version of the Formant. Leaving aside the mounting costs of the production (the bill for the first stage of proofs alone amounted to the considerable sum of 13,446 shillings compared to amounts of S.182 and S.384 for the initial proofs of 'Trope'), there were the enormous practical problems associated with the publication, which must have taken up much time at a point in Boulez's career when both his teaching and conducting commitments were rapidly expanding. In addition, there is the issue of the format of publication. The final stages of colour proofs appear on pages which are glued into a continuous whole, following the format of the manuscript. However, the practicalities of printing dictated a different solution. Schlee is able to announce to Boulez in his letter of 24th June 1963:

"Dear Friend,

A few good pieces of news today.

'Constellation-Miroir is printed in its original form. We decided
after much experimenting to print the work in separate pages without a margin. The reason for this is that difficulties occur whatever type of join is used, which result in unsurmountable obstacles for the pianist. Separate pages can be placed next to one another so that at all times he has two pages in front of his eyes, just as you yourself do when you play the Sonata. The pages are printed loose so that anyone who does not wish to use a copy in performance will be able to obtain it in the form we originally envisaged from a bookbinder".

How Boulez reacted to this particular piece of "good news" is not recorded. However, as any pianist who has attempted to work from the printed score is aware, the format is a totally impractical one for performance purposes, and undermines Boulez's intention that the various available routes through the score could be freely chosen during performance. Nonetheless, despite all the problems associated with the production of 'Miroir', Universal Edition was evidently prepared to honour its agreement to print both versions of the Formant. A brief letter from Schlee to Boulez on 10th August 1963 makes the following reference: "As agreed, I am sending you the manuscript of 'Constellation' so that you can put in the arrows". This is consistent with the letter quoted above, of 15th May, 1962, that the printing of 'Constellation' would be facilitated after an accurate version of 'Miroir' had been produced. However there are no further records of production work on 'Constellation', so it must be assumed that the decision to abandon the project, at least for the present, rested with Boulez. He may well have decided at this point to delay publication until such time as the Formant could be reproduced in the form which he had originally envisaged.

If this is indeed the case, it again raises the issue of performer choice, and the extent
to which Boulez was committed to it as a structural principle. The changes and additions to
the directional arrows at proof stage support the theory that performer choice gradually
assumed an enhanced role in Boulez's concept of the structure of the Third Sonata, whilst at
the same time lending support to the seemingly contradictory view that he retained control
over all the most important compositional decisions. The greater range of permutations now
available gives the structure a more flexible shape on a local level without in any way
affecting its overall coherence. One might even argue that the lateness of these changes
reduces them to the status of an afterthought - that performer choice, whilst integral to the
conception, is the least important compositional element in 'Constellation'. On the other hand,
there is the viewpoint that, since Boulez himself gave the first performances, this was an
aspect of the score which did not need precisely detailed instructions in 1957-58; that, as with
ornamentation and cadenzas in eighteenth century music, such precision was only required
at the point when the composer himself ceased to become directly involved in performances.
Certainly by the time of the publication of 'Sonate, que me veux-tu?' in 1960, Boulez had
committed himself in print not only to the precise role of performer choice in the Third
Sonata, but even to the format of the printed score. It must have been doubly galling for him
to have his wishes thwarted on technical grounds by his publishers, and the effects of this
frustration may well have had far reaching consequences in other ways.

A surprising feature of the printing records in the archive of Universal Edition was the
existence of a sheet recording the various stages in the production of Formant 1, 'Antiphonie'.
The evidence at the Paul Saher Stiftung had indicated that sections of the movement had
indeed been sent to Vienna for printing, but only the brief extract, 'Sigle', had ever appeared,
and that as part of a separate anthology rather than as a continuation of the publication of
Formants 2 and 3. Yet the records indicated that as early as March 1960, i.e., towards the
end of the printing of 'Trope' but before that for 'Miroir' had begun, the first stages in the production of 'Antiphonie' were underway, with four sheets of proofs sent from Herr Friedrich of the printing department to Roman Haubenstock-Ramati for correction. Plate engravings were ready later the same year, and a separate entry on 15th October lists the amount of S.1968 as being the expenses of the Vienna Engraving Company for the production of four plates at S.492 per plate. Further correction of proofs followed over the next two years, overlapping the work on 'Miroir', and an entry on 15th November 1962 indicates that the proofs were with the manufacturer and were ready for printing.

The long-forgotten proofs of 'Antiphonie' were eventually located in the store of Universal Edition, and proved to consist of the version completed prior to 1960 of the five sections of 'Antiphonie I', and its varied counterpart, 'Antiphonie II', here described as 'Répons 1 and 2'. The sections are disposed on four large sheets of paper, precisely as described in 'Sonate, que me veux-tu?', although the article goes into more detail concerning the eventual format of the movement, which was to be published on cardboard strips, printed on both sides in order to facilitate the operation of performer choice. Again, Boulez has fixed in advance the details of the layout without anticipating any practical difficulties in the production process. The available proofs consist of two corrected copies, although the later one is marked as 'third correction', suggesting that there may have been an intervening stage. Corrections are in Haubenstock-Ramati's hand rather than Boulez's, but the final proof is commendably accurate, being virtually identical to the manuscript in the Paul Sacher Stiftung. The immediate question which arises is: why go to the considerable expense of producing these proofs if the project was to be aborted?

In between the first stages of the production of 'Antiphonie' in 1960, and the final correction of the proofs in 1962, Boulez's concept of the Formant had changed dramatically,
judging by the available evidence in Basel. We have observed a vast expansion in the design, with four projected 'Conduits' or 'Traits' now forming the central panels of the enlarged structure. Reexamination of the correspondence relating to 'Miroir' makes it is evident that Universal Edition were kept informed of a modification to the original plan. Thus in the same month that the original form of 'Antiphonie' was ready for printing, a memo from Schlee dated 30th November 1962 indicates that Boulez had promised to send not only the explanations for 'Miroir' mentioned above, but also "die fehlenden Stücke fur Formant I". These "missing pieces for Formant I" can only refer to the 'Trait Initial' and 'Premier Trait Médian', which are again mentioned in Schlee's increasingly agitated memos of 28th December and 16th January. Presumably the new sections for 'Antiphonie' were awaited by Universal Edition with as much anxiety as the explanations for 'Miroir', since the production of the first Formant had commenced a year before that for 'Miroir' and had already spanned a period in excess of two and a half years. Boulez was unable to keep his promise to complete the work prior to his departure for America, although, as we have seen, 'Trait Initial' at least was completed during the first part of 1963. The year was a significant one in Boulez's career, with the enormous challenge of his first major operatic conducting engagement, that of 'Wozzeck' at the Paris Opera, scheduled for November. The previous month, Boulez evidently met with Dr. Alfred Kalmus of UE, London, and two representatives of UE, Vienna, Haubenstock-Ramati and Herr Hartmann. The discussion, judging from Dr. Kalmus's notes of the meeting, dated 31st October, was evidently wide ranging, clarifying the structure of 'Pli Selon Pli', but also containing the following reference:

"Sonata III - First Part - Antiphonie

A definite date for the completion of this part of the work cannot yet be given.

However, with regard to the third part, 'Constellation', the composer will return
the proofs before the end of December”.

Proofs of 'Sigle' were made in due course, prior to its publication in 1968, but a note in the printing records dated 23rd March 1964 indicates that the remainder of the material relating to 'Antiphonie' was to be held in store for hire purposes. To all intents and purposes, at least as far as Boulez was concerned, the publication had been abandoned. Schlee, however, persisted: as late as 1971, in a letter dated 20th July, he perseveres in his enquiries concerning both 'Antiphonie' and 'Constellation':

"Dearest Friend,

It will be tiresome for you, but I must ask again why you do not write and send me the few bars missing in 'Antiphonie' of your Third Sonata. Equally, 'Constellation' with the directional signs supplied is still lacking. Putting them in is, however, a lot of work which you, presumably, will not be able to do in the near future. Do you think it possible that Tabachnik or another with sufficient information from you would be able to work out the arrows?"

The considerable interlude that had passed since the last available correspondence between Boulez and Universal Edition concerning the Third Sonata argues that other, verbal communications are likely to have taken place in the intervening period. The letter is very interesting in other respects. Clearly, Schlee had no inkling of the extent to which Boulez had modified the structure of 'Antiphonie': the "few bars missing" consist of four large sections, only one of which had been completed. Similarly, Schlee is under a misapprehension concerning the directional arrows in 'Constellation': whilst the order of the six sections is reversed in 'Miroir', it was never Boulez's intention that the retrograde should be applied within sections, as is conclusively demonstrated by the order of sketches. In fact, to have inserted the directional arrows in 'Constellation' would be a simple process of copying
from the existing score of 'Miroir', with small adjustments at the end of sections. Claude Helffer has recorded the 'Constellation' version, presumably with the composer's approval, and with the minimum of adjustment from the published score of 'Miroir'. One is forced to the conclusion on the available evidence that it was Boulez's decision to stall on the matter, and that he had lost interest in proceeding further with publication of the Third Sonata.

In seeking explanations for the change in Boulez's attitude, it is certainly the case that, since the publication of 'Miroir' in 1963, his international conducting career had expanded enormously, with his first appearances at Bayreuth in 1966, and culminating in his simultaneous tenure of the posts of Chief Conductor of the BBC Symphony Orchestra and the New York Philharmonic by 1971. Yet it would be facile to conclude that such new commitments were the prime reasons for the fate of the Third Sonata. An equally strong reason could well be the incapacity of Universal Edition to produce the work in the form he wished. This must have been particularly frustrating in the case of the two versions of 'Constellation', the format of which he had described precisely in 'Sonate, que me veux-tu?'.

As Boulez worked on the expanded version of 'Antiphonie' in 1963, he must have realised that the plan to produce both 'Trait initial' and 'Premier Trait Médian' on reverse sides of the same sheet could well run into the same difficulties as had the production of 'Constellation'. Such was the scale of the two 'Traits' that they could not possibly be contained on a single sheet of paper, in which case all the same excuses for the failure to produce both versions of 'Constellation' at the same time would be used again. The problem was even greater with regard to 'Antiphonie', since the design was entirely based on the principle of alternative versions of sections of different lengths, from the tiny 'Sigle' through to the enormous 'Traits'.

Clearly, there is no one explanation for the disruption of the planned publication of the Third Sonata, and the apparent abandonment of further work on the piece after the middle of 1963,
but all of these factors, combined with Boulez's increasingly ambivalent stance towards the
direction of contemporary music during the 1960s, must have played a part.

Although the unresolved issues relating to the Third Sonata resulted in his
abandonment of the piano as a solo instrument, Boulez continued to assign it an important
role in his later works. 'Eclat', his next major ensemble work, begins with a piano cadenza,
the style of which is remarkably similar to that of the 'antiphonies verticales' of 'Trait Initial'.
This is unsurprising, especially in view of its proximity of composition to the final stages of
work on the Third Sonata. The original version of Eclat was completed in 1965, but its
expansion, 'Eclats multiples', is still incomplete, despite the appearance of several extended
versions. Boulez's apparent intention is to conclude the work with a resolution of the
opening piano cadenza. This use of the instrument in a soloistic role is continued in 'Répons',
the principal achievement of his years at IRCAM. Mention was made in the chapter on
'Antiphonie' of the links, both structural and textural, between 'Répons' and the Third Sonata.
The additional dimension acquired by each of the six solo instruments in 'Répons', as a result
of their interaction with the 4X computer programme, transforms the piano into a vast
resonating chamber, which both recalls and transcends its treatment in 'Constellation'. Yet,
'Repons', like so many of the works succeeding the Third Sonata, is in an unresolved state of
continuing expansion. At last, in 1994, Boulez seemed to have returned to the piano as a solo
instrument, producing a short, three-minute piece entitled 'Incises'. The piece has recently
been issued on CD, but, in the meantime, Boulez has evidently had second thoughts. In April
1996, at a concert in Basel celebrating the ninetieth birthday of Paul Sacher, Boulez
conducted an ensemble version of 'Incises'. Now, the original piano solo version became a
cadenza prefaced by a short introduction, and was effectively concluded by a vigorous coda,
the whole piece lasting some ten minutes. Even this is apparently a provisional version, and the indications are that Boulez intends to develop the piece further. Perhaps the eventual result will be the major work for piano and ensemble, first projected in the mid 1950s, during the time that the Third Sonata was conceived.

Hence the pivotal role of the Third Sonata in any consideration of Boulez's subsequent development. The stylistic evolution of his music during the time of its composition resonates throughout his subsequent works, and the directions which it established remain a profound influence on his most recent music. Yet it would be foolish not to acknowledge that the gains, both in the comprehensive development of serial permutation and new principles of formal organisation, are offset by losses. The principle of formal mobility, explored for the first time in the Third Sonata, has influences both positive and negative on his later music. The loosening of structural bonds creates a series of unforeseen problems in terms of defining the boundaries of the piece. So many major projects remain in a state of seemingly permanent flux, and Boulez's oeuvre increasingly presents the commentator with the paradox that this most decisive of thinkers has produced a growing list of works which seem unlikely ever to resolve into a single definitive version. In a recent speech (3), Boulez acknowledged that, had he not spent time on conducting and other activities, he might well have composed more - although, characteristically, he added that a musical career must be seen as an entity rather than consisting of elements which can be evaluated independently. The question, in the light of the Third Sonata and of subsequent incomplete works, is not so much whether he would have composed more, but whether a greater concentration on composition would have resulted in the completion of some of the unfinished projects. The matter is speculative, but one is drawn to the conclusion that the lure of the open-plan work, with its allusions to
Boulez's literary heroes, Joyce and Mallarmé, has profoundly influenced his creative thinking in the aftermath of the Third Sonata. Perhaps the final words on this open question belong to Boulez himself, as he introduces in the article 'Sonate, que me veux-tu?' the new world of formal mobility to be explored in the Third Sonata:

"Pourquoi composer des oeuvres destinées à être renouvelées à chaque exécution? Parce qu'un déroulement fixé d'une manière définitive m'a paru ne plus coïncider exactement avec l'état actuel de la pensée musicale, avec l'évolution même de la technique musicale qui, à vrai dire, se tourne de plus en plus vers la recherche d'un univers relatif, vers une découverte permanente - comparable à une 'révolution permanente'" (4).
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(1) Nattiez, J-J, (ed.) 'The Boulez-Cage Correspondence' (1993), Cambridge, CUP, p.19
(2) "Dear Friend,
   All the signs joining Blocs and Points to each other in very large characters.
   The important directional arrows within an important section of Blocs and
   Points; in medium characters.
   The rest, from line to line, (small sections), in small characters.
   I will mark on the next proof these signs, which I have changed a great deal.
   If that is finished [?] / correct the text first;
   then send me a proof, I will make a fair copy, marking these directional
   arrows exactly - I think that this will be simpler in the long run.
   Sincerely
   P.B."
(3) Royal College of Music, London, 12.2.97.
(4) Boulez, P. ' Points de repère I: Imaginer', p.431
   "Why compose works that have to be recreated every time they are performed?
   Because definitive, once-and -for-all developments seem no longer appropriate
   to musical thought as it is today, or to the actual state that we have reached in
   the evolution of musical technique, which is increasingly concerned with the
   investigation of a relative world, a permanent 'discovering' rather like the state
   of 'permanent revolution". 
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