THE MUSICAL LANGUAGE

OF

EDGARD VARESE. 

(VOLUME ONE)

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THE MUSICAL LANGUAGE OF EDGARD VARÈSE.

This thesis examines the musical language of Edgard Varèse: how it was constructed, and how it evolved throughout his life. Varèse composed with sound. The "sound masses" which form his music are developed from a complex mixture of the basic elements of pitch, timbre, rhythm, texture, dynamics and articulation. This study analyses the relationship of these elements within the sound masses, and the way the sound masses interact to create the form of the works.

The first section of the thesis presents material to help contextualise the later analyses. The second section details the methodological approach with reference to a number of works taken from all periods of his life. This helps to explain the various analytical techniques, why they were considered suitable for Varèse's music, and how they can be combined to provide an overview of the musical structures within a work. In addition, evidence is provided of a number of changes in Varèse's approach to composition.

In the third section a comprehensive analysis of Déserts is undertaken. This work occupies a vital place in Varèse's musical output marking the end of a prolonged period of apparent musical silence and allowing Varèse to work with electronics for the first time. Déserts is considered to epitomise Varèse's musical language, and thus it provides the basis for a wide ranging discussion on the evolution of his musical language from Amériques to Nocturnal.

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PREFACE

When this thesis was conceived it was the intention that a purely theoretical approach to the analysis of Varèse's music would be adopted. As I researched the area more thoroughly, and as I grew more familiar with the music, it seemed to me that this approach was not really appropriate. Considerable time and energy was spent in developing a more "open ended"(1) and flexible approach which I consider to be better suited to the music. Although some of these issues will be discussed within the main body of the text, the background to this philosophical and methodological change is outlined below.

Varèse's music poses many problems when some of the established methods of atonal musical analysis are applied to it. By concentrating solely on "the notes" crucial aspects of the music can be ignored. For example, a technique of harmonic analysis is required that can differentiate between a five note chord spread over the interval of a fifth and the same notes spread over six octaves. Similarly, many established methods ignore rhythm, yet this element is crucial to the development of the music of Varèse.

I consider that many of these problems can be overcome through comparative analysis. By first examining the elements
individually, and then comparing the findings, an alternative analytical technique was developed that, I feel, covers all of the important aspects of the music. The way in which the elements are synthesised makes it natural to refer, where relevant, to other elements within the individual analyses. Thus, the techniques adopted may appear to examine the elements individually, but will in fact emphasise the "symbiotic" relationship between all of the elements in Varèse's music.

The musical language of Varèse changes throughout his life. In *Amériques* (1920-21) we are presented with a free musical structure incorporating late romantic ideas; by *Integrales* (1923-25) the synthesis of the elements within a concise yet flexible structure marks the mature musical language; in *Déserts* (1950-54) Varèse was finally able to fulfil many of his musical ideals, in particular the integration of electronic sounds; by *Nocturnal* (1961-65) the synthesis of the elements shows signs of disintegration, with the emphasis returning to the development of individual sonorities and increasingly spartan and barren textures. Thus, to examine Varèse's musical language over an extended period of time, as I propose, requires analytical techniques that are flexible enough to accommodate this change, and are able to evolve in parallel with the music.

Another problem that needed to be tackled was one of the terminology to be used. Too often problems have arisen when
theoreticians have attempted to mould Varèse's music into inappropriate formal structures. Thus when R.T.Beck describes *Ionisation* as being,

"A classical sonata movement, strictly organised." (2)

it is not clear what he means. The music is evidently not a "classical sonata", but there are two clearly defined "themes" and the music does appear to have various sections whose functions are similar to the exposition, development and recapitulation sections of sonata form. Similarly, P.Ramsier when discussing *Octandre* says,

"Each of the three movements of *Octandre* is cast in modified ternary form, and *Intégrales* bears comparison with works in sonata form in which the recapitulation has been omitted."(3)

Again, the reasoning behind these statements is understandable but the actual terminology could cause confusion. It is therefore important to reach a consensus regarding the interpretation of terms to be applied to the music of Varèse. A number of terms were explained by Varèse himself and others have been adopted from eminent authors on the subject. It is almost impossible, and probably undesirable, to eradicate all conventional terms and thus a detailed glossary has been included to prevent any possible confusion.

We know that Varèse was somewhat sceptical as to the merits of musical analysis, a sentiment reflected by Pierre Boulez,

"The wish to arrange everything in schools is proof of a shopkeeper's mentality."(4)
Although a comprehensive analysis of *Déserts* has been undertaken, I have been at pains to avoid a mechanical approach to this examination. On the other hand it should not be forgotten that much of musical analysis is subjective. I have therefore tried to bridge the gap between an objective approach and a subjective approach to musical analysis in developing a methodology suitable for the music of Varèse.

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PART ONE.

CONTEXTUALISATION.
CHAPTER ONE.

INTRODUCTION.

The purpose of this thesis is to evaluate the compositional techniques and processes employed in the construction of the music of Edgard Varèse and the manner in which his music evolved throughout his life.

The musical language of Varèse is complex. Throughout his life he was dedicated to pushing back the boundaries of music and challenging traditional ideals. This manifests itself in all aspects of his musical language; from the instruments employed to the emphasis he places on timbre, from the rhythmic complexity of the music to the generation of new forms.

My previous work on Intégrales (1) made me realise that music of such intricacy cannot be examined in a conventional manner. Many of the elements of the music are capable of generating form. In one passage rhythmic development may dominate, in another pitch or timbre. Thus, it is through the interaction of the various elements of the music that the form is created.

In developing a methodology through which to examine Varèse's musical language it seemed logical to use the ideas of the composer himself as a starting point. Throughout his life he
made frequent references that likened the construction of his
music to the process of crystallisation.

"I have never tried to fit my conceptions into any known
container. . . Conceiving musical form as a resultant, the
result of a process, I saw a close analogy in the
phenomenon of crystallization. . . . There is an idea, the
basis of an internal structure, expanded or split into
different shapes or groups of sound, constantly changing in
shape, direction, and speed, attracted and repulsed by
various forces. The form of the work is the consequence of
this interaction. Possible musical forms are limitless as
the exterior forms of crystals. . . . Form and content are
one."(2)

Therefore, if the "crystals" of his music can be identified this
should provide a key to the construction of the "sound shapes"
to which he refers. In addition, he says that it is the
interaction of these "sound shapes" that generates the form.

Musical analysis can be seen as,

". . . the breaking down of a whole into its constituent parts
and an assessment of these parts in relation to each other
and the whole. In music an analysis includes an
examination of the form created by the musical elements and
some conclusions about the principles underlying the
relationships of these elements." G.M.Roberts. (3)

Thus, any analysis of the music of Varèse should address two
fundamental questions. Firstly, how are "sound shapes"
generated, and secondly, how do "sound shapes" interact?

To examine the construction of Varèse's music through
traditional forms of analysis proves difficult. Linear
development is no longer generated through melodic or harmonic
expectation, rather, it develops from the interaction between
contrasting sound shapes. In general these sound masses (See
Glossary), as Varèse was to call them, are formed from the combination of a number of elements. Pitch, register and timbre tend to define the vertical structure of the music and rhythm, dynamics and articulation define the horizontal structure. Therefore, methods of analysis that are concerned with one element, at the expense of others, are likely to be unbalanced.

"We know that the isolation of a single musical factor necessarily leads to distortions and an overly simplified view of compositional process." R.P.Morgan. (4)

Similarly, some previous analyses have tried to examine the music within the context of traditional forms. These methods start with a known structure and then examine various types of development within that structure. This approach to the music of Varèse is inappropriate. Varèse has abandoned traditional concepts of form and structure. In his music the form results from the types of development employed and not vice versa. Therefore, to separate these two aspects would be unwise especially as Varèse sees "form and content as one"(5). This is not to say that his music does not have form. On the contrary, the form is very clearly defined in most of his works. What it does mean, however, is that to discuss form as being separate or predetermined would be unwise.

Varèse, through the destruction of his earlier works by his own hand and by fire (6), leaves only the music of the
mature composer for consideration. Detailed examination of all of the surviving works is beyond the scope of this thesis. I have therefore focussed examination of his musical language on a number of works, namely Amériques, Hyperprism, Intégrales, Ionisation, Density 21.5 and Nocturnal. In addition, I have chosen to undertake a comprehensive analysis of Déserts as in many ways this work can be seen to epitomise his musical language. (Reasons for this choice and support for this argument will be detailed later in Chapter 12.) This choice does not exclude consideration of the other works but was merely a way of providing a focus for the gradual transformation in the musical language that occurs throughout his life. (See also Appendix 1)

My research revealed that there were many problems to be faced when analysing Varèse's music. The music is extremely complicated so how does one start to "break down the whole into its constituent parts"? The principal aim was to ensure that any methodology developed was both rigorous and comprehensive. My earlier work on Intégrales had shown a number of motives and cells (harmonic, melodic and rhythmic) combine to generate the form of the work, and many of these were used at a number of levels within the composition. Similar motives and cells appear in many, if not all of his other compositions. This provided a basis from which to start.
However, I soon realised that my earlier analyses fell short of providing a complete picture of Varèse's musical language. Pitch, timbre, texture, dynamics and articulation had only been dealt with in a superficial manner and it became increasingly obvious that all of these elements were important in the structuring of Varèse's music. In particular timbre and pitch (whether precise or imprecise) have a vital role in outlining the structure of sound masses. Therefore, I have developed a technique of comparative analysis which enables all of these elements to be examined, both individually, and in the way in which they interact. (See Chapter 4)

Although I was satisfied with the analytical technique which had been developed, it still seemed that to try and discuss Varèse's musical language solely in terms of its elements could also bring the accusation of being an "overly simplified view". Therefore, factors such as the character and personality of Varèse, his background, the influences on him, and what it was that motivated him, will all be considered to help provide a more complete picture of the Varèsian musical language. For this reason the following two chapters have been included to help contextualise the findings contained later within this thesis.

Thus, in this study, I am attempting to answer the following questions. Firstly, how is the music of Varèse constructed?
If much of his music breaks down to the same, or similar components, how is it that so many different works emerged containing such a variety of sound? Secondly, how does his musical language evolve? It seems apparent that Varèse's musical language changed throughout his life, so how does the musical language of the nineteen-twenties compare with that of the nineteen-sixties? Or, what are the thought processes behind the change from the "thematicism" of Amériques to the "athematicism" of Deserts (7) and what is it that makes both works still distinctly Varèsian?
CHAPTER TWO.

EDGARD VARÈSE: THE MAN.

Introduction.

The musical language of Edgard Varèse developed from a variety of contrasting sources; his early life, his education, the composers and artists with whom he had contact, his move to the "new world", the constant search for new sounds and the rejection of established techniques. The manner in which Varèse eclectically drew upon these sources changed throughout his life, and hence the need for an introduction to the more important of these sources before examining his musical language in more depth. If we can come to some understanding of the personality of the man, through an examination of some of the incidents that shaped his life, this should help to reveal some of the processes involved in the creation of his music.

It would be unreasonable to assume that anyone, outside his immediate circle of friends, could claim to fully understand Varèse the man. However, it is possible to come to an understanding of his music through an examination of its elements, the way in which they combine and interact, and the forces which shaped Varèse's musical ideology.

Many previous authors have detailed the events of Varèse's life, but in addition a number of them have given an insight
into his personality. This, I consider to be important factor in contextualising his musical language. Thus, to consider the music without some consideration of the man would be unwise. A point noted by Ouellette who stated,

"His works came from his fullness, from the wonder of his own uniqueness, but Varese cannot be reduced to (just) his own works." (1)

An examination of the music in isolation is therefore insufficient to reveal the genius of a man who produced,

"with so cool a concept of artistic creation, music of such warm sonorous interest and such urgent continuity."(2)

which led Virgil Thompson to conclude that Edgard Varèse was,

"the most original composer of the past half century and one of the most communicative." (3)

In order to effect this contextualisation I shall examine three main areas. Firstly, the principal events in his life, secondly, the key traits within his personality, and thirdly, the many and varied influences on Varèse. In combination these three areas should provide a complete picture of Varèse, the man.

The Life of Edgard Varèse.

I do not propose to enter into a detailed account of Varèse's life. Excellent biographies by his widow Louise Varèse and by his close friend Ferdinand Ouellette have already been produced which fully cover this area. However a certain degree
of knowledge of the events of Varèse's life serves to enhance an understanding of some of the motive forces that lie behind his music, and hence is applicable here.

His personality was shaped by the events of his life; his depressive states; his temper; his hatred of his father; his inability to get on with anyone in a position of authority over him; and all of these factors have their origins in the events of his life, and in particular of his childhood. (These will be examined later in more detail.)

Edgard Varèse was born in Paris in December 1883 and spent the first ten years of his life either in Paris or with relatives in Burgundy. He was the eldest of five children, having two brothers and two sisters, but, for reasons that have not been explained, the majority of his early years were spent in the care of his maternal grandfather and away from the rest of the family. In 1893 the family moved to Turin, and the young Varèse went with them. It is from this point that the conflict between the ardently musical Edgard and his father seems to have arisen. Henri Varèse was determined to school his son towards a business career yet Edgard had already started composing and had secretly enrolled for lessons with Bolzoni at the Turin Conservatoire. The bitterness that grew between father and son is perhaps best reflected in the fact that the piano at their Turin home was locked once Edgard's interest in music became too
"There could never be any question of musical studies for his businessman son." (4) Through Bolzoni Edgard came into contact with the opera house. He later played percussion in the pit and even took some rehearsals as a teenager when the resident conductor became ill. His precise knowledge of the percussion section, the variety of instruments and their capabilities was hence activated in Turin in the orchestral pit.

In 1900 Edgard visited Paris with his grandfather—"for the "Exposition Universelle" and this appears formative in introducing the impressionable young composer to new ideas and instruments. Shortly after his return to Turin his mother died, and the conflict with his father grew in ferocity. On her deathbed his mother had accused Henri of being a murderer, certainly he had been brutal with his wife, and thus his mother's last request was that Edgard protect his younger brothers and sisters from their father. When Henri first started to brutalise his second wife Edgard reacted violently and this led to the permanent split between the two.

After this episode Edgard moved to Paris and entered the Schola Cantorum where his teachers included Roussel and Vincent d'Indy. But Varèse was unable to cope with the rigid methods of d'Indy and soon left to enrol with Widor at the Conservatoire. It is possible that d'Indy was too paternal towards Varèse and in the light of his relationship with his father another split
was bound to ensue. He was to leave the Conservatoire early as well, being "kicked out" by Fauré. However, during his time there he met, and married, his first wife an aspiring actress called Suzanne Bing. They married in 1907 and in 1910 had a daughter named Claude after his grandfather. Ironically almost at the exact time his daughter was born and his labours on the score of Bourgogne were completed, (both meant to honour his grandfather) his beloved Claude Cortot died. This was a crushing blow for Varese, and his second wife Louise later revealed that he had suffered a nervous breakdown at the time.

It was during these years in Paris that Varese became friendly with many artists, poets and musicians. The artistic life in Paris must have been extraordinary at the time. Varese established a long and lasting friendship with Debussy, and was indebted to many friends, sponsors and anonymous donors for his financial survival during this period, and the following years based in Berlin.

In 1907 Varese moved to Berlin and became acquainted with Busoni, whose "Sketch of a New Esthetic of Music" he was later to describe as,

"another milestone in my musical development." (5)

Through his meetings with Busoni and Strauss, who assisted in getting his early work Bourgogne (1908) performed, and visits to Paris to see Debussy, Varese gained the confidence to go on with his ideas and his composition. Varese often moved between
Paris and Berlin during these years, he had a variety of conducting jobs but was still committed to composition above all else. A rift grew between Varèse and his wife Suzanne, who evidently wished to pursue her own career and felt she could not do so whilst based in Berlin. The marriage ended amicably a short while later and Suzanne left with the baby Claude. (The divorce was not finalised until some years later when Varese wished to remarry.)

In 1913 Varèse returned to Paris (leaving his manuscripts in storage in Berlin) and rapidly gained a reputation as a conductor. In December 1915, being unable to secure a permanent post, he decided to leave to temporarily try his hand in America.

On arriving in New York he soon established himself as a leading conductor of contemporary music. He made a major impact by managing to establish a third resident symphony orchestra specifically designed to promoting "new" music. Although the New Symphony Orchestra failed after a single concert Varèse was not deterred, and transferred his efforts to an organisation called the International Composers Guild which he founded in 1922 with Carlos Salzedo. Through this medium Varèse was able to perform most of his own works written since his arrival in America. The reactions he received were somewhat mixed. However, the critics were, on the whole, unwilling to reject Varèse out of hand, and thus Varèse quickly established himself
at the centre of the avant garde in American culture.

In 1917 Varèse had met Louise Norton. The attraction was not immediate but they married shortly after, and the relationship with Louise became the stabilising effect in his life and, in some ways, it filled the gap left by the death of his grandfather.

"The most touching compliment Varès had ever to make to his wife, Louise, was to confess that the two beings he loved the most were his grandfather Claude and herself." (6)

In 1922 Varèse was to learn of the disastrous destruction of all of his stored music in Berlin. This must have been a crushing blow, cutting him off in an instant from practically all of his work written before his trip to America. He was now only left with Amériques and Offrandes, composed since his arrival, a score of Bourgogne and Un grand sommeil noir.(7) Rather than stopping him from composing the effect of this blow was to spark off a new period of creativity with Hyperprism, Octandre, Integrales and Arcana all following in quick succession. Of these works Hyperprism was perhaps the most significant, not only for the reaction it caused at its first performance but also in that it attracted Kenneth Curwen who offered to publish his scores.

Towards the end of 1927 the International Composers Guild was dissolved and for reasons of health Varèse returned to Paris. Here he became increasingly interested in electronic instruments and was to start many adventurous projects destined never to come to fruition. L'astronome, Espace and Metal were all
conceived during this period and all were unfinished because of Varèse's failure to achieve his musical ideals, the lack of new instruments available to him, and the impracticality of staging and presenting the works as initially conceived. Work on Espace continued after Varèse returned to America yet he must have realised that a composition on such a vast scale would never become a reality as it required, in its ideal state, simultaneous broadcasts by performers all over the globe. (The problems surrounding Espace, and the background to Déserts will be discussed at length in Chapter Thirteen.)

During this period Varèse produced Ionisation and Ecuatorial and in these works we see the realisation, at a practical level, of some of his aims at that time. In Ionisation Varèse takes conventional instrumentation to the limits of its development, and during the gap before the appearance of Ecuatorial it is clear that Varèse was desperately searching for new sound sources. He tried to persuade the Bell Telephone Company and the Guggenheim Foundation to look into electrical instrument research, but his only real success was in the use of the recently developed Ondes Teremine in Ecuatorial.

In 1933 Varèse left Paris to return to America but the inability to obtain funding to develop his ideas, combined with the impracticality of the project on which he was still employed (Espace), led to a depressive state that was to stay with him until the early fifties. In 1936 Varèse had composed Density
21.5 for Barrère's platignum flute but this was to be his last complete and published work for nearly twenty years.

During this period, which F. Ouglette describes as "the abyss" (8), Espace was in a constant state of flux but only the brief Etude for Espace was ever finished, and this remains unpublished as the composer was not satisfied with the work. During this time he dedicated himself to teaching and conducting. He formed the Greater New York Chorus, specialising in the performance of Renaissance and Baroque music, and lectured in composition and twentieth century music at Columbia University and other institutions.

In 1950 Varese started work on Déserts but it was only in 1953, following the anonymous donation of an early tape recorder, that he was able to start to realise some of his dreams of the previous years. He worked on collecting various mechanical, industrial and musical sounds, and in 1954 was invited to complete his work on the sections of organised sound at the Radio Télévision Francaise research centre in Le Havre. The offer was gratefully received and in the same year the first performance of Déserts was broadcast, played by the RTF orchestra.

More work on organised sound was to follow, a piece entitled La Procession de Vergès was prepared for the film Around and about Joan Miro and through this Varese was able to perfect his technique for dealing with taped music. Consequently in 1957 he
started work on his most ambitious project to be completed, the purely electronic Poème Électronique. This was written for Le Corbusier's Philips Pavilion, constructed in Brussels for the Exposition of 1958, and Varèse made full use of the resources and architecture at his disposal. The sound was projected from one hundred and fifty loud speakers placed all over the pavilion creating complex sound patterns and surrounding the listener with the music. The reaction was generally favourable, although some critics made sure they never actually referred to the work as "music". Nevertheless, through this work, Varèse had finally attained the ideal stated in 1925 when talking about his earlier composition Intégrales.

"Intégrales was conceived for spacial projection. I constructed the work to employ certain acoustical means which did not yet exist, but which I knew would be realised, and used, sooner or later." (9)

In Poème Électronique this had been achieved, leading one critic to write,

"Here, one no longer hears the sounds, one finds oneself literally in the heart of the sound source. One does not listen to the sound, one lives it." (10)

Through Poème Électronique Varèse appears to have reached the peak of his development with organised sound (bearing in mind the equipment available to him at the time). It is probably for this reason that he was to return to orchestral writing in the last few years of his life.

In the sixties Varèse finally achieved international
recognition. He was honoured by the National Institute of Arts and the Royal Swedish Academy, accepting honours which he had previously despised. Pierre Boulez and Robert Craft both made recordings of his music and his scores were reprinted. He spent much time revising and altering scores and reworking the taped sections of Déserts, but the only new work to appear at this time was Nocturnal. This was only one of many projects under consideration at the time whose theme was night and death. Despite being incomplete Nocturnal was performed at a concert staged in his honour in 1961, but at the time of his death in 1965 it still remained unfinished. The work was subsequently completed by his pupil Chou Wen Chung. Quite why Varèse became so obsessed with such morbid subject matter at a time when he was finally attaining the recognition he deserved is not clear. Perhaps his deteriorating health had made him aware of his own mortality. Certainly, he made his attitude towards death very clear,

"I loathe death, I hate it. As soon as one ceases to struggle one dies." (11)

Perhaps the recognition he was at last receiving had stopped him from struggling so vehemently. Whatever the reason the effect of eighty years of fighting had finally taken its toll.

"The man who had been born to transform the universe of music fell victim to the time he had defied. Yet the Varèsian universe has the everlastingness of humanity on its side, the infinite progress of culture and the spirit of humanity. Varèse is still going forward." F. Ouimet. (12)
The Personality of Edgard Varèse.

The personality of Varèse is reflected in his musical language. This is particularly evident in Déserts but was commented on as early as 1910 with regards to Bourgogne.

"In effect, Bourgogne did without doubt already reflect Varèse's own personality, even though his technique and musical mastery were to evolve profoundly later on." (13)

The various aspects his personality are evident in his music: intense highs and lows of emotion; aggression; anger; uncontrollable temper; refusal to accept authority or control. Thus, his life was a constant battle between the creative and the destructive forces contained within him.

I do not pretend to have any detailed knowledge of Varèse's personality, the following observations are taken from comments made by his wife and friends. Therefore, I have chosen to include many of these observations in full rather than attempting to paraphrase them. However, what is evident is that had it not have been for the steadying influence of his grandfather, his second wife Louise, and the support of many friends, Varèse might not have lived anything like as full a life as he did.

Depression.

Varèse's personality was characterised by intense emotional highs and lows. Periods of extreme elation were often followed
by periods of intense depression, and often the two states followed in quick succession. (These are classic symptoms of manic depression which might account for the prolonged silence in the 1930's and 1940's.) His second wife Louise describes one such occasion,

"As we paused on the bridge to look down at the harbor traffic, back at the misty towers of New York, Varèse's mood suddenly became one of intense exhilaration, which, as usual, at such times by some psychic osmosis passed to me; I felt a euphoria as enveloping as champagne but with clearer focus, which was Varèse's ebullient talking....... Varèse's spurt of euphoric improvements did not last. By August he was so depressed that he was in a perpetual rage. His depressions were never brooding or sullen. They were fierce and furiously resentful." (14)

Varèse attributed these depressions to his upbringing, and he was known to suffer from them throughout his life. Whatever the cause, we know he required considerable medical attention for various nervous disorders. He also suffered at least one "breakdown" following the death of his beloved grandfather and prolonged periods of nervous disorder during the time Ouèlette describes as the "abyss".

It is also possible that, had it not have been for these periods of intense depression, a good deal more of Varèse's music may have survived. Ouèlette commented with regards to Bourgogne that,

"Varèse himself did not consider the work sufficiently expressive of his personality, since he destroyed his manuscript score of it in about 1962." (15)
and his wife Louise reinforces this opinion when discussing the destruction of Bourgogne,

"As this infanticide occurred on a sleepless night during one of his prolonged depressions, I cannot help wondering if, at more objective moments, he did not have regrets - like the rest of us." (16)

Ill-health.

Varèse battled against poor physical health throughout his life and was plagued by persistent respiratory problems. He believed his ill-health also originated from his childhood, and this reinforced the anger felt towards his father who had caused him to have such an unsettled and unhappy time.

During the First World War his request to be a translator, due to his expertise in German, was rejected. He became, as he described, a "heroic bicyclist" taking messages to the front. He hated his military career, primarily because of the boredom, and so applied for active service. However, he failed the medical with double pneumonia and was invalided out of the army. He therefore had considerable medical problems at this time even although he was still in his late twenties.

When in America he even resorted on a number of occasions to return to Europe in an attempt to get well, both on his own and with his wife Louise. She describes in detail the numerous injections he had to take, and the operations he underwent. On
one of these trips that he made alone he wrote to his wife,

"Saw Flandarin and Prof. Fisch - I am very ill again and full of pus... The Drs. tell me my nervous system is completely undermined by this chronic infection which dates from childhood - but I'll get well and merde for wine etc."(17)

Although Varèse recognised that his problems were both mental and physical he always tried to ignore the former and blame his condition on the latter. The following comment also written to his wife reveals this confusion.

"I've decided to get well once and for all... I'm glad it's only physical, not mental. Merde for the Freuds." (18)

Yet it must have been obvious to those who knew him that, even at this time, his problems arose from both factors. He wrote on a number of occasions of the elation he felt over the progress he was making on Arcanes, later to become Arcana.

"I'm going to be cured - and above all my poor head - it's already better. I am gay - Arcanes is singing. It will be for you - I am going to work and do my best so you will be pleased with Arcanes." (19)

But when the treatment failed to result in the rapid cure he had hoped for he once again became depressed. Louise states that,

"On October 29 he wrote that he had destroyed all that he had written and was beginning all over again." (20)

This combination of physical ill-health and mental depression was to re-occur throughout his life. The variety of projects under consideration during his final years, particularly Nuit and the incomplete Nocturnal, testify that this struggle continued right until his death.
"As he continued to struggle with these two works, he had the sort of intuition that he would not have the physical strength or the time to complete them as he would have wished. His determination to go on, the tension he was creating inside himself, were perhaps daily diminishing his capacity for work. Hence the attacks of discouragement... the periods of depression." (21)

Thus, throughout his life his physical and mental health were intrinsically linked, and both affected the act of musical creation. Both his physical illnesses and his depressions go far beyond what be might be considered "normal". F. Ouellette illustrates this when discussing the despair Varèse felt whilst working on Espace arising from his inability to realise his acoustical dreams as the instruments simply did not exist.

"The dialectic between aspiration and means was all the more terrible in that it was experienced by a creator of the utmost power and lasted for so long. That is why this inward rift was to manifest itself in a physical illness, and above all in the temptation to kill himself, in a veritable obsession with suicide as the struggle reached its peak of intensity." (22)

Temper.

Closely allied to his depressions were his violent bursts of temper, which he fought to try and control throughout his life. Once again his wife Louise describes a momentary loss of control.

"He was deeply troubled by an ugly element in his nature that he had inherited, he believed, from the "Varèse" tribe. It was more than a violent temper. There were moments when, for apparently no reason, he would be seized by cold fury, a blind brutal hate." (23)
At times this temper spilled over into his professional and musical career. On some occasions his loss of temper was not simply a momentary loss of control but turned into an anger and hatred which persisted for years to come. When Furtwängler, a close friend, had his contract with the New York Philharmonic Orchestra dropped in favour of Toscanini Furtwängler was bitter and,

"Varèse had the pleasure of joining him in flaying Toscanini alive, blood dripping from every word." (24)

When the two met during the intermission of a concert of the International Composers' Guild the result was "spectacular".

"Like Varèse, Toscanini was notorious for his uncontrollable temper, and when he shouted at Varèse that it was a disgrace to make people listen to the kind of music he not only sponsored but wrote, Varèse met him temper for temper, insult for insult. It was quite a spectacle. From then on, the slightest mention of Toscanini was like the muleta to a bull." (25)

**Hatred of his Father.**

Varèse's hatred for his father was perhaps the most powerful of all the forces contained within the Varèsian personality. His early childhood was governed by his maternal grandfather but he had to return to his family, and Paris, to go to school.

"Far from being afraid of his brutal father, who indulged in corporal punishment for the slightest fault, Varèse soon began to hate him with a bitter hate that never abated until the end of his life." (26)

It was important that he had the controlling, and calming influence of his grandfather for as Ouellette commented Varèse
had to overcome, or at least control, this burning hatred.

"The tenderness he felt for his grandfather and his all-devouring passion for music no doubt saved him from the total hatred and revolt that would have made all creation impossible. For total hatred can engender nothing it can only destroy." (27)

Years of bitterness and aggression finally came to a head in 1900 when Varèse was only 17. Following the death of his mother Varèse's father had quickly remarried. Although there was no particular bond between them Varèse recognised that his stepmother was good for his younger brothers and sisters. It seems that his father soon resorted to his violent ways, the explosion was immediate.

"One day Varèse saw his father raise his hand to strike his wife, and in a burst of rage Varèse attacked him. Turning the tables at last, he beat his father instead of being beaten by him." (28)

Varèse left home immediately, severing his ties with his family with the exception of his grandfather. He did not even see his brothers or sisters for another fourteen years, and thus lived throughout his formative years with no parental or family ties other than those with the Cortot side of the family.

Although there were a number of attempts to restore relations made by his father through his grandfather, Varèse always rejected them out of hand. Rather than time healing the wound it seemed to deepen the gulf between the two men. Both Louise Varèse and F. Ouellette comment that on a number of occasions Varèse was heard to say,
"I should have killed the bastard."(29)

However the effect of this hatred had both positive and negative effects on Varèse's personality, and consequently his music. The destructive side manifested itself in his violent temper. Louise describes an occasion where they argued,

"A complete change of personality occurred in an instant. What he said I hardly took in, but the brutality with which he spoke, the cruelty and coldness of his look horrified me as it astounded me. All I could think was "This is what your father must have been like".... I said aloud, "You are just like your father" before bursting into tears, and rushing out of the room." (30)

But Ouqlette notes the fundamental effect this relationship, or rather lack of it, had upon his music,

"How deep that hatred must have gone! This aggression manifests itself, it seems to me, even in Varèse's way of shattering or attacking a sound, a chord, in his works. Needless to say, without the hatred, burning like a bed of coals under all his acts, he would not have composed the works we know today." (31)

Aggression.

Varèse was always aggressive, even as a boy he fought regularly at school. It was probable that the young Varèse was subject to much teasing and bullying. Being frequently moved around by his father could not have helped, and in addition there were the language problems faced by living alternately in Italy and France. However, far from being upset by the fighting he actually seemed to relish it.

"What I really liked when I was a boy was street fighting."
If a brute of a boy, even much bigger than I was, teased me or in any way roused my awful temper, I would go for him with all my comparatively puny might and when I got home, bloody and with my clothes torn I'd get another beating." (32)

Thankfully, in later life he managed to channel this aggression away from physical violence. Indeed it seems that the fight with his father was probably the last time he resorted to physical violence of any type, although the threat was ever present. It is this pent up aggression which reveals itself throughout his music. The controlled violence, the controlled anger all stems from this aspect of his personality.

Rejection of Authority.

The hatred he felt for his father was to effect many other relationships, in particular when an older male was in a position of authority over him. His clashes with d'Indy, Rodin and Fauré, to name but a few, were all doomed to end in animosity following initial periods of friendship or admiration.

"D'Indy wanted us all to become little d'Indys and I thought one was enough." (33)

"Varèse had begun to feel resentment at Rodin's rather magisterial ways. So it was almost inevitable that such a godlike figure who also acted the part would irritate a youth who had run away from a father who had been the jealous god of his childhood. One day his rancour, exacerbated by disagreement on the fatal subject of music, led to a fatal quarrel." (34)

"The immediate cause for leaving (the Conservatoire) was a rather nasty exchange of unpleasanties with Fauré, who, as administrator of the Conservatoire, kicked me out." (35)
However his leaving of the Conservatoire was probably a good thing as there had never been any suggestion that his musical ideas were acceptable, or would be encouraged. In view of the close friendship that he struck with Debussy it is interesting that Debussy had previously written.

"One should leave the Conservatoire as soon as possible to look for and discover one's own personality." (36)

Relationships.

Although there are many examples of disastrous relationships with "father figures", this over-riding influence did not stop him from establishing firm friendships with a number of older, and influential, males. The success of these relationships stem from the fact that, almost without exception, he admired the work of these people. He saw in them a kindred spirit, and was quickly accepted by them as an equal. The relationships with Debussy, Hoffmansthal, Muck and Busoni clearly illustrate this. His affection for Busoni even extended to Varèse organising a trip to Europe specifically to see him when he was critically ill in 1924. Thus, Varèse was able to establish friendships with musicians whom he admired or respected but his rejection of others stemmed from the autocratic nature of his musical opinions and his inability to "suffer fools gladly". This probably accounts for the fact that he was more likely to list painters and poets amongst his friends than musicians.
His relationships with women were rather more friendly. In his youth he was apparently a strikingly handsome man. He met his first wife, the actress Suzanne Bing, whilst studying at the Conservatoire.

"That winter Varèse lived alone in his refrigerator of a room, and it was Suzanne who, the following spring, came to share it with him." (37)

They were married in the following autumn of 1907. Although they were later to divorce, the relationship with Suzanne remained amicable, and he gained considerable pleasure from his daughter Claude (named in honour of his Grandfather) who maintained contact despite the separation.

The relationship with his second wife Louise was long and enduring. There is evidence of some turbulence at the start but in general it seems that they were extremely close.

"Louise was to be not only a wife to Varèse but a collaborator and a support as well. She believed in Varèse, in his ideas, in his art, always." (38)

The major quarrel they had shortly after their first meeting had an enduring effect, and on Louise in particular.

"Varèse being occupied with multitudinous activities - organisational, musical, and time-consumingly social - he had much less time for me. Consequently, I saw more of other friends. Varèse objected to some of them and in general objected to our dancing, drinking habits; I objected to and resented his assumption that he had the right to dictate to me. So we quarrelled.... I lost my temper, he lost his temper and we parted forever. That eternity lasted until early in the following March." (39)

She recognised that Varèse was not a saint with regards to other women, but after this initial clash they obviously managed
to reach an understanding, as jealousy does not figure elsewhere in Varèse's personality.

"It is true that Varèse had a way with girls, and girls with Varèse. Luckily for both of us, I did not mind Varèse's gallantries and occasional inconstancies, his urge for erotic variety not being alien to my nature either." (40)

Autocratic.

Given Varèse's inability to get on with anyone in a position of authority over him it is ironic that he was often equally domineering and autocratic, especially with regards to anything musical. An early example of this is quoted by Ouellette regarding a visit to Busoni in Berlin.

"One day, when Varèse was showing him his score, les Cycles du Nord, or perhaps Ædipus und die Sphinx, Busoni has several observations to make. At several points he advised certain modifications, then asked if Varèse agreed. "No, Maestro!" the latter replied; and gave his reasons. Whereupon Busoni came with: "From this moment on, I want to hear no more of maestro - only Ferruccio and tu.""(41)

Although in this instance this aspect of his personality worked in his favour there are a number of instances in his later life where his stubborness to receive others' views resulted in the loss of friends or in the destruction of organisations he had been instrumental in establishing. The New Symphony Orchestra and the International Composers Guild both suffered from this, and it appears the word "compromise" was not common in Varèse's vocabulary.

A battle within the International Composers Guild with one of
the executive directors illustrates this point. Varèse fell out with Mrs Reis (who evidently worked wonders with regards to fund raising) and following considerable legal battles Varèse won the argument. The result was that Mrs Reis and her followers left the organisation. It is ironic that the ICG folded a few years later for lack of funds. Mrs Reis commented,

"As the executive director I tried to remain on the sidelines. I saw, however, the point had been reached where what was regarded as Varèse's domination of the Guild was no longer acceptable to some of his colleagues. I did think that because he was European and rather new as a leader among colleagues of equal artistic and intellectual stature, his attitude might stem from a misunderstanding of the democratic method expected of the chairman of an organisation in this country." (42)

and this is reinforced by Louise Varèse.

"This of course was the kind of democratic cant Varèse (he would have used a different four letter word) could not stomach. Mrs Reis was quite right; Varèse, though as democratic as it is possible to be in his human relations, was an autocrat in all musical matters." (43)

Impulsive/Impetuous.

Another aspect of his character was his impetuosity and impulsiveness. Whilst these can be endearing traits, Louise comments that sometimes these factors caused Varèse problems. He almost lost his first major conducting role in America due to his over-eagerness which put off the backers of the venture, and on a number of occasions he was forced, reluctantly, to re-assess an initial opinion of a person made in haste. The most obvious example of this being with Carlos Salzedo, whom he dismissed as,
"That little harpist - he doesn't interest me." (44) Although he was later to strike up a firm friendship which resulted in the creation of the International Composers' Guild.

All of these traits within his personality should not be seen as factors which only featured in his personal life. Many of them directly effected his ability to compose, and others manifest themselves throughout his music and are a dominant part of his musical language. Varèse's music reflects his personality and his life, it is controlled aggression and conflict. This is evident itself in the way the sound masses are constructed and interact, and perhaps *Déserts*, of all the works, represents this most clearly.

"To recognise the unique value of a man and an artist, most people wait for the perspective of distance and time. But those friends of Edgard Varèse who were aware of how strikingly the personality of the man and his music matched each other, had a more immediate clue to his true stature and unique place in the history of music." Anaïs Nin. (45)

The picture of Varèse's personality painted above seems almost totally gloomy and negative. It is important to remember that the power and forcefulness of his personality which comes over in his compositions resulted from his conquering, or at least controlling, these negative aspects, his "Varèse devil" (46). It should not be forgotten that Varèse certainly knew how to enjoy himself. He had huge circles of friends and acquaintances, and there are many descriptions of idyllic and
happy times throughout his life and particularly with regards to his childhood with his grandfather. His pupil and friend in the latter years of his life, Chou Wen-Chung, was obviously familiar with this side of his personality referring to him as the "man full of sun"(47).

Thus, at all times, the emotional highs and lows in his life are reflected in his music and it is for this reason that it is important to view the musical language of Varèse in context, and not as an abstract statement.

Influences on the Music of Varèse.

The influences on the music of Varèse were many and varied. Some influences had their roots in the past, arising through his education, upbringing and general cultural and aesthetic background. Other influences were more contemporary, arising from composers whose work he admired, the new aesthetic trends that were prevalent at the time, and maybe even the various forms of criticism he was subjected to, whether professional or not.

Although it is necessary to examine the most important of these influences, it should not be forgotten that by the time of Amériques Varèse's music had already developed its own unique style. This is to be expected as for various reasons the earlier works were destroyed. (The only surviving work from
the early period is *Un grand sommeil noir* which shows considerable evidence of plagiarism of Debussy's music.)

Any evolving musical language, such as Varèse's, will progress beyond direct influences to a stage where these factors are absorbed into the psyche of the composer and will only indirectly manifest themselves in the various compositions. Although this state may not have been fully achieved in *Amériques* or *Offrandes* it certainly seems to have been the case by the time of *Hyperprism*, *Octandre* and *Intégrales*.

"It would be futile to seek for any influence from the past in *Hyperprism*. In this work Varèse is like no one but Varèse." (48)

The major influences on Varèse must have been the background of his musical education and the spheres in which he moved whilst residing in Europe. Although his music may initially appear to be divorced from all that had gone before we should remember that in *Amériques* we are immediately presented with the music of a mature composer; at this time Varèse was already in his late thirties. Through the tragic burning of his stored scores in Berlin (during his first trip to America) and the later destruction by his own hand of the few surviving works from his early period, he apparently severed his ties with European musical tradition. The only exception to this was *Un grand sommeil noir* and D.H. Cox comments that,

"He destroyed *Un grand sommeil noir* by never pointing out its existence." (49)
By doing this Varèse created an enigmatic aura which was to surround him until his death.

"By refusing to accept any given doctrines, Varèse has been forced to create his own highly individual language from the stuff of his personal and extremely rigorous imaginative experience. Here there is never any suspicion of composition from memory." R.Henderson. (50)

Yet it is clear that his music does owe a considerable amount to the European musical tradition, a point he was to acknowledge many times throughout his life.

"My fight for the liberation of sound and for my right to make music with any sound and all sounds has sometimes been construed as a desire to disparage and even discard the past. But this is where my roots are. No matter how original, how different a composer may seem, he has only grafted a little bit of himself onto an old plant...... Many of the old masters are my intimate friends ...... all are respected colleagues. None of them are saints, and the rules they made for themselves are not sacrosanct and everlasting laws." (51)

**Historical Influences on the Music of Varèse.**

It is known that the music of the medieval period interested Varèse, in particular during his early period. Varèse's music of this time has been noted for its "quasi organum lines" (52) and a number of people commented that the influence of medieval music could be clearly heard in his early works. Of course, we have to accept the accuracy of these interpretations as practically all of the music from this time was destroyed.
"In the studio bedroom of a young composer, Edgard Varèse, I, with a few intimate friends, had the great pleasure in hearing four of his compositions: Dans le Parc, Colloque au Bord d'une Fontaine, Poème des Brumes, Rhapsodie Romane. We were deeply moved by the medieval spirit of this young artist." (53)

"Peladan who heard this work (Rhapsodie Romane) said that Varèse was writing a profane Gregorian chant." (54)

This medieval influence was also evident in Bourgogne and, it can be argued, still appears in his more mature music. (In particular Arcana seems to include a number of passages which reflect the spirit of medieval music.)

"Three years later Romain Rolland, writing to Varèse of Bourgogne, speaks of its calm religious character." (55)

"It might seem strange in a pagan like Varèse that both Romain Rolland and the Bayonnais journalist should have felt a religious spirit in the music, until you recall Varèse's passionate admiration for the great Catholic polyphonic composers." (56)

Thus, although the influence of medieval and religious music is not overt in his surviving compositions, we do know that his passion for this music persisted throughout his life.

"Above all, I want to rescue all the marvels of our French choral music from oblivion, the primitive masters, infact all those who have paved the way up till our own day... for this music has always belonged to everyone, and still does." (57)

His work with numerous different choruses, both in Europe and America, also reflected this interest. In later years through his work with the Greater New York Chorus he concentrated on music from the Renaissance and Baroque period. Most of these various interests had their origins in his education in Paris.
Although his time at the Schola Cantorum had not been particularly useful to the formation of his musical language,

"Nobody ever taught me anything except d'Indy and Roussel what not to do." (58)

he did have an affinity with one of the professors called Charles Bordes.

"Bordes had devoted all his life to a study of old church music and it was with him that Varèse first studied the old polyphonic masters, whom he came to love so passionately, and whom he always gave the predominant place in the repertories of his various choruses." (59)

The other predominant historical influence on the music of Varèse was his liking for the music of the German masters. Although he disliked the music of Mozart he did enjoy the music of the late classical and romantic periods, and Brahms and Wagner particular. Louise writes regarding the move to Berlin,

"That Varèse chose Germany is not strange. Except for Berlioz, Varèse preferred the German masters." (60)

Varèse was particularly attracted by the power and intensity of the music of Brahms. He identified closely with Brahms' definition of composition as,

"The organisation of disparate elements." (61)

and often used the music of Brahms in his lectures to demonstrate what he considered to be good and effective writing for wind and brass, and good orchestration in general.

"The orchestra, in the present sense of the word, is finished. Therefore orchestration, must revert to its
original meaning; must become part and parcel of the substance itself. From this it follows that Rimsky-Korsakov was a poor orchestrator and Brahms a good one." (62)

It was this affinity with the German masters, and the German musical tradition that also attracted him to the music of Strauss. Although Strauss was a contemporary he was viewed in the same light, and treated with the same reverence, by the young Varese. (This will be discussed more fully on p.42.) It is also possible that his interest in early French music stemmed from a desire to try and establish a tradition of French music along similar lines to the German tradition he so admired.

His admiration for the music of Berlioz arose from a different source altogether. It was his writing for percussion and his interest with "sound", coupled to the fact that, to a large extent, Berlioz managed to realise his ideas, that drew Varese to the music of Berlioz. Ferdinand Ouellette comments with regards to Berlioz's Requiem Mass.

"How could he have failed to react with enthusiasm to that extraordinary idea Berlioz had conceived of placing four fanfares at the cardinal points of the church? How could he not have been particularly impressed by the end of the Hostia et preces in which the flutes and trombones play against one another? One might say that this stroke of invention on Berlioz's part was an annunciatory sign of Varese's own works. Berlioz too was passionately interested in sound." (63)

Varese also saw in Berlioz a kindred spirit, a genius with ideas far beyond his time. He was able to identify with his
rebellious nature and his constant exploration for new means by which to convey musical expression, to transmit the thoughts of the composer to a third party.

"He (Berlioz) was the creator of the dramatic symphony and the inventor of the modern orchestra. If he were living today he would certainly be one of the first to deplore the stagnation of music and to wish for new instruments and new means of sound production." E. Varèse. (64)

The music of Berlioz often featured in the programmes of music that Varèse presented. It is not surprising that he chose to conduct Berlioz's Requiem Mass for his first major concert in America. The reaction was overwhelmingly good, Varèse was heralded as a genius, and saw the concert as the first step on the ladder to success in America. This overnight success did not materialise but certainly the concert helped to establish his reputation in New York.

"... Berlioz did manifest himself that night at the Hippodrome in a veritable blaze of power. He manifested himself in a manner that revolutionized all our conceptions. It is not as the romanticist, it is not as the literary musician, or the bizarre technical innovator. It was as perhaps the most classic artist who ever composed." (65)

It can be argued that all of these historical influences had a powerful effect on the formation of his musical language. However, problems arise if one tries to specify places where these historical influences can be seen. One cannot make direct comparison (as is the case with many of his contemporaries), but the music of the past certainly shaped his
attitudes and ways of thinking. Why else would he maintain such an affection for this music, and why else should he consider them worthy of study and preservation?

"First I knew Varèse as an ultra-modern composer. Later I discovered his profound knowledge of the great composers of the past. He would be an ideal guide for young composers, as his wide knowledge of music of all schools, and his sensitive vibration to them, give an unusual balance to his musical nature." (66)

Contemporary Influences on the Music of Varèse.

Three main areas can be identified where links with his contemporaries could have directly and indirectly influenced his music. Firstly, those who helped his career and gave him moral support, such as Hoffmannsthal, Muck and Strauss. Secondly, those who offered new ideas and stimulation, such as Busoni. Thirdly, those whose music may have influenced him directly, such as Debussy.

Claude Debussy.

Debussy can claim to fulfil a role in all three of the above categories. We know that Varèse had frequent meetings with Debussy whilst still a student in Paris, and it was from him that Varèse, the composer, grew in confidence.

"You have the right to compose what you want to, the way you want to if the music that comes out is your own." (67)
Despite initial apprehension over meeting Debussy this was soon dispelled. Debussy treated him as an equal, and thus the spectre of the relationship with his father did not arise.

"He treated me simply as a colleague without the least condescension. He was too intelligent to be self-important" (68)

Debussy did not pretend to fully approve of Varèse's music, the tendencies being "too foreign for his nature" (69) but still Varèse recognised that Debussy was "one of the greatest innovators of all time" (70). (A mantle he wished to inherit?)

The depth of the friendship between the two men is perhaps best illustrated by the following exchanges taken from Debussy's letters to Varèse. The former is concerned with the death of Varèse's grandfather in 1910, the latter with the death of Debussy's mother in 1915.

"My dear Varèse, I understand so well your sorrow, and I know that at this moment nothing counts, neither success, nor even your work. I think of you affectionately." (71)

"My dear Varèse, your affectionate sympathy touches me infinitely. The loss of my mother affects me more painfully than I can say." (72)

In addition to the moral support Debussy frequently assisted the student Varèse materially. Varèse sites an instance when he was too poor to afford a piano so Debussy wrote to the head of the Gaveau piano manufacturers; an instrument was immediately forthcoming. He also provided Varèse with many letters of recommendation, and supported his applications for
various conducting posts.

It is difficult to say precisely how influential individual compositions of Debussy's may have been but we know that one of his most treasured possessions was a personally inscribed score of *La Mer* complete with corrections in the composer's own hand. Ouellette quotes the instance, related to him, when Varèse attended his first concert as a boy including works by Strauss, Wagner and Debussy.

"He was always to retain a great admiration for the *Prélude à l'après midi d'un faune*. It was a real shock for him. I do not believe he was struck again by Debussy in such a thunderbolt way until the revelation of *Jeux.*" (73)

Varèse's admiration for Debussy's music was to continue into his later life with Debussy's compositions featuring regularly in the orchestral programmes he presented and promoted whilst trying to establish his conducting career in America in the nineteen twenties.

The influence of Debussy was widespread, and effected many aspects of Varèse life, particularly during his formative years. Although parts of the early *Un grand sommeil noir* are clearly plagiarised from *Pelléas and Mélisande* Debussy's influence on Varèse was more to do with ways of thinking; having the courage to continue with his work; and moral and physical support.

It is interesting that the influence of Debussy was to stay with him throughout his life, but the admiration he held for
Strauss, which was equally strong at the time, gradually disseminated as his mature musical language evolved.

"In spite of the influence of Strauss in the general movement (not to mention a few Debussy traits in the beginning), it seems very French in feeling." Romain Rolland writing to Varèse about Bourgogne. (74)

"Debussy certainly played an important role in his development, his greatest admiration among the contemporary composers at that moment was for Richard Strauss." (75)

Richard Strauss.

The primary reason Varèse seemed so enamoured with the music of Strauss was because of the brilliance of the orchestration. It seems that one of the reasons for the move to Berlin was to meet Strauss, and yet it was some considerable time before Varèse attempted to meet him. Ouellette attributes this to the fact that he admired Strauss so much and did not want to be disillusioned by being badly received. It was ironic that their first meeting was by chance in the street, some two years after Varèse had moved to Berlin.

"He had never brought himself to go and knock on the Austrian composer's door, despite a letter of introduction from Rolland which he carried around on him." (76)

Strauss was influential in the letters of recommendation he wrote for Varèse, and particularly he was instrumental in getting Bourgogne performed despite problems with the orchestra and players.
Although Strauss was obviously an important figure, I do not believe he was a major influence on the music of Varèse. The fact that many colleagues and friends saw evidence of Strauss in Varèse's early music could have arisen from many sources. Firstly, Varèse was full of admiration for the Germanic tradition of composers and Strauss represented the contemporary face of this tradition. Secondly, the music of Strauss was in the ascendency at the time, his popularity and status was unchallenged, thus it would have been easy for comparisons to have been made with his work. Thirdly, both men seemed to be exploring similar themes and using similar orchestral forces.

Varèse himself was to dismiss Strauss's music as "bad music" full of "vulgar motifs" whilst always recognising the "brilliant orchestral colourings" (77). Louise describes Varèse's change from open admiration during his twenties to almost total rejection by the time they met in his early thirties.

"I came to know his musical predilections and aversions, his enthusiasm for Strauss's music had abated. Not that he admired less the virtuosity of Strauss's orchestration, but he found the themes, the motifs, really too "cheap". Elektra he still enjoyed, while the Rosenkavalier was, in his own simple word, de la merde." (78)

Arnold Schoenberg.

The work of Schoenberg was often featured in Varèse's programmes in America (The celebrated argument with Mrs Reis was
over a repeat performance of *Pierrot Lunaire.*) and yet he did not particularly like his music. He admired Schoenberg for the way he had "liberated music from tonality" (79) but disliked serialism and the school which had formed around it.

"Beware of codification of systems and, in spite of all the revolutionary slogans, their latent academicism. There is nothing more deplorable than traditionalists of the left." (80)

It is probable that they met on a number of occasions. Schoenberg had moved to Berlin at the same time as Varèse, and was later to follow him to America. In Berlin they had a number of mutual friends and it is known that Varèse was present at a preview of *Pierrot Lunaire* in October 1912, a final rehearsal to which a select group of "musicians, critics and friends" (81) were invited.

Regardless of Varèse's dislike for much of Schoenberg's music he recognised that he was an important composer. Varèse was responsible for introducing Debussy to the music of Schoenberg, and this also accounts for the promotion of his music through the International Composers' Guild. In 1934 Varèse gave an interview to the magazine *Trend* in which he summarised his attitudes towards Schoenberg and his music.

"I think that Stravinsky is finished, and I believe that Schoenberg is of much greater importance. But on the other hand, while Schoenberg's music will undoubtedly leave its impress on the future, his system is not likely to, it being to music what the Cubists are to painting. This system of atonality simply does not exist, it is a fallacy of thought, for we feel a tonality whether or not we deny its presence." (82)
It seems that as Schoenberg moved towards serialism then Varèse grew away from his music. The influence of Schoenberg on the music of Varèse is therefore limited, but the "liberation" of tonality and the concept of timbre being structural to a composition as presented by Schoenberg's writings on Klangfarbenmelodie (83) must have been important during Varèse's formative years.

Igor Stravinsky.

The influence of Stravinsky on the music of Varèse is even harder to specify then that of Schoenberg. Although the two composers moved in similar circles, for example, they were both at the preview of Pierrot Lunaire, and Varèse attended the infamous first performance of Le Sacre du Printemps in Paris in 1913, there is no evidence that they actually met until an interview for Musical America in 1962. It seems the two composers respected one another from a distance.

Stravinsky revealed in many of his writings that he considered Varèse to be an important composer; the way he used "sound" as the primary element of his music; his working with "rhythms, frequencies and intensities"; the use of dynamics as an "integral formal element" (84). Varèse similarly considered Stravinsky important and the International Composer's Guild performed many of his works, including persuading Stravinsky to allow Renard to be performed "correctly" for the first time.(85)
Varese never admitted to any direct influence of Stravinsky upon his music but there seem to be a number of passages that are similar, in *Amériques* and *Arcana* in particular. Stravinsky even went so far as to list them, even giving specific locations in Varese's music,

"Some of me shows through in *Arcana*, to: *Petrushka* at number 9; *The Firebird* at three measures before 5; and *Le Sacre du Printemps*, at two measures before 17....." (86)

and so the list continues. He even gives examples where he claims Varese borrowed from Debussy. The reason for all of this is not clear. Was Stravinsky trying to gain some retribution for Varese's well publicised remark made in the thirties, "Stravinsky is finished"? If so it seems strange that he should write so many positive things about Varese, and that both composers should seem to revere one another in later life.

Varese never admitted to being influenced by the music of Stravinsky, and yet most neutral observers will instantly recognise a number of similarities, especially in the earlier works. Many have commented on the chordal sections of *Amériques* and *Le Sacre du Printemps*, the opening of *Arcana* and the Infernal Dance from *The Firebird*, and personally I was struck by the similarity between the close of *Ionisation* and *Les Noces*. But do any of these matter? Even if Varese did borrow from other composers' work occasionally, the context in which the material appears, and the way in which it is developed is still distinctly Varesian.
Ferruccio Busoni.

The influence of Busoni on the music of Varèse is much easier to quantify than that of Strauss, Schoenberg or Stravinsky. The relationship between the two men was similar to that he held with Debussy, Busoni treated Varèse as an equal and saw in him a fellow "rebel" with similar ideas and aims.

"One cannot overassess the importance of Busoni's influence on Varèse in his twenties. Varèse was not only stimulated as never before by Busoni's brilliant personality and caustic intelligence but in Busoni Varèse found the first musician whose ideas on the future of music were an echo of his own thoughts." (87)

Varèse had become acquainted with Busoni through his Sketch of a New Esthetic of Music which helped to crystallise Varèse's early musical ideals.

"When I came across his dictum: 'Music was born free and to win freedom is its destiny' I was amazed and very much excited to find there was somebody else, besides myself, who believed this." (88)

It is easy to find the sorts of ideas which would have excited the young Varèse within Busoni's writings.

"Is it not singular, to demand of a composer originality in all things, and to forbid it as regards form?" (89)

"In each motive there lies the embryo of its fully developed form; each one must unfold itself differently, yet each obediently follows the law of eternal harmony. This form is imperishable, though each be unlike every other." (90) (This is particularly interesting with regards to Déserts.)

"We have divided the octave into twelve equidistant degrees, because we had to manage somehow..... Yet nature created and infinite gradation - infinite! who still knows it nowadays?" (91)
Thus, the **Sketch for a New Esthetic of Music** was the key to a lasting friendship which arose despite the difference in age between the two men. Busoni took considerable interest in the scores of the young Varèse (still in his early twenties) offering encouragement and suggesting changes, only some of which were acted upon. Although they did not always see eye to eye with regards to musical matters Varèse's affection for Busoni was lasting. Louise states that Varèse's most treasured possessions were the personally inscribed scores he had received from Busoni, Debussy and Bolzoni.

Nevertheless, despite the radical nature of Busoni's ideas, Varèse could not balance this against Busoni's individual musical tastes.

"I was surprised to find his musical tastes and his own music so orthodox. He could never understand how most of the works of such a master as Mozart, his favourite composer, could bore me as they did and still do." (92)

The influence of Busoni was considerable. Like Debussy, Busoni helped to formulate the background to his musical language, providing stimulation when required and giving the young composer the encouragement to continue with his ideas. He also assisted Varèse financially, through letters of recommendation and by arranging grants, etc., which allowed him to remain in Berlin at a formative stage in the development of his musical language.
Artistic Movements and the Music of Varèse.

Futurism.

The music of Varèse has sometimes been linked with the Futurist movement. Throughout his life Varèse made it clear that he condemned the futurists and the music they made. In Russolo's manifesto The Art of Noise he called for music that would relate to the sounds and rhythms of machines and factories. Noises that must be,

"strident, dynamic and eagerly in tune with modern life."(93)

It appears that Russolo and Varèse shared a number of common interests and ideas. Both were interested in "sound" rather than just music, both were examining new methods of sound production, yet in many other ways their work was diametrically opposed.

"It is a mistake to link Varèse's researches in any way with Russolo's. Although he was a friend of the man, he could not accept the noise-artist. Their conceptions were on two very different levels and could never have come together." (94)

This apparent anachronism stems from the fact that Varèse found many of the futurist ideas exciting and similar to his own but,

"As we have seen, when he heard their music he was disappointed, for it did not fit his image of what music should be." (95)

As is often the case, movements seeking a greater degree of credence lay claim to leading figures hoping they will champion
their cause. Thus, although Varèse was familiar with both Marinetti and Russolo he quickly detached himself from their movement. Varèse may have had an interest in examining the sounds of the mechanical modern world, but had no desire to reproduce it musically as had the futurists. His anger at being linked with the Futurist movement led to his public denouncement of them in Picabia's magazine 391. Ironically, with Picabia he was to enter into a similar situation, with the Dadaists claiming him as their own.

Dadaism.

Varèse's involvement with dadaism arose initially through his friendship with Picabia, and as a means by which Varèse could voice his opposition to the futurists. He signed the manifesto Dada souleve tout in 1921 but, as Oudlette notes,

"This does not mean Varèse ever seriously belonged to the Picabian-dadaist movement. He was so deeply independent by temperament that he was incapable of belonging to any movement." (96)

Nevertheless, Varèse's music at the time attracted the label "dadaist" (97), but it is interesting to note that his own manifesto produced at the time for the setting up of the International Composer's Guild firmly refutes this idea, its closing lines being,
"The International Composers' Guild disapproves of all "isms"; denies the existence of schools; recognizes only the individual." (98)

Thus, although Varèse listed many of the founders of dadaism amongst his friends, and even contributed a "dadaist" poem to there are fundamental artistic differences which meant he could never be associated with movement. Louise Varèse summarises this in saying,

"Varèse did not subscribe to Duchamp's anti-art philosophy. Art, whether music, painting, sculpture, architecture, or poetry, was serious, was important - the only thing that kept life from being absurd: and music was the nucleus of his own life." (99)

Therefore, Varèse may have been interested by some of the ideas presented by various artistic movements with which he was familiar but terms such as "futurism", "dadaism" or "primitivism" cannot be attached to his music.

Conclusion.

The influences on Varèse were many and varied; historical, contemporary, and stemming from a variety of art forms. The circles with which he mixed contained a phenomenal number of illustrious artists of all kinds, and these contacts must have had an influence on the shaping of his ideas, and, indirectly, his music. In addition, the importance of the various people who provided him with financial and moral support should not be overlooked. His financial viability was always a problem during
the early years, and without this support he would not have had the time or space in which to develop his musical philosophy which was to remain relatively unchanged throughout his life.

Varèse was clearly well versed in both the artistic trends and the music of the beginning of the century in both Europe and America. Debussy, Busoni and a number of other composers clearly affected the development of his musical language but all of the various influences upon him were absorbed and assimilated into a style that is distinct and unique.

"The artist being always of his own time is influenced by it, and in turn is an influence." E. Varèse. (100)
CHAPTER THREE.

EDGARD VARESE: THE MUSIC

Introduction.

The music of Varese is unique. It rejected traditional methods of organisation and opened up a whole new approach to composition centred on music as sound. Varese was constantly striving to find new sounds. He explored new and radical combinations of instruments, introduced new instruments to the ensembles, asked performers to master increasingly difficult techniques and opened up the field of electronic music. His approach is summarised in the following statement,

"I refuse to limit myself to sounds that have already been heard." (1)

He created a new approach to the organisation of sound that rejected traditional concepts of melodic and harmonic development. His music is formed from the interaction of blocks of sound, and these blocks are identified by each having a unique combination of pitch, texture, timbre and rhythm.

He first became aware that music could be structured in this way on hearing the Scherzo of Beethoven's Seventh Symphony at a concert in Paris.

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"Probably because the hall was over-resonant... I became conscious of an entirely new effect produced by this familiar music. I seemed to feel the music detaching itself and projecting itself in space. I call this phenomenon sound projection, or the feeling given us by certain blocks of sound." (2)

Therefore, the development of a musical language that used these ideas required the development of a technique to plan and shape these blocks of sound. This would have been an extremely difficult process as the character of any block of sound is created from a complex combination of many musical elements. Yet this Varèse achieved, a point noted by P. Griffiths,

"His startling sounds were meticulously planned and shaped; there is a finesse even in his ferocity." (3)

and it is the juxtaposition and interaction of these sound masses that creates the form of each work.

"You will find in my works the movement of masses." (4)

Therefore, we can examine Varèse's musical language through analysis of these sound masses. This can be achieved by first analysing the elements that form the sound mass, both individually and in the way in which they interact, and then analysing the movement of sound masses with regards to the overall form.

Varèse's musical language evolved throughout his life but it seems that his attitudes towards, and his use of, the individual elements of his music did not really change. (Rhythm remains the
driving force, timbre and pitch the means by which sound masses are defined, etc.) Rather, it is the manner in which the elements are combined that results in the discernable differences between the types of sound mass employed in his early and his late works.

Many of Varèse's contemporaries had moved through numerous stylistic changes, from late romanticism to neoclassicism, or from formal freedom to serialism. However, from the evidence of his surviving works, it seems that Varèse composed all of his life within a single evolving musical language. Although this language is unique, Varèse was influenced from a variety of different sources throughout his life. For example, if we examine the musical trends present at the turn of the century we see that Varèse can clearly be identified with many of them. Nevertheless, he seemed able to selectively draw on ideas that interested him and tried to avoid being categorised or identified with any particular school of thought.

"Debussy had opened the paths of modern music - the abandonment of traditional tonality, the development of new rhythmic complexity, the recognition of colour as essential, the creation of a quite new form for each work, the exploration of deeper mental processes - but he had done so by stealth." P.Griffiths. (5)

It was from this background that Varèse's music evolved. Although these trends were to be found in the music of many of the composers writing in the first few decades of the century,
Varese's compositions are extraordinary in the manner in which they managed to realise, to the full, ideals towards which he and many of his contemporaries had been striving. In his music the basic elements of melody, harmony, pitch, rhythm, dynamics and timbre are still evident, but it is the manner in which Varese explores their latent potential by methodically developing them away from the accepted norm, and combining them, that makes his music so unique.

Thus, the importance of Varese's music should not be underestimated. J. Machlis summarises this well in saying,

"Several important currents within the mainstream of contemporary music come together in Varese's works; the desire to root out private feelings from art and to achieve a totally objective style; the spirit of urbanism, and the attempt to evolve the imagery of a machine civilisation; the rejection of tonal harmony; the interest in primitivism, with its revitalisation of rhythm and its attendant emphasis on the percussion instruments; the attempt to return music to its pristine sources, and to mould it into architectural forms as pure sound." (6)

**Science and the Music of Varese.**

Any examination of science in the music of Varese must recognise that he composed with sound and not music per se.

"... music must live in sound." (7)

Scientific theories can be seen to influence and define the sounds with which Varese worked. In addition, science has been
used by Varèse when explaining his ideas, and by many authors to attempt to gain an insight into his music.

Some confusion has arisen regarding the role of science in Varèse's music. There are various interpretations as to its role, and importance. We can start the discussion of this factor by considering his statement,

"In reality music partakes of both art and science." (8)

Varèse had a scientific education and consequently uses many scientific analogies when discussing his music. His knowledge of the physical properties of sound was obviously important, helping to shape the sound masses from which his music was created. He also considered sound, not as an abstract timbre written in a musical score, but as a vibrant and living means by which a composer presented his ideas to others. When composing, even for a single instrument, his consideration of the sound produced was dependent on a number of factors: the concepts of changing timbre in different registers; the differing physical properties of the sound caused by changes in the harmonics produced; the acoustic in which the music was to be performed.

"When you listen to music do you ever stop to consider you are being subjected to a physical phenomenon? Not until the air between the listener's ear and the instrument has been disturbed does music occur.... In order to anticipate the result, a composer must know as much as possible about acoustics." (9)
Therefore, his approach towards sound was scientific, a point he was to re-emphasise throughout his life.

"On the threshold of beauty, art and science must collaborate... I tell people I am not a musician; I work with rhythms, frequencies and intensities." (10)

There is evidence of scientific logic behind the construction of his ensembles, with regards to pitch, register and tone colours offered. The result of this is that none of the ensembles can be considered to be "normal" combinations of instruments. Nevertheless, all of the ensembles are successful through precise choice of contrasting timbres, textures, pitches and dynamics, and this emanates from his detailed scientific knowledge of the sound capabilities of the various instruments.

The manner in which the sound was communicated to an audience was subjected to similar scientific scrutiny. The concept of projection of sound was fundamental to the construction of his music resulting from the conflict between sound masses.

"Intégrales was conceived for spacial projection." (11)

Perhaps the clearest explanation he gave regarding the projection of sound was the following visual analogy.

"Probably I should call them (blocks of sound projected into space) beams of sound, since the feeling is akin to that aroused by beams of light sent forth by a powerful searchlight. For the ear - just as for the eye - it gives a sense of prolongation, a journey into space." (12)

However, when we consider the following explanation, given by Varèse some thirty years later, the idea of projection is used
to explain quite a different concept. What he seems to be discussing here are the limitless variations that can be obtained through the interaction of a few simple ideas, a concept he had explained earlier with reference to the process of crystallisation.

"Whereas in our musical system we divide up quantities whose values are fixed, in the realization I wanted, the values would have been continually changing in relation to a constant. In order to make myself better understood let us transfer this conception into the visual sphere and consider the changing projection of a geometrical figure onto a plane surface, with both geometrical figure and plane surface moving in space, but each at its own changing and varying speeds of lateral movement and rotation. The form of the projection is determined by the relative orientation of the figure and surface at an instant. But by allowing both figure and surface to have their own movements, one is able to represent with that projection an apparently unpredictable image of a high degree of complexity." (13)

Scientific considerations are therefore extremely important to the music of Varèse, but confusion can arise through misunderstanding what he said, and because it seems that some authors considered "science" to be the key to all aspects of his music. The reasons for the latter are understandable: his frequent scientific analogies; his descriptions of music as sound; his pioneering work with electronics; the titles of his compositions. Nevertheless to consider science as the only key is an oversimplification. For example, the titles of his compositions, Ionisation, Hyperprism, Octandre and Intégrales,
to name but a few, are not meant to be direct scientific references but merely evocative of the background from which they originated. Indeed, many of the titles were added after the works had been completed. Thus, in this respect,

"It was the mythology of science that Varèse embraced rather than its method." (14)

I see Varese's use of scientific analogies more as a means by which he tried to explain his ideas, which, if discussed purely in musical terms, would have been extremely complex and subject to misinterpretation (as many terms embody traditional concepts). He further complicated matters by adopting many new terms to describe his music, some of which have been used within this thesis (See Glossary). However, some of these terms seem to pass from analogy into general musical use. The quotation concerning the movement of sound masses, which has already been alluded to is a good example of this. Varèse gave this explanation during a lecture given in 1936 in Sante Fe.

"Taking the place of old fixed linear counterpoint, you will find in my works the movement of masses, varying in radiance, and of different densities and volumes. When these come into collision, the phenomena of penetration or repulsion will result. Certain transmutations taking place on one plane, by projecting themselves on other planes which move at different speeds and are placed at different angles, should create the impression of prismatic aural (auditory) deformations." (15)

From this explanation the concept that Varèse was trying to portray is understandable, yet I cannot imagine the same ideas being explained in purely musical terms without becoming
complicated and inaccessible. It also introduces one of his favourite terms, "transmutation". Once stated this term was taken up by critics and authors and so passed into general use in descriptions of Varèse's music. For example, G. Tremblay explains the thinning of the musical textures to solo lines in the early works as,

"a transmutation of the vertical into the horizontal." (16)

Similar instances can be found with many other terms.

As the musical language of Varèse is constructed from "crystals" from which "sound masses" are developed containing various "planes" and "pitch levels", it is easy to see that scientific concepts are fundamental to the musical language of Varèse. (See glossary) However, I do not consider that Varèse composed with scientific theories at the forefront of his mind, nor does his music centre on complex mathematical relationships as some authors propose (17). To try and explain Varèse's music solely as the result of scientific theory denegrates the individuality of the act of creation. Naturally, through his education, and by living at a time of rapid scientific and technological change Varèse could not fail to have been influenced by scientific theories, but the notion that only through "science" we shall find the key to unlock the extraordinary music of Varese, is somewhat simplistic.
Form in the Music of Varèse.

The form of Varèse's music is not predetermined but emerges from the juxtaposition of sound masses. These in turn are created from a complex combination of the elements of pitch, timbre, texture, rhythm, dynamics and articulation. The form evolves from changes within the sound masses and the manner in which the sound masses interact. Hence the form of his compositions results from the types of development employed, which explains his statement,

"Form and content are one." (18)

Therefore, traditional concepts of musical form are not adhered to.

"Form.... consists of elements arranged in orderly fashion according to numerous obvious principles." (19)

On the contrary, the form of Varèse's music emerges from the dissolution of the rules and principles that had previously governed their use. Nevertheless, he was not interested in destroying form but rather exploring new and alternate means of structuring sound. If form emerges from the content of the music this will result in the creation of a different form for each work. Through his many comments, lectures and articles it seems that form in his music occupied a prominent place in his thoughts. Boulez noted this saying that Varèse had,

"a constant preoccupation with form." (20)

To understand form in the music of Varèse we must first
examine the structure of sound masses. Sound masses are created from many diverse elements. These elements are synthesised, and distinguishing one element from another can prove problematical. I have already stated a simplistic view of the way in which sound masses are constructed—with pitch, register and timbre defining the vertical structure and rhythm, dynamics and articulation the horizontal structure. However, to try and communicate my ideas on the structure and form of his music the following examples will focus on dominant elements within particular sound masses. In some ways the examples may be considered to be unrepresentative because of this focus, and it should be remembered that no sound mass relies on one element to the exclusion of all others.

This examination should also help in explaining a number of the terms that will be adopted throughout this thesis. Most of the elements are capable of generating form at a number of different levels within his music. Varèse's term for this was "architectonic" (an example of the constructional terminology of which he was fond). Thus, an understanding of terms such as blocks, masses, planes and levels is necessary when examining Varèse's own comments regarding form. Consequently the unsuitability of conventional terminology and the problems surrounding the development of a new language (21) made it logical to adopt a number of Varèse's terms.
The Construction of Sound Masses.

Sound masses can be created in numerous different ways. G.M. Roberts has defined the term sound mass as,

"A block of sound of such complexity that its individual components are subordinate to its total aural effect."

This infers that sound masses are constructed from a number of different elements, and a number of different constructional units. Individual interpretations of Varèse's terms can vary as can the identification of individual sound masses. I have therefore developed a hierarchy of terms which will be adhered to throughout this thesis to describe the internal structure of sound masses.

This hierarchy is shown in the following diagram and will be subsequently illustrated by musical examples.

Example 1. Constructional Units within a Sound Mass.

The Cell.

The smallest constructional unit contained within a sound mass is the cell. Cells can be distinguished by rhythm or interval.
Whatever the case, the cell is the smallest block of material to be found in Varèse's music and acts as the basis for wide-ranging and complex developments.

Example 2.
Nocturnal. Bars 43 to 46 Bass Voices. Intervallic cell of a semitone.

Example 3.
Ionisation. Bars 7.1 to 7.4 Players 1, 2 and 3. Rhythmic cells of duple and triple attacks.

Motives.

The next constructional unit is the motive. These can be rhythmic, melodic or harmonic and are subjected to numerous forms of development such as augmentation, inversion,
diminution, and so on. Whatever the development it must not destroy the fundamental characteristic by which the motive is defined.

Pitched and rhythmic motives are usually of three or four notes duration and normally first occur within the opening sound mass of the work. They can appear independently, as in the opening of Intégrales, or they can act as the basis for a more extensive melodic or rhythmic statement. The structure of motives changes throughout Varèse's music. In Amériques the opening motive on alto flute is repeated in full on numerous occasions, thus the motive is defined by the rhythmic and pitched shape outlined below.

Example 4. The Opening Motive of Amériques.

Motives contained within subsequent works are usually much shorter, and instigate further development. The opening of Density 21.5 is motivic, but the motive is only the opening three notes, and the characteristic rhythm, and not the entire phrase. The phrase never returns, but the motive is the basis for the majority of developments within the work.
Example 5. The Opening Motive of *Density 21.5*

Rhythmic motives are usually equally brief, and can initiate numerous forms of development. The principal rhythmic motive of *Ionisation* is only 2 beats long, yet re-occurs in numerous forms throughout the work. It initiates a variety of complicated rhythmic developments which can be seen from the following phrase which occurs at Figure 1. It is interesting that the statement of the motive here is itself a decoration of the opening rhythm on the bass drums (characterised by short - long attacks), which is the motive which occurs throughout *Déserts*.

Example 6. Rhythmic Motive in *Ionisation*.
Side Drum. Figure 1.

Sound Idea.

Sound ideas are small units of sound which are neither cells or motives, yet have a structural role in the construction of a
sound area. They can take any number of forms, and can be defined by timbre, pitch, rhythm, etc. They commonly occur within the percussion section, and are used to create temporal development against a sustained pitch level or pitch area. If a sound idea persists, or is repeated in a number of different locations, it may require re-defining as a motive, thus sound ideas are usually varied and specific to a single sound area.

Example 7. Sound ideas contrasting with a Melodic Line.
Hyperprism. Bars 2.6 and 2.7.

Pitch Level.

Pitch is of primary importance in the construction of sound masses. Pitch, whether precise as in wind or brass, or imprecise as in the percussion section, is carefully planned to provide contrasting areas of sound. This serves to define the vertical constraints of the sound mass and provide the basis for
various forms of temporal development. Pitch level is the term that refers to a persistent note that dominates within a sound area or sound mass. For example, the opening of Nocturnal establishes and develops the pitch level Ab5 through changing the timbre and dynamics.

Example 8.
Nocturnal. Bars 1 to 7

Pitch areas can also be developed through motivic activity when a single note within the motive is dominant. The opening passage of Intégrales illustrates this, as does the opening of Hyperprism where a pitch level of C4 is established. The glissandos are important, but their brevity emphasises the pitch level rather than a pitch area containing all of the notes.
Example 9. Establishing a pitch level.
Hyperprism. Trombone. Bars 0.3 to 1.1

Pitch Area.

Conversely, in the opening of Octandre all four notes on the oboe are important. Although more emphasis may be given to the E what is defined here is a pitch area ranging from F4 to Gb5. The oboe development works almost exclusively within this pitch area right up to Figure 1, where the first important vertical pitch pattern brings the sound mass to a close.

Example 10. Establishing a pitch area.
Octandre. Oboe. Bars 0.1 to 0.3

It should be remembered that whilst both the terms outlined above seem to emphasise the constructional role of pitch they are only labels which are used to describe the content of a sound mass. They are not meant to exclude instruments that do
not have precise pitch. Similarly, their use does not mean that texture, rhythm, dynamics, etc, are not equally important in the definition of pitch areas and pitch levels.

**Sound Area.**

By their very nature sound areas are somewhat difficult to define. They are the larger scale units which combine to form a sound mass. Sound areas can occur simultaneously, can be juxtaposed or overlapping.

Sound areas usually contain a number of pitch levels or pitch areas. Whereas foreground rhythmic activity is usually created from the development of cells, motives and sound ideas, the larger scale rhythmic development of a sound mass evolves from the interaction of the pitch levels and pitch areas, and the interaction of the sound areas within the sound mass. (To gain a better understanding of my use of this term please refer to the graphs contained within Chapter Fourteen which illustrate how sound areas combine to create the sound masses within *Déserts*.)

The previous definitions help to outline how sound masses can be constructed but do tend to give the impression that, once the blocks have been put together, sound masses do not change. This is seldom the case. Sound masses develop through changing the rhythmic intensity, moulding the timbral quality of the
sound, expanding the vertical pitch pattern, and so on. Thus, although Varèse calls them "blocks of sound" the analogy should not be taken too literally. They are not inanimate bricks that are stuck together to create a composition but are highly complex living representations of Varèse's ideas which, through performance, can be animated again.

The Synthesis of the Elements within a Sound Mass.

Although the previous discussion has focussed on Varèse's use of various constructional blocks it is important to remember that sound masses depend upon the synthesis of a number of elements. The emphasis placed on individual elements may change, the relationship between the elements may change, but sound masses can only be generated through a combination of these elements. It is through the numerous constructional blocks that the various combinations of these elements are translated into music or sound.

The opening of Integrales clearly shows evidence of such synthesis. The opening sound mass lasts for twenty nine bars, with the vertical pitch pattern and rhythmic and textural development changing over the last few bars as the sound mass comes to a close.

At the beginning of the sound mass a three note motive on the
clarinet is presented. This establishes the pitch level Bb5 and, through repetition, defines a pitch area covering five and a half tones. The music develops through the addition of two contrasting timbres on high woodwind and trombones, defining pitch areas of nine, and eight and a half tones respectively. These contrast with the Eb clarinet texturally, rhythmically and dynamically (Note the differences in dynamics and articulation between woodwind and brass.) Through repetition these three ideas become simultaneous sound areas, and in combination they generate the vertical pitch pattern for the sound mass.

Example 11. Intégraless. Sound Areas Presented by the Wind. Bars 1 to 9

Temporal development stems from the contrast in dynamics and
articulation, from the rhythm of the various statements of the opening motive, and from the interaction of the various entries between the three sound areas. Throughout this sound mass the central sound area, regardless of the instrument on which it occurs, always produces a response initially in the woodwind, and then in the brass.

This larger scale rhythmic development between the planes is complemented by three contrasting sound ideas in the percussion section.

Example 12.
Integrales. Percussion. Bars 0.4 to 0.7

Note how different values of articulation, dynamics, and rhythmic intensity are assigned to the different sound ideas, each developing within itself and in relation to one another. For example, the second idea develops through the addition of cymbals and whip in bar 0.8, and the third idea developed rhythmically when it passes to the casagnets in bar 0.7 before transferring this back to the side drum.

Moreover, these sound ideas also interact with the wind
instruments. The first sound idea almost always coincides with points where the first sound area occurs alone. The second sound idea occurs at points where all three sound areas are interacting, its rapidly changing dynamic level contrasting with rhythmic activity in the wind. The third sound idea occurs only when the opening motive sustains the Bb, and not when it is being rhythmically developed.

This description of the opening sound mass of *Intégrales* tends to over-simplify the issue. Nevertheless, it is clear that sound masses are extremely complicated and infinitely variable structures making Varèse's crystallisation analogy seem all the more appropriate.

The Interaction of Sound Masses and the Generation of Form.

There are two basic ways in which sound masses and sound areas interact, defined by Varèse as "repulsion" and "penetration". By repulsion Varèse means the juxtaposition of contrasting and oppositional material. For example, intense rhythmic activity will be answered by long sonorous notes; vertical pitch patterns covering five or six octaves will contrast with the development of narrow pitch areas; wind timbres will contrast with percussion; articulation and dynamics will change.

Alternatively, penetration occurs when two sound masses in
which a number of elements coincide, are juxtaposed. These terms have only limited use in describing the multifarious ways in which musical material interacts, and can, I consider cause some confusion. For example, within Déserts there are a number of cases where extended sound areas are temporarily interrupted by opposing material. This material is "repulsed" by the established sound area, but is also temporarily "penetrated" by it. Thus, I prefer to discuss the interaction of sound masses in terms of their relative stability, as this, I believe, is the underlying theme behind these terms. (A more detailed exposition of stability and instability in sound masses is contained within Chapter 14.)

If form develops solely from the interaction of sound masses it seems to infer that Varèse's music develops in an amorphous fashion. However, there is evidence that he also planned the form at a higher architectonic level. In some works this is clear as they are in a number of sections or movements defined by the composer. In works that are in a single movement the placement of large, dynamically emphasised vertical pitch patterns usually outline the sectional form (particularly in the earlier works). These points of closure are often re-emphasised by changes in tempo following these "cadences". I use the term "cadential" as they,
"convey the impression of a momentary or permanent conclusion." (23)

and this is not the case with all vertical pitch patterns.

To what extent these higher levels were planned has been the subject of considerable debate. Stravinsky said in conversation with Robert Craft,

"(Varèse)... was among the first to plot the intensities of a composition, the highs and lows in pitch, speed, density, rhythmic movement." (24)

If all these aspects of his compositions were pre-planned it seems to rather contradict the idea that form results from the content. I prefer the explanation that overall form in Varèse's music is more intuitive than predetermined. For example, from his many comments it is obvious that he thought a great deal about his compositions before committing them to paper. It would be inevitable that through this process he formulated ideas concerning the overall structure. Additionally, his background and education would have instilled within him a feeling for form: where to place cadential structures; where to change the intensity; when to combine and when to contrast the sound masses.

In conclusion, form does not arise from harmonic or melodic expectation but is generated through the complex combinations of the elements of the music. Form evolves from the interaction of sound masses, and this occurs within a larger scale intuitive framework that was Varèse's conception of the piece.
Harmonic/Vertical Structure.

In conventional terms harmony is of little importance in Varèse's music. Within the context of this thesis I prefer to use the term vertical pitch pattern (See Glossary) to avoid confusion. However, many authors still assign various meanings to the term harmony in Varèse's music. There is a need to differentiate between individual vertical pitch patterns and sequences of these pitch patterns. The term harmony, within this thesis, will be used to describe the movement of sequences of vertical pitch patterns that occur within, and between, the sound masses.

There is a tendency for authors to see Varèse's attitude towards the vertical aspect of his music as radical. Although the effect is often startling and new, Varèse's harmonic language is really an extension of the movement into atonality adopted by so many composers at the turn of the century. Whereas the Second Viennese School turned towards serialism, Varèse continued to explore the vertical aspects of his music within the atonal medium. This led to the development of a harmonic language that fully integrated aspects of pitch, register and timbre.

Henry Cowell notes that Varèse does not break the rules of ordinary harmony as the rules do not even enter into his consideration (25). Rather, the coherence of the vertical pitch
patterns in his music is attained by,

"Finding a note that will "sound" a certain way in a certain instrument, and will "sound" in the orchestral fabric." (26)

This emphasises the close link between harmony, pitch, and the timbral qualities of the instruments employed. It is this combination that gives the music its unique character. This Jolivet attributes to Varèse,

"Dominating tonality so as to exclude it." (27)

and this has been achieved by Varèse extending the conventional role of harmony by,

"Restoring its primitive role as resonance and timbre." (28)

The variety of views expressed on Varèseian harmony can generally be seen to be correct; however many statements over simplify this complex aspect of his musical language. Some theoreticians find it hard to accept that Varèse's harmony no longer slots into any particular category, or that it no longer fulfils the role of being the fundamental motive force responsible for the temporal development of a work.

"One of the most pervasive qualities of post tonal music has been the attempt of almost all the major composers to fashion musical material that, despite its abnegation of the functional tonal system, preserves the character of expected continuation." (29)

In Varèse's music this role has become the responsibility of timbral, rhythmic and motivic development and this requires rethinking traditional musical concepts.
Melodic/Horizontal Structure.

Once again the immediate problem to confront is one of terminology. Melody and pitch are inseparable in the music of Varèse and the horizontal structure of the music is defined through timbral, textural and dynamic development of pitch levels. However, a succession of rapidly changing pitch levels or motivic development within a pitch area can be considered melodic. Thus, the term melody is used within this thesis to refer to the movement of notes in time, and includes aspects of timbre, texture, rhythm and dynamic.

"Melody in the traditional sense (is) of negligible importance .... There are few melodic phrases of more than two or three notes. On the other hand, rhythm is immensely important; typically the patterns are highly varied, complex and irregular. Timbre and dynamics are prominent elements too, and again they are very varied - also often harsh, strident and extreme. Texture plays an important role...." (30)

Although his music has been described as "athematic" (31) it cannot be considered unmelodic. Within the definition outlined above his music can be seen to contain a good deal of melodic invention. However, normal concepts of linear development are not adhered to in the music of Varèse. For example, it is not possible to isolate melodic from harmonic textures as the interaction between the two elements is so extensive.

"When the body of sound thins down till it is monody, the musical fabric, as though relieved of a burden, springs to life and becomes melodic. This is perhaps a transmutation of the vertical into the horizontal." (32)
Similarly, it is difficult to examine melody in isolation as it is intrinsically linked with pitch, dynamics and texture. By changing the emphasis placed on these elements Varèse is able to create a huge variety of horizontal structures. At one extreme there are single pitch lines that centre on rhythmic and timbral development, and at the other extreme there are melodies incorporating all twelve notes in various registers. Nevertheless, horizontal developments containing a large number of different pitches are rare (especially in the later works). In general there are few melodic phrases of more than a few notes in duration, and these sustain development through constant changes in dynamics, attack or timbre. The opening sound area of Intégrales shows this synthesis of different elements.

Example 14.
Intégrales. Bars 0:1 to 1:1
In this example the motive on the E flat clarinet is rhythmically and dynamically developed in bars four to six. In bar seven the sound area is expanded to encompass the A flat, which is presented for the first time as a full note and not a grace note. In bar eight this is re-emphasised through dynamic change, and in bar ten the development continues with the addition of new notes, with timbral change by passing to the C trumpet, and a new mode of attack is introduced with the first staccato note following the opening grace notes.

It is possible, particularly in the earlier works, to identify some extended melodic lines. (Especially Amériques and Offrandes.) These usually follow a large vertical pitch pattern and often these lines are developed either from motivic ideas that are rhythmically expanded or from the transference of vertical material into the horizontal plane. The following oboe solo, also taken from Integrales, is clearly based on the cell of the interval of a semitone. (Incorporating its inversion of the major seventh and the augmentation of the minor ninth.) It emerges from an eleven note cadence, a large vertical pitch pattern that is also constructed from cells of the semitone.

Example 15. Integrales. Oboe solo. Bars 19.1 to 19.5
Although these examples are not necessarily representative of his musical language throughout his life they do illustrate the fact that the horizontal development of pitches results from a variety of different sources. This aspect will be examined more comprehensively through the following analyses.

**Timbre. (Texture and Register)**

In the music of Varèse timbre is the crucial element by which the sound masses are defined and developed. Timbre is integral to concepts of pitch, register and texture and becomes one of the main ways through which form is generated in the music.

"Timbres and their combination, instead of being incidental, become part of the form, colouring and making discernable the different planes and various sound masses, and so creating the sensation of non-blending. Variations in the intensity of certain notes of the compounds modify the structure of the masses and planes."(33)

With the exception of electronics, the instruments used in Varèse's music still conform to the sections of woodwind, brass, strings and percussion. However, the use of conventional instruments in unconventional ways, the introduction of new instruments (especially in the percussion section), and the development of new ensembles provided him with a huge range of new sounds with which to work.

There was a conflict between the new timbres that Varèse could envisage and the actual instruments that were available to
Marc Wilkinson comments that Varèse had to compromise throughout his life with regards to this aspect of his music.

"Lacking the facilities he needed, Varèse has had to make do with conventional means of performance, choosing the instruments that would come nearest to the timbres and effects he had in mind. There exists therefore a strained duality in his music, for while composing with techniques based on fluctuating values, he must contrive to work within the fixed values of temperament and within the limits of timbre, dynamics, and duration imposed by our mechanical instruments." (34)

Most of the pitched development of his music occurs within the wind sections. He liked the way in which wind instruments could produce large changes in dynamic level, and maintained the intensity of sound throughout their ranges. With regards to brass instruments he said,

"They can rise from pianissimo to tremendous power immediately; can make great attack, then drop to piano right away." (35)

He was, however, critical of the upper register of the bassoon, which perhaps explains the emphasis placed on the horns in the smaller ensemble works, and the occasional use of bass clarinet.

"It (the bassoon) is very powerful in the bass but loses its personality, growing thinner as it goes up." (36)

He also liked the way in which notes could be sustained for long periods, especially in the lower brass, and by changing dynamic levels he could alter and adapt the timbre of the sound produced.
Through concentrating much of the pitched development of his music on the wind he was able to explore many of his ideas whilst still using conventional instruments. The ranges of pitch, dynamics and articulation offered when combined with Varèse's detailed knowledge of their sound properties and capabilities produced extraordinary music for the wind, the likes of which had not been seen before. In particular, he felt that the wind could communicate his music in the most accurate way. When discussing his ideas concerning the development of new instruments, one of the major advantages he envisaged was that these instruments would enable the composer to communicate directly with the public, free from the interpretation of a third party, the performers. This manifests itself through the attention given to dynamic and articulative markings in his music and, as mentioned previously, through his affinity with brass and woodwind.

"Varèse favours woodwind and brass because they produce sounds relatively clear of such clouding factors as vibrato and approximate pitch." M. Wilkinson. (37)
It was for similar reasons that he was to favour the percussion.

The percussion section is of prime importance when examining the structure of Varèse's music. It takes upon itself much of the rhythmic development and has emerged from its usual role of colouring climaxes into one of equal importance with the wind sections. In describing Hyperprism, Boulez comments on the role of percussion in relation to the rest of the ensemble.

"The percussion section becomes a subtle, elastic, personal organism, whose noises, following the progress of the other sounds trace out arabesques." (38)

The prominent role of this section derives from a number of factors. Firstly, the vast expansion in the number of percussion instruments employed: a process that culminates in Ionisation which required thirteen percussionists and in excess of thirty different percussion instruments. Secondly, the emphasis placed on rhythmic development in the music of Varèse, much of which occurs within the percussion section. Thirdly, the use of sound masses as the basic unit from which to create a musical composition means that instruments that do not have precise pitch can be as important to the structure as woodwind, brass or strings. Fourthly, it is clear that Varèse had a great deal of knowledge of the technical possibilities of the percussion section and this is exploited to the full.

"To me an enlarged percussion department seems inevitable. The violin is an eighteenth century instrument of inadequate tone power for the present orchestra. Why do we keep adding to the number of violins in the orchestra? For no other reason than the violin is such a weak thing."
And then take the Double Bass of the string family. It does not give us the foundation we need. We should have in the orchestra a sixty four foot tone; but we haven't even a thirty two foot but only a sixteen foot. " (39)

Varèse regarded the string section as inadequate, partially because of the traditional concepts inherent in the use of strings, and partially because he was dissatisfied with their timbral qualities. Nevertheless, he still employed strings in Amériques, Offrandes, Arcana and Nocturnal, and a string bass is used to compliment the wind in Octandre. This was partly because of the fact that the viable alternatives envisaged by Varèse had not been forthcoming, and partly because the manner in which he uses the section did open up a variety of new sounds to him. Thus, his string writing features frequent glissandi, harmonics, pizzicatos and many differences of attack revealing the strings are often used more percussively than melodically.

Much has been written on Varèse and electronic music, and it is true that he recognised the need for such instruments decades before they became a reality. Nevertheless, with the exception of the Ondes Teremine (40), none of his works before Déserts were able to use such instruments. (The use of electronics will be examined in more depth in Chapter 13.) However, he was still able to experiment with some of the concepts he had envisaged through conventional means, long before electronics became available to him.

He attempted to free music from the tempered scale. This is
evident through the increase in the use of instruments of imprecise pitch, and the use of glissando, portamento and quarter notes on conventional instruments.

"It must not be forgotten that the division of the octave into twelve half notes is purely arbitrary. There is no good reason why we should continue to tolerate the restriction." (41)

It was for this reason that he so liked the use of sirens in Ionisation, sirens that had to be specially adapted with a means by which to instantly stop the sound, as they came close to describing the curves of sound he envisaged.

In addition Varèse spaces the vertical pitch patterns in his music to make optimum use of the harmonics of the various instruments, most of which are outside of the normal tempered system.

"Timbre is the paramount element in the music of Varèse; and this in turn depends on the harmonics produced by each instrument. Hence timbre, through the overtone series, becomes a means of exploring sounds in between the whole and half tones of customary pitch." G. Chase. (42)

The ability to sustain sound for long periods of time was another principle he had envisaged early on. This aspect is obviously important in establishing pitch levels and pitch areas within his music. Some of the instruments he employed were able to achieve this effect directly: strings, noticeably through tremelos and sustained harmonics as can be seen in Amériques and Arcana; some percussion instruments, through rolls and the great length of the reverberation, particularly in the metal
percussion; the organ and Ondes Teremine in Ecuatorial, both of which were capable of sustaining sound indefinitely. On the other instruments he sustained the sound of the planes through voice transfer and rhythmic development. The pitch levels C#4 and B♭5 found at the opening of Hyperprism and Intégrales respectively clearly demonstrate this. However, this type of development occurs throughout his music, and not necessarily in such an obvious manner. Note in the following example how rhythmic development is used to sustain the notes A and E on the trumpets (as well as allowing them to breathe), and this is complimented by dynamic and articulative change.

Example 17.
Intégrales. C and D Trumpets. Bars 14.4 to 15.4

The specific timbre of many of the sound masses is closely linked to the register of the instrument in which the note was to be performed. These two aspects cannot really be separated. For example, many of the unusual timbres found in his music stem
from the way in which conventional instruments are employed at the utmost limits of their ranges, requiring the development of increasingly virtuostic techniques from the performers. The following example illustrates this point with a complicated oboe solo rising to a high G which is well outside its normal range. The flute response rises in three beats over practically three octaves, and the clarinet is required to flutter tongue, again a difficult technique and not common in music of the nineteen twenties.

Example 18. Octandre. Oboe, Flute and Clarinet. Bars 0.8 to 1.2

The texture of the music is also an important consideration. Texture and timbre have often been confused but I consider the
terms to have specific definitions within the context of this thesis. Timbre refers to the characteristic quality of a sound and texture refers to the relationships between the various lines of the music. The texture of the music is planned. Although it should not be separated from timbre, it is interesting that texture, the number of instruments employed and the way they interact, is often the principal characteristic by which a sound mass can be defined.

Thus, Varèse still managed to develop enormous contrast in all aspects of his music; of pitch, from piccolo to contrabass trombone; of attack, from the staccatissimo brass wind to the silky tones of the Ondes Teremine; of sostenuto, from the sharp notes of the wooden percussion to the prolonged organ pedal notes; of dynamics, from pppp to ffff; yet individually these developments were not revolutionary but merely a logical extension from the trends prevalent at the time.

Rhythm. (Dynamics and Articulation.)

The importance of the element of rhythm in the music of Varèse cannot be underestimated. Throughout the previous
discussions on form, timbre, horizontal and vertical structures
the importance of rhythm has been a recurring theme. Elliot
Carter notes the fundamental role of rhythm in Varèse's music.

"He made rhythm the primary material of his musical language
and used it, rather than thematic linearity, as the thread
which holds his compositions together." (43)

It is through rhythm that the structure and form of his
compositions emerges, and all of the various hierarchical levels
within his works are dependent on rhythmic development for their
forward movement in time. Varèse commented on the importance of
rhythm by saying,

"Rhythm is the element in music that not only gives life to
a work but holds it together. It is the element of
stability..... In my own works, for instance, rhythm
derives from the simultaneous interplay of unrelated
elements that intervene at calculated, but not regular time
lapses." (44)

There are numerous instances of rhythmic interplay occurring
between the elements at a number of hierarchical levels. For
example, one of the simplest ways in which this manifests itself
is in the interaction between instruments of precise pitch and
the percussion section. There are often complex rhythmic
textures created in the foreground emerging from the interplay
between the sound ideas and the contrast between rhythmic cells
and rhythmic motives. In the middleground it is usual to find
that sound areas where rhythmic activity is intense in the
instruments of precise pitch, are contrasted by sonorous sustained developments in the percussion, and vice versa. (The
exceptions are probably the "march" ideas where both wind and percussion combine.) Similarly, the key cadential vertical pitch patterns are practically always constructed whilst the percussion section is totally silent, yet in the following section it bursts into activity once more.

There is also evidence of planning of the rhythmic intensity in the background, and many of the major sections of his music are delineated by a change in the level of rhythmic intensity. The concept of rhythmic intensity is result of the synthesis of a number of elements. The rhythmic density can be examined by calculating the number of attacks within a given space of time, but this does not include all of the factors that contribute to the relative intensity of the music at any given time.

When Stravinsky observed that Varèse plotted the "intensities, pitch, speed, density and rhythmic movement" (45) it shows that the definition of what constitutes "rhythm" in Varèse's music is not as simple as it may have first appeared. The way in which the elements are synthesised makes it difficult to isolate rhythm if the term is used only to refer to the movement of sound in time. Gilles Tremblay notes how rhythm and dynamics can be seen to be intrinsically linked in Varèse's music.

"We may say that durations give sound its dimensions in time, whereas dynamics shape its volume. Here, the rhythm of the music is created by the combination of the two and is centred on the formation of the sound, since in Varèse's work it is the sound that is the master of everything else." (46)
Similarly, it can be argued that articulation is also a vital part of Varèse's concept of rhythm. The example overleaf shows how these factors combine. The rhythmic activity is quite simple within the individual parts but when combined the result is highly complex. The interaction of duple and triple groupings is a very common feature, as can be seen between the Chinese blocks and tambourine (Bar 0.5) and between Indian drum and trombone (Bar 0.4). This type of rhythmic development between wind and percussion is a common feature in his music and occurs in most of his works.

The changes in dynamic levels are quite extraordinary, ranging from fff to ppp in six bars with every entry being assigned its own individual dynamic level to ensure its place within the sound mass. Again, the importance of dynamics was recognised by Stravinsky who said,

"Varèse was also one of the first composers to employ dynamics as an integral formal element." (47)

There are similar variations of articulation, ranging from the heavy accents on the metal percussion at the start to the almost imperceptible change in the horns.

It is also interesting to note how timbre is intrinsically linked to rhythmic development. The percussion contrasts metal, membraned, wooden and rattling percussion in a constantly changing instrumental texture. Note also how, despite the static pitch level of C#4 on the trombone, the various pitch
areas in the percussion are contrasted. The low tam tam and bass drum at the start contrasts with higher pitch tambourine and snare drum before returning to bass drum and tam tam in bar 0.6.

Through examining this example it is clear that we have moved on from a simple discussion about rhythm in Varèse's music. What it has shown is how all of the elements combine within a sound mass. One cannot consider rhythm without including dynamics and articulation, one cannot consider timbre without including texture and register (even this is an oversimplification). Furthermore, the way the elements are combined within sound masses is not fixed. All elements can change and develop so long as the main characteristics which define the sound mass are not destroyed. Thus, I repeat, sound masses are not inanimate blocks of sound that are stuck together to create a composition. The fact that all elements can undergo development without threatening the synthesis shows what phenomenal variety can be achieved from the interaction of a few simple ideas. This returns us to Varèse's crystallisation analogy,

"There is an idea, the basis of an internal structure, expanded or split into different shapes or groups of sound, constantly changing in shape, direction, and speed, attracted and repulsed by various forces. The form of the work is the consequence of this interaction. Possible musical forms are as limitless as the exterior forms of crystals.... Form and content are one." (48)
PART TWO.

METHODOLOGY.
CHAPTER FOUR.

ANALYTICAL METHODOLOGY: AN OVER-VIEW.

The development of an analytical methodology I consider suitable for the music of Varèse has taken a number of years and has undergone a number of changes of direction. I do not purport to have found the answer, but I have tried to compensate for the inadequacies of some of the analytical methods employed by a multiplicity of techniques, and the use of comparative analysis. The problems posed by Varèse's music are summed up in Virgil Thompson's observation,

"The music itself, moreover, is resistant to analysis, even when there is a verbal text. Such resistance, especially in the early decades of a composition's life, is a mark of quality."(1)

The choice of analytical methods is designed to include all of the elements perceived as important to the structure of the music of Varèse. The various methods employed ensure that the crucial elements of pitch, timbre and rhythm are examined in depth, and these have been supported, where necessary, by considerations of dynamics, articulation, register and texture.

I consider that few of these elements are capable of being comprehensively examined by a single analytical method. I have therefore employed a variety of techniques which, in
combination, build into a comprehensive statement on his musical language. I have consciously avoided focusing on a single analytical method because of my attempt to explore the premise that the musical language of Varèse is constructed from the synthesis and interchange of its various elements. Thus, harmonic analysis would ignore crucial aspects of rhythm, motivic analysis would ignore pitch levels, and so on.

It is inevitable that certain elements will be examined by more than one analytical method. For example, pitch is considered in the motivic analyses, in the pitch class set analysis, as well as in the pitch level graphs. Similarly timbre is important in the identification of sound masses, the textural graphs, and the higher level rhythmic analyses. It is inevitable that a certain degree of overlapping will occur between the various types of analysis employed. This should not be seen as a "waste of time", but rather a means by which the most crucial points of the musical structure are emphasised. In addition, it reveals the synthesis of the elements within Varèse's music.

**Sound Masses and Sound Areas.**

The initial examination of structure within the music of Varèse is based on the identification of sound masses and sound areas. To identify the various sound areas and sound masses
requires consideration of all of the elements. There are no fixed criteria by which this identification is achieved as at one point pitch may be the deciding factor, at another texture, and so on. This can perhaps be most clearly explained by example. (See overleaf.)

In the following passage taken from Intégrales the sound mass is constructed from five overlapping sound areas. The first is the upper register development between the piccolos and clarinets. These are considered to be a single sound area as the statement of the minor ninth on the piccolos always brings the same response from the clarinets. The four note harmony that is created always stopped simultaneously. This sound area, and sound mass, is distinguished from the previous material by the physical separation of a bars silence, as well as drastic changes in dynamics, pitch, and texture. (The previous material being low brass marked ffff.)

The second sound area is constructed from independent rhythmic fragments on the percussion. These developments contrast low pitched membraned timbres with metal based sounds. Thus, there is a clear distinction in timbre, dynamic level, and the rhythmic nature of the material, Sound Area 1 being essentially sustained notes, and this sound area concentrating on short independent attacks.

The third sound area is a three note rhythmic harmonic
Example 1. Intégrales. Bars 7.1 - 7.8
statement on the upper brass. The distinction is made once again because of dynamic, rhythmic and timbral contrast.

The fourth sound area consists of two brief ideas which lead to the construction of the closing vertical pitch pattern on trombones and trumpets respectively. These are seen as a single sound area as both contrast minor ninth and then major seventh intervals, both start at a similar dynamic level, and both are of a similar timbre.

The fifth sound area is the eleven note vertical pitch pattern which is dynamically and rhythmically developed in bars 7.7 and 7.8. Again, the identification of this sound area is clear, resulting from a change in dynamics, texture and pitch.

If one agrees with these various blocks then what are the factors that define these bars as a single sound mass? Firstly, the physical separation from the surrounding material points towards the reading of these bars as a single sound mass. Secondly, the various sound ideas overlap and merge with one another. Thirdly, sound areas 1, 3 and 4 all support the construction of the final vertical pitch pattern. They present rhythmic developments based on harmonic ideas derived from the closing vertical pitch pattern, and thus are supportive sound areas and not contradictory. (ie. They are not polyphonic developments, or independent linear progressions.)

The examination also suggests some important aspects of the
internal structure of the sound mass. Although it is premature to make assumptions based on the analysis of a single sound mass, it does seem that the pitched structure focuses almost exclusively on various semitone cells. Major sevenths and minor ninths appear harmonically, and semitones melodically. The closing vertical pitch pattern is almost exclusively constructed from these intervals. There also seems to be a suggestion that a three note rhythmic motive occurs. This motive is characterised by a short and then a long interval. (This will be more fully explained in Chapters 9 and 18.) This motive appears on the woodwind in bar 7.3, percussion 3 in bar 7.4, trombones in bars 7.6 - 7.7 and trumpets and clarinets in bar 7.7. Obviously considerable work would have to be done to establish whether or not these ideas are significant factors elsewhere in the composition.

Ideas regarding the overall form are suggested by a number of factors. Firstly, the eleven note vertical pitch pattern is not a common structure in Intégrales. Their placement normally indicates the conclusion of the various sections of the work. This is reinforced by the way the percussive activity stops during the construction of the vertical pitch pattern, as found during all of the other cadential eleven note vertical pitch patterns. Secondly, the various sound areas at this point all seem to work together in creating this harmony. In other sound
masses it is clear that material is often in opposition. Thus, the concept of stability and instability, or penetration and repulsion, between sound masses and sound areas is evident. The structure of the work is a direct result of this interaction. (See Chapter 14 for a more detailed examination of the stability and instability of sound masses.)

Therefore, this brief eight bar sound mass suggests the basis of the structure of the music both at an immediate (foreground) level and at higher structural levels (middleground and background).

Analysis of this type is difficult to quantify as it requires a subjective view of how the various elements interact in the music. Timbre and pitch are perhaps the most crucial elements in deciding where the various divisions between sound masses and sound areas are located, and these are supported by the role of dynamics, articulation, rhythm and texture.

This type of analysis has been used as the basis for comparison with all of the following analytical methods. The identification of sound masses and sound areas can reveal the importance of various pitch levels, and rhythmic and pitched motives. It can also help to indicate how the higher structural levels of a composition are created.

Identification of the various "blocks" provides an immediate impression of where "penetration" or "repulsion" might occur,
and which sound masses are stable and which unstable. Thus, the movement of the sound masses is synonymous with the development of the overall structure, as are the changes which are apparent in the way the internal structure of the sound masses are created.

Pitch Class Set Analysis.

Set theory of the type first outlined by Allen Forte (2) has been used to examine the instruments of precise pitch. Pitch class set analysis is one of the few established methods which has been consistently applied to all forms of atonal music (3). The method described by Forte has had to be adapted to facilitate the music of Varèse, and certain parts of the method have not been used. It should be remembered that whilst Forte may have pioneered this technique, it is only one of a number of methods which help towards the analysis of Varèse's music. Also, aspects of this technique are already being challenged and adapted. J. Dunsby and A. Whittall emphasise that,

"The Structure of Atonal Music is a theoretical exposition, not a textbook." (4)

and it therefore seemed prudent to apply only the aspects of the technique which I considered best suited to the music of Varèse.

Set Theory does prove particularly useful in illustrating how material constantly moves between the horizontal and
vertical planes. It also helps to define the overall structure of the works by identifying the placement of the "cadential" harmonic structures, as well as supporting the pitched motivic analyses. However, it does have its drawbacks. Firstly, by reducing all musical material to a prime form based on twelve different pitch classes it negates all aspects of pitch and register. Secondly, it is arhythmic. Hence the obvious need for comparative analysis with regards to this technique.

**Analysis of Pitched Motives and Cells.**

One of the most prominent features of Varèse's music is his use of various motives around which the musical structure appears to be developed. All of the works contain a number of motives, and normally these are established through repetition during the opening sound mass of the work. Yet the extent to which motivic development occurs is remarkable. It is hardly surprising to find motives permeating all aspects of Varèse's music when one considers Busoni's statement (See Page 47.) regarding their germinal force, and Varèse's own crystallisation analogy.

The importance of the motivic structure is emphasised by Virgil Thompson's comment on Varèse's music.

"It seems to hang together not from themes and their restatements but from tiny cells or motives which agglomerate like crystals." (5)
What is apparent is that the term "motive" in the music of Varèse is not an extended exposition of a melodic idea but,
"A short figure of characteristic design that recurs throughout a composition." Harvard Dictionary of Music.(6)
or perhaps P.Ramsier's definition is even clearer,
"The term motive refers to the briefest intelligible and self contained musical figure."(7)
With the exception of Amériques the motives in the music of Varèse are generally brief three or four note ideas. The simplicity of their structure allows for considerable development.

In his motivic analyses of Octandre and Intégrales P.Ramsier concludes that motivic development accounts for literally all of the musical material contained within these two works. I consider the same holds true for Déserts. However, despite the prominence of these ideas, the development of an adequate means of motivic analysis is not necessarily easy. It cannot rely on simple identification of inverted, retrograde or transposed statements as this only reveals a tiny amount of the overall motivic structure.

P.Ramsier's solution was to identify twenty different developmental forms to which each motive could be subjected. This seemed unnecessarily complicated, and I do not consider there is any real evidence that motivic forms, other than the prime form, have any specific structural application. Yet
there is no established technique of motivic analysis that can be applied to Varèse's music. Whittall and Dunsby emphasise this point in saying,

"Simply because motives are compositional ideas rather than the abstracted sources of compositional materials, there is (as yet) no theory of motivic analysis." (8)

The criteria I have employed to identify motives are both straightforward and all encompassing. A statement of a motive is normally considered to have occurred so long as it is reducible to the same prime form within pitch class set analysis. This means that all transpositions, inversions, re-ordering of the notes, and octave displacements can still be considered as variations on the prime form of the motive. Most of the works include both pitched and rhythmic motives, and the general over-riding rule to which I have adhered with regards to both types of motive is as follows. A motivic statement will be considered to have occurred so long as the primary characteristics by which it is identified are not destroyed.

In some instances it seemed logical to extend the motivic analysis to include certain forms of intervallic or cellular analysis. The prominence of the semitone interval, its inversion of the major seventh and the augmentation to the minor ninth are a good example of this. The majority of motives include this interval and in many cases these two aspects cannot be differentiated. For example the opening motive of Octandre
is formed from four notes all linked by the cell of a semitone. It is therefore inevitable that motivic examination will also initiate some analysis of the differing manner in which allied cells are used and developed.

**Example 2. Octandre. Bar 1**
Opening motive developing semitone cells.

![Musical notation](image)

Augmentation. Inversion. Original. (Minor ninth) (Major Seventh) (Semitone)

What has also emerged is the fact that motivic and intervallic development occurs at a number of levels within the compositions and is not confined to immediate foreground development. It can also be a means by which the middle and background levels are structured, a point that is re-emphasised through comparison with the other analyses.

**Note Ordering Analysis.**

There is considerable evidence to support the structuring of notes in the music of Varèse. The extent to which "note ordering" permeates many aspects of the compositions required the development of an analytical technique specific to this
factor. It appears that note ordering occurs at various structural levels within the works, and this led to the development of the method outlined in Chapter 8. This technique reinforces the structures outlined by the previous analyses. It also fills in much of the internal detail, and reveals how the internal structure of many sound areas and sound masses are developed, and how they interact.

Rhythmic Analyses.

The rhythmic aspect of Varèse's music is highly complex and requires a variety of techniques if one is to be able to understand how rhythmic developments occur and how the rhythmic structure of the music arises. Varèse saw rhythm as,

".........(deriving) from the simultaneous interplay of unrelated elements ....... The element of stability, the generator of form." (9)

which infers rhythm consists of two inter-related aspects. Firstly foreground, immediate interaction between sound areas and sound ideas, and secondly, the larger scale development of form.

Examination of the various facets of the rhythmic structure is crucial to any understanding of Varèse's music. The size and role of the percussion sections employed are an indication of the importance of rhythmic development in the music of Varèse, but all instruments within the various ensembles are equally
capable of undertaking foreground rhythmic development. Rhythmic development, both independent and through the constant interaction between pitched and unpitched instruments, is the means by which the majority of temporal development occurs.

Motivic analyses of the foreground rhythmic structure have been undertaken. Most of the works contain characteristic rhythmic patterns that are developed in a number of different ways (similar to the pitched motives). The criteria by which rhythmic motives and pitched motives are identified are similar. Rhythmic motives often contain only three or four notes and the most common forms of development are augmentation and diminution.

The higher structural levels have been examined through graphs of rhythmic density. The density of the sound masses varies throughout, and the highs and lows are clear to see. This concept has also been applied at a higher structural level through calculating the average rhythmic density for each of the sound masses. This provides useful information regarding the overall changes in density and intensity which occur throughout the various works. These have been supplemented by graphs detailing the relative durations of the various sound masses, and the durations of the various sections. Despite the many different approaches adopted it is surprising how often the various analyses support the overall structure outlined by the initial examination of sound masses and sound areas.
Supplementary Analyses.

The following graphic analyses are meant to supplement the previous methods, providing more weight to the various arguments regarding internal structures and overall form.

Pitch.

Pitch has already been examined as a part of the analysis of sound areas and sound masses. In addition separate graphs detailing pitch have been employed. These are useful in indicating the changes between sound masses and sound areas. They also draw attention to important pitch levels, as well as providing an idea of the overall temporal progression (the movement of sound masses). In the pitched graphs prepared for *Déserts* the percussion section has also been subjected to a rudimentary pitch analysis by dividing the various instruments into five broad pitch areas, ranging from the low notes of the tam tams and bass drum to the high pitched attacks of claves or cymbals.

Texture.

Consideration of texture has also been included within the previous analyses of sound areas and sound masses. However, supplementary graphs of the instrumental texture have been prepared. (These have proved particularly useful in the analysis
of the passages of organised sound within *Déarts*.) The role of these graphs is similar to the pitched graphs, detailing changes in the internal structure of the sound masses, as well as supporting the overall reading of the form.

**Comparative Analysis.**

Initially the idea of comparative analysis was to bring together analyses which had examined the music of Varèse from different perspectives. Through comparison it was hoped to highlight the key points in the construction of the music by the coincidental findings of the various techniques. In reality the concept of comparison has never been a separate part of the analytical technique. The remarkable way in which all the elements interact and are synthesised within the music of Varèse became immediately obvious. Thus, cross referencing has occurred throughout the various analyses and will not be dealt with solely as a separate consideration "tagged" on the end of the other analyses.

**Conclusions.**

By employing a variety of techniques it is considered that all of the important elements of Varèse's music have been fully analysed, both individually, and in the way they interact. Through the following chapters I shall present examples to
support my ideas regarding the construction of Varèse's musical language. I shall also show how the various techniques point to changes occurring in Varèse's musical language from the early Amériques through to the unfinished Nocturnal.
CHAPTER FIVE.

ANALYSIS OF SOUND MASSES AND SOUND AREAS.

Analysis of sound masses is the basis for any examination of the music of Varèse.

"You will find in my works the movement of masses." (1)

Although the term "sound mass" was frequently used by Varèse neither he, or those who comment on his music seem to be consistent in their usage or terminology. "Blocks of sound"(2), "sound objects"(3), "sound masses"(4), "sound complexes"(5), sound "groups" (6) sound "shapes" (7) have all been variously applied to describe the music of Varèse. Furthermore, even if one focuses on Varèse's favourite term of "sound mass" the actual interpretations of what constitutes a sound mass seems to vary from author to author.

Some authors consider sound masses as pertaining to every individual block of sound whilst others take a more hierarchical view where sound masses can encompass a number of different, and sometimes opposing blocks of music (See Appendix 3. C.Riley and G.M.Roberts). It is for this reason that the terminology has been described in full in Chapter Three (Pg 64).

We know that the sound masses contain a number of "planes" (sound areas) and that these can "transmute" from the vertical
into the horizontal, and vice versa. This makes the identification of sound masses increasingly difficult. For example, the linear sound masses at the beginning of Hyperprism and Integrales demonstrate that a single sound mass can contain a number of interactive yet diverse sound areas. In both cases the rhythmic development in the percussion section is the motive force behind the sustained pitch areas in the wind. Thus, although both sound areas are distinct, they combine to create the overall aural effect of a single sound mass.

However, if a sound mass is constructed from a number of vertical sound areas, as is frequently displayed in Déserts, the tendency can be to split the sound masses down simply because traditional analytical expectations tend to treat vertical separation as more structurally significant than horizontal separation. Thus, there can be a considerable degree of subjectivity in this form of analysis.

In reality it is extremely unusual to find sound masses which only contain horizontal or vertical sound areas. The vast majority contain both, and the internal structure develops from the interaction between these various forces.

The majority of sound masses can be identified through major changes in one or more of the structural elements. In addition, Varèse frequently assists in this definition through the placement of pauses and rehearsal figures in the scores.

The variety of sound masses is reflected in the variety of
internal structures that can be distinguished. In some sound masses it is not possible to identify individual sound areas at all, yet in others a number of separate sound areas may contribute to the "total aural effect". For example, in the "march like" passages in Hyperprism and Intégrales the percussion, melodic line and supporting harmonic structure are so unified that they cannot be readily separated, whereas in some of the passages of organised sound in Déserts as many as eleven interactive, and inter-related sound areas can be identified (See Sound Mass 16).

To illustrate these various points, and to provide a basis for comparison with Déserts, the following examination of Hyperprism is included. In parts of the work the sound masses are easily identifiable, yet in others it is possible to interpret the material in a number of ways. The distinction between the sound masses is often confused by the use of pivotal notes which conclude one pattern of development and instigate another. In some instances this may simply link two sound areas within a sound mass, in others it may link two separate sound masses. There are no fixed criteria for these choices, decisions have to be made on the evidence of a number of factors. Thus, the justification for my choices of sound masses and sound areas are detailed in the table which follows the graphs. (For more detailed explanations of the graphs refer to Chapters 14 and 19 respectively.)
Hyperprism. Analysis of Sound Masses and Sound Areas.
Hyperprism. Analysis of Sound Masses and Sound Areas.
Hyperprism. Analysis of Sound Masses and Sound Areas.
### Hyperprism: Sound Masses and Sound Areas

<table>
<thead>
<tr>
<th>Sound Mass 1.</th>
<th>Consists of three independent linear sound areas in the percussion and brass.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bars 0.1 - 1.5</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Sound Area 1.</th>
<th>A complex independent rhythmic development by the percussion section, contrasting duple and triple groups of attacks and all of the various percussive timbres and textures. The density of the rhythm, the independence of dynamic and articulative markings, all indicate that this is a separate sound area.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bars 0.1 - 1.5</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Sound Area 2.</th>
<th>Repetition of the pitch level C#4 in the brass, decorated both above and below by glissandi on the trombone before passing to the horn at the close. The pitch level is subject to considerable rhythmic, dynamic, timbral and textural development which is independent of the other sound areas.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bars 0.3 - 1.5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sound Area 3.</th>
<th>The lower harmonic &quot;pedal&quot; to the sound mass. Although this pitch level interacts with the C#4 pitch level it is not subject to the same forms of development. It always occurs in the same voice, its dynamics are independent of both of the other sound areas, and its rhythmic activity is minimal.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bars 0.5 - 1.5</td>
<td></td>
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</table>

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<thead>
<tr>
<th>Sound Mass 2.</th>
<th>Distinguished from Sound Mass 1 by a drastic change in dynamics, pitch and timbre and the marking in the score &quot;Très calme&quot;.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bars 1.6 - 3.7</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Sound Area 1.</th>
<th>The creation of a large vertical pitch pattern in which the upper pitches are established first and then the lower voices join the texture. This is the first appearance of the woodwind and the percussion at the beginning is supportive, in contrast to its role in the previous sound mass.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bars 1.6 - 2.3</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Sound Area 2.</th>
<th>Independent rhythmic ideas on the percussion. Opens with dynamically emphasised fragments which contrast duple and triple attacks again, and becomes increasingly dense towards the closing pause where it is finally united with sound area 3.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bars 2.2 - 3.7</td>
<td></td>
</tr>
</tbody>
</table>
### Hyperprism: Sound Masses and Sound Areas.

| Sound Area 3. | Upper register melodic development on the flute. The upper note of the previous pitch pattern acts as the starting (pivotal) note, and the sound area is concluded by the addition of the trumpet which creates a minor ninth harmonic interval with the flute. This sound area illustrates the problems of precise identification that can arise. At what point does the C6 cease from being heard as part of the vertical pitch pattern and as part of an independent melodic line? The dynamics and the tempo changes in the score indicate this occurs in bar 2.5 but the actual location cannot be specified. Similarly sound area 4 could be seen as an extension of the closing texture of this sound area, separated by two bars silence, but essentially employing the same pitch levels, timbres and instrumental textures. Note also how the instrumental and percussive forces combine in the final bar, unifying the different sound areas to conclude the sound mass. |
| Sound Area 4. | Bars 3.5 - 3.7 |

| Sound Mass 3. | The "march" idea. Separated from the previous sound mass by a marked change in texture, timbre, dynamics, pitch, and the tempo indication "Pesante". It is not possible to identify separate sound areas as the percussion is an integral part of the development by the wind, as is the melodic line on the horn. These three aspects of the "march" work together and are developed in a similar manner, and this is the essential difference between this sound mass and the Sound Mass 1 when the same instruments presented three clearly defined sound areas. The final melodic Eb4 is sustained on a pause and acts as a pivot into the following sound mass. Note once again how harmonic major sevenths or minor ninths are used as the link between the sound masses. |
| Sound Mass 3. | Bars 4.1 - 5.1 |
Hyperprism: Sound Masses and Sound Areas.

| Sound Mass 4. | A sound mass containing a number of polyphonic lines leading to the creation of a large nine note vertical pitch pattern. The sound mass is in total contrast with the homophonic style of the previous sound mass and is separated by changes in pitch, dynamics, texture, timbre and the tempo indication of "Lent". |
| Sound Mass 5. | Sound Mass 5 contains two sound areas in the wind and percussion respectively. The wind development contains a number of rhythmically independent sound ideas which are unified into a single sound area as they all employ similar developments based on semitones, major sevenths and minor ninths. The first statement penetrates into sound area 2 through the sustained notes on the trumpets, and then briefly tries to start again in bar 6.6. In bar 7.1 the wind development reasserts itself to conclude the sound mass. |
| Sound Mass 6. | An extended sound mass which is separated from the previous material by a change in texture, timbre, pitch and the tempo "moderato". |
| Sound Area 1. | A melodic unfolding of a slowly descending pitch area moving from F#3 down to Eb3 at Figure 9. It is supported at the start by a pedal point on the trombone and returns to the same voice at the close, establishing the pitch level Db\# which penetrates into sound areas 3 and 4. |
| Sound Area 2. | An independent percussive development which once again contrasts duple and triple attacks similar to the developments in sound masses 1 and 2. |
Hyperprism: Sound Masses and Sound Areas.

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</thead>
<tbody>
<tr>
<td>An upper register rhythmic development in the woodwind, accompanied by frenetic activity on the Chinese blocks. The blocks seem to support the woodwind rather than opposing it (as in the surrounding sound areas), the dynamic levels of both ideas are relatively static and balanced, and the Chinese blocks do not feature in either of the surrounding percussive developments. The cessation of the Chinese blocks coincides with a move to a higher pitch area where the wind conclude with complicated rhythmic figures on two sustained pitch levels which interact rhythmically with sound area 4.</td>
<td>A contrasting percussive sound area which combines with the low Db♭ and the upper woodwind pitch levels to create a complex overall texture which closes the sound mass. In this instance the &quot;link&quot; into the next sound mass is provided by a pianissimo cymbal role which emerges from the sfff dynamic which closes Sounds Mass 6.</td>
<td>Concluding sound mass created from brief rhythmic fragments and a large vertical pitch pattern which is emphasised by metal percussion in the final two bars.</td>
<td>A brief percussive development which presents duple and triple attacks on the previously silent membraned percussion. It seems to act, not only as a total contrast to the surrounding material, but also as a driving force leading to the inevitable final harmonic conclusion of the work.</td>
<td>Wide ranging dynamically emphasised vertical pitch pattern emerging from a brief melodic figure on the horns. It contains the widest range of pitches presented simultaneously within the work, and the loudest dynamic level (sfff).</td>
</tr>
</tbody>
</table>
From the examination of Hyperprism the variety of different sound masses can be clearly seen. In some instances the distinction is immediately obvious, in others the music can be interpreted in a variety of ways. The two recurring features of these sound masses are firstly, that they are practically all linked by pivotal notes, and secondly that the major seventh/minor ninth harmonic interval is used as a structural device to open and close the various sound masses.

Example 1. Hyperprism.

The Role of Major Seventh/Minor Ninth in Defining Sound Masses.

This use of a unifying interval or motive at the beginning or end of sound masses can be found throughout Varèse's music. In Déserts the majority of sound masses conclude with a statement of the principal motive (Motive A), whether it is presented melodically or incorporated into the harmonic texture. Similarly, in Density 21.5 the majority of sound masses start
with a characteristic rhythmic semitone figure presented at the beginning of the work.

Example 2. Density 21.5

This method of structuring sound masses naturally points the way towards motivic analyses that will be considered in Chapter Seven.

Of all Varèse's works *Amériques* is the most difficult to divide into distinct sound masses and sound areas due to the density and complexity of some of the developments. Whilst it appears that Varèse was composing with contrasting "blocks of sound" there does not appear to be the structuring and interaction of sound masses and sound areas as found in the later works. The opening motive certainly plays an important role, and the various developments frequently overlap with one another, but there is no obvious unifying idea employed throughout the work. In addition, some of the passages are extremely long (eg. the passage between Figure 33 and 38.) and again, with the exception of the opening of *Intégrales*, this is not in keeping with the later works.

Thus, the structure of sound masses can be seen to change
from the early to late works. In *Amériques* sound masses can be identified, but they do not appear to be the primary structural blocks found in the later works. In *Hyperprism* and *Intégrales* the sound masses often present extensive linear sound areas and vertical sound areas are comparatively rare. Also, the percussion is almost exclusively used to interact and oppose the sound areas presented by the wind. In *Déserts* there are more vertical pitch areas, far fewer extended linear sound areas, and the percussion is frequently employed in a supporting role. *Nocturnal* seems to return to the types of sound mass found in *Intégrales*, but there is no recurrent motive or interval to provide structural unity, and the relative brevity of the music that was completed by Varèse makes it unwise to draw any significant conclusions from this work.

The analysis of sound masses and sound areas provides an initial insight into how the foreground structures of the various works are developed. The internal structure of sound masses varies considerably employing vertical, horizontal and combined sound areas which occur simultaneously, consequentially or are juxtaposed. Although the foreground material may appear diverse, Varèse is able to provide a structure and a sense of cohesion to the works by carefully planning the way in which the sound masses interact. Hence, this analysis also indicates how the higher structural levels arise through the interaction of these sound areas and sound masses.
Pitch class set analysis has proved a useful tool in the initial examination of the pitched structures of Varèse's music. It demonstrates how material transfers from the horizontal into the vertical plane, and vice versa. It also makes the distinction between the various sections clear, through the placement of large ten or eleven note vertical pitch patterns, and demonstrates (through examination of the pitch classes) how a number of simple motives permeate all aspects of the compositions.

The Adaption of Forte's Technique.

The theory of pitch class set analysis outlined by Allen Forte in The Structure of Atonal Music is the technique upon which the following analyses have been based (1). Forte's technique has had to be modified slightly to incorporate the larger and smaller groupings of notes he ignores, and only some of the similarity and inclusion relations he identifies have been employed. (The reasons for this will be detailed below.)
The Size of Pitch Class Sets.

Forte's technique only accommodates groupings between 3 and 9 notes and there are many instances where two note harmonic sets are solely responsible for the pitched development of Varèse's music. (For example, Hyperprism bars 3.1 - 3.7 and 9.5 to 9.8 or Nocturnal bars 1 - 7.)

This reveals one of the initial problems with set theory as it will be shown through the motivic and cellular analyses that simple intervallic cells are often the basis for extensive harmonic and melodic developments.

"Forte's decision to include only sets of cardinality 3 to 9 in his definitive list is the result of his general view of atonal compositional techniques, and indicates among other things that small scale motivic factors are not in his judgement the most essential in determining the structure of atonal music." (2)

In addition, the importance of the large structural ten and eleven note vertical pitch patterns in the music of Varèse cannot be over-emphasised. They are the means by which the majority of important sectional structures in his compositions are defined and usually coincide with major changes in pitch, dynamics, rhythm, and so on.

As all groupings of notes are reducible to the same universal set of twelve pitch classes this means that there are six possible two note pitch class sets, six ten note pitch class sets, one eleven and one twelve note pitch class sets which need to be added. These are as follows:
Example 1. Additional Pitch Class Sets for the Music of Varèse.

<table>
<thead>
<tr>
<th>Set Name</th>
<th>Pitch Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 - 1</td>
<td>[ 0,1 ]</td>
</tr>
<tr>
<td>2 - 2</td>
<td>[ 0,2 ]</td>
</tr>
<tr>
<td>2 - 3</td>
<td>[ 0,3 ]</td>
</tr>
<tr>
<td>2 - 4</td>
<td>[ 0,4 ]</td>
</tr>
<tr>
<td>2 - 5</td>
<td>[ 0,5 ]</td>
</tr>
<tr>
<td>2 - 6</td>
<td>[ 0,6 ]</td>
</tr>
<tr>
<td>10 - 1</td>
<td>[ 0,1,2,3,4,5,6,7,8,9 ]</td>
</tr>
<tr>
<td>10 - 2</td>
<td>[ 0,1,2,3,4,5,6,7,8,10 ]</td>
</tr>
<tr>
<td>10 - 3</td>
<td>[ 0,1,2,3,4,5,6,7,9,10 ]</td>
</tr>
<tr>
<td>10 - 4</td>
<td>[ 0,1,2,3,4,5,6,8,9,10 ]</td>
</tr>
<tr>
<td>10 - 5</td>
<td>[ 0,1,2,3,4,5,7,8,9,10 ]</td>
</tr>
<tr>
<td>10 - 6</td>
<td>[ 0,1,2,3,4,6,7,8,9,10 ]</td>
</tr>
<tr>
<td>11 - 1</td>
<td>[ 0,1,2,3,4,5,6,7,8,9,10 ]</td>
</tr>
<tr>
<td>12 - 1</td>
<td>[ 0,1,2,3,4,5,6,7,8,9,10,11 ]</td>
</tr>
</tbody>
</table>

Segmentation.

The segmentation of compositions can also cause problems. Although the outward appearance of the technique is one of scientific or mathematical accuracy, the element of subjectivity is always evident in the analyst's choice of notes to be included within each segment.

"Forte's own segmentation can be controversial. In the absence of hard and fast rules for segmentation, and given the sheer variety of texture typical of atonal music, differences of opinion and emphasis in segmentation are inevitable." (3)

In the music of Varèse it is common to find pitch patterns or pitch areas which are constructed through the gradual addition...
of notes. (For example, the opening eight bars of Density 21.5, the oboe solo between bars 19.1 and 19.8 in Intégrales, the opening of Octandre, etc.) Does one simply segment the entire development or should all of the individual sets be indicated? I have chosen to indicate the majority of sets on the various graphs, and the criteria by which this segmentation has been effected are timbral and rhythmic similarity, and not simply the physical coincidence of notes.

Thus, when two pitch areas overlap the coincidental vertical pitch pattern may be important, or merely consequential. The following example taken from Hyperprism clearly demonstrates this. The elements of rhythm, dynamics, pitch and articulation all indicate the sound mass to be constructed from three separate motivic developments. (The opening motive of Hyperprism being the 3 - 1(12) set presented by the trombone in the opening sound mass. Bar 0.4.) The piccolo and clarinet both present the same pitch classes so that the individual and combined segments are both sets of 3-1(12). The trombones and 1st horn present another 3-1(12) harmonic set, and both trumpets present 3-1(12) melodic sets. When combined the sound area on the trumpets employs four notes. The important harmonic interval is the 2-1 set which is maintained throughout the development, and the 4-1(12) set which arises through their combination is less important.
The unifying factor throughout this sound mass is the sustained A4 pitch level on the horns. This pitch level reacts with all of these independent motivic developments suggesting a variety of eight note vertical pitch patterns. However, the only important harmonic structure is the closing vertical pitch pattern which is created once the linear motivic developments cease during the last beat of bar 7.4. This eight note set contains two distinct statements of the 3-1(12) set, the first being the sustained lower brass sound area heard previously, and the second being created in the upper brass between the trumpets and the horn semiquavers.

In this case the segmentation is comparatively easy to make, the four, five and eight note harmonic sets which occur during this sound mass result from the independent motivic developments and therefore have not been segmented. Unfortunately decisions over segmentation are not always this clear cut.

**Similarity and Inclusion Relations.**

There is little point in segmenting a composition unless the sets which are identified are consequently examined for similarity and inclusion relations. Forte identifies four types of similarity relations. Firstly, there is maximum similarity with regards to pitch class. This can be seen in the following example from *Integrales* where the return of the opening motive is preceded by a brief interjection on the piccolo. The motive
creates a sustained four note harmonic texture and three of the four pitch classes are identical. Thus, there is a similarity relation between these two apparently unrelated ideas.

Example 3. Intégrales. Bars 16.8 - 16.10

\[
\begin{align*}
\text{Piccolo: } & 4-6(12) \ [0,1,2,7] \\
\text{Harmony: } & 4-16 \ [0,1,5,7]
\end{align*}
\]

The three other types of similarity relations are concerned with interval vectors. These can be useful but are somewhat restrictive as the concept only readily applies to sets of the same cardinality. Thus, as the intervallic content will be examined through the motivic and cellular analyses these types of similarity relation have not been employed within the pitch class set analyses.

However, I consider that it is the various types of inclusion relations identified by Forte which can prove problematical with regards to Varèse's music.

It is inevitable that inclusion and similarity relations will occur throughout Varèse's music. If a pitch area is developed by the gradual addition of notes then all of the smaller sets (subsets) are bound to be included within the larger set (superset). It is easy to see that the majority of sets of cardinality 5 and above will contain statements of the various
motives (which are usually three note sets). However, Forte states that these smaller three note sets and their complements cannot be seen as the "nexus" sets of the various works,

"... as the relationships are too widespread to be of major structural significance." (4)

Surely, it is precisely the fact that these ideas permeate the majority of sets within the various compositions that makes them of major structural significance.

However, Forte sees nexus sets as "governers rather than generators". This seems to infer a compositional process which is in opposition to Varèse's own description of his music, as being analogous to the process of crystallisation. Dunsby and Whittall note this point in saying,

"Forte's nexus sets... seem to control the flow of events by reference to their own invariant properties, rather than setting in motion a sequence of transformations that may become progressively more remote from the original nucleus, as in an evolutionary, motivic structure." (5)

Thus, although five, six and seven note sets may be seen to be important during various sound masses I do not consider them to fulfil this "nexus" role, as almost without exception these sets are created from the addition of notes to simple motivic ideas. It is the motives which control the sets, and not vice versa.

Whilst I accept that inclusion relations are a necessary means of comparison between sets, I find it hard to agree with the inclusion relations K and Kh that Forte employs. Whilst
there is obviously a need to refine inclusion relations, it is the fact that Forte only identifies relationships between pitch class sets and their complements that I find unsuitable for the music of Varèse. The $K$ relations are so numerous to be of little use, but the refinement of the $Kh$ inclusion relations does not seem to me to be particularly useful in analysing the music of Varèse. For example, in the opening sound mass of *Déserts* the fact that the principal motive $(3-5)$ is in a $Kh$ relation with $6-7(6)$ could be significant, the vertical pitch pattern is obviously constructed from two statements of the $3-5$ set. But it is also in a $Kh$ relation with the previous vertical pitch pattern, $6-Z41$. In some instances this might have revealed a previously unnoticed motivic statement, but in this case I fail to see what significance the $3-5$ set has to the construction of the previous vertical pitch pattern.

Example 4. *Déserts.*
The other factor that makes an examination of K and Kh relationships unsuitable for the music of Varèse is the fact that they exclude nine and ten note sets.

I recognise that the previous comments greatly over-simplify a complex analytical technique, but nevertheless when I have attempted to explore both K and Kh inclusion relations I have not found them particularly revealing. (See the tables included at the end of Appendix 5.) This is not to say that these types of inclusion relation are not useful in the analysis of other types of atonal music, but it is the cellular and motivic basis of Varèse's music that I think negates their effectiveness.

As so much of the above discussion seems to be so negative, why therefore have I persevered with pitch class set analysis? The reasons are that there are many types of inclusion relation that are enlightening, in particular the notion of subsets and supersets. It is often the case that sustained vertical pitch patterns are contrasted with smaller melodic or harmonic fragments. The effect of these fragments varies, they can either reinforce or try to contradict the established pitch pattern. If these fragments are found to be in an inclusion relation they normally reinforce the pitch pattern, if they are not, the opposite is usually the case. (These types of inclusion relation are only evident through examination of the pitch classes.)

The other useful type of inclusion relation that arises is
where sets complement one another. This is usually evident through the set names. The set names are designed so that, within the universal set of twelve pitch classes, complementation is evident between sets which combine to total twelve. Thus, the complement of set 5-13 is 7-13, the complement of 8-2 is 4-2, and so on. This type of complementation is instantly recognisable, and is useful as it is so closely allied to the ideas explored through the note ordering analyses.

Whilst I recognise that my approach to pitch class set analysis may be unusual the adaptations I have made are not without precedent (6). Furthermore, the use of set theory must be seen within the broader context of comparative analysis.

**Pitch Class Set Analysis.**

In *Amériques* pitch class set analysis is useful in revealing the way in which many of the contrasting blocks presented in the foreground are in fact unified through similarity or inclusion relations. The placement of large vertical pitch patterns is not necessarily structurally significant as the density of the orchestral writing means that numerous harmonic sets of nine or more notes can be identified. For example, there is an eleven note harmony created in bar 6.3 yet the section is clearly
concluded in bar 6.35 even through the vertical pitch pattern at that point only contains nine notes. Nevertheless, the form of the work is revealed, and develops around a number of statements of the opening motive on the flute, the pitch class set 5-23 [0, 2, 3, 5, 7]. Many smaller motives can be identified, for example, the 3-1(12) set of the recurrent descending wind figure first stated in bar 4.6, the 3-5 harmonic set, and the intervals of the semitone and fifth all seem to be prominent in most harmonic and melodic developments.

In the programme note written for the first performance of Amériques in 1926 Zanotti-Bianco gave an idea of how the form of the work was generated.

"The forward movement of the score could be represented as a series of varied and continual displacements of levels and volumes of sound around a number of solid pivots."

He also commented on the apparent diversity of the material employed by Varèse.

"At several points, the work presents us with sudden shifts, breathtaking leaps which give it a barbaric flavour. This characteristic even more condensed in the first few pages, which form a swift synthesis of the whole work, summing up its essential elements." (7)

Whilst is is beyond the scope of this chapter to include a detailed examination of Amériques the similarity between these blocks of music which cause these "breathtaking leaps" is revealed through pitch class set analysis. The various developments may appear to be unrelated and diverse but the vast
majority of material is synthesised and unified as can be seen from the following examples.

Example 5. Amériques. Bars 0.1 - 1.4

Bar 0.1 Bar 0.2 Bar 0.4 Bar 1.4

Pitch class set analysis also reveals that the majority of harmonic and melodic developments are quite "rich"(8) with six and seven-note chords tending to dominate. There is also a clear distinction between passages where melodic development is
at the fore and those where harmonic development dominates. In
the latter, melodic invention is almost totally excluded and
alternately when melodic development is at the fore the
accompanying harmony is normally static. It therefore appears
that the integration of harmonic and melodic material is not yet
fully developed as, with the exception of the smaller motives,
very little music transfers from one plane to the another.

In Hyperprism the pitch class set analysis indicates the
major sections of the work through the placement of the
three nine-note chords. Each of these are shown to be unique
which bears out Paul Griffiths' statement,

"Chords generally composed of eight to eleven pitch classes,
widely disposed in register and each represented once
only, are frequently found in Varèse's music at points
of closure." (9)

The harmonic structures are dominated by the set 2-1 [0,1],
which occurs at the end of each sound mass, and regularly
throughout the individual sound areas. This set is a subset of
every harmonic structure within the work. This is closely
allied to the dominant melodic idea which is the opening 3-1(12)
[0,1,2] set presented by the trombone in bar 0.3. This set
occurs throughout, and in most of the different voices. All of
the more extended melodic developments are simply expansions of
this set through the addition of more semitones as can be seen
overleaf.
Thus, pitch class set analysis indicates the overall structure and the intrinsic links between melodic and harmonic material. This integration of vertically and horizontally presented music, and the change from the dense harmonic textures of *Amériques* to a preponderance of independent melodic lines and simple duple harmonic ideas, marks the beginning of the compositional style that culminates in *Déserts*. Gone are the excesses of the previous compositions, and Varèse’s harmonic and melodic language is cut back to the bare essentials required to allow the sound masses to fulfil their structural function.

"He has never given us a more tightly knit, a more clear cut conception than this is as a whole. Faced with certain passages, full of blanks, reduced to essentials, one thinks of certain Picasso drawings in which two incisive strokes suffice to send us leaping across the whole universe."

(10) A. Carpentier.

In *Intégrales* the set theory analysis shows similar
structural development to occur. The major sections are outlined by the placement of eleven note harmonies and there is frequent transference of material between harmonic and melodic planes. The motivic structure is evident with the 3-8 set presented by the clarinet at the opening recurring throughout the work both independently and as subset of larger harmonic and melodic structures. The semitone $[0,1]$ interval is once again revealed through the interval vectors to be of primary importance.

Intégrales also shows evidence of the "transmutation" throughout. This can be seen at the very beginning, where the melodic 3-8 set is answered by a harmonic 3-8 set in the woodwind, and the seven note vertical pitch pattern that arises following the entry of the low brass contains two statements of the motive.

Example 7. Intégrales.

Eb clarinet. Bar 0.1  Woodwind. Bar 0.5  Tutti wind. Bar 0.6

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The first excursion from this motive is the trumpet development in bar 5.4 and even here the 3-8 set is a subset of the 5-7 set which is developed over the following eight bars. As well as being a subset of most important harmonic and melodic constructions the motive also returns towards the end of the work, initially on trombone (bar 18.7), and then on the original voice of Eb clarinet (bars 19.4 - 19.8).

As the work progresses the 3-5 set becomes increasingly important, occurring in practically all important horizontal and vertical developments. Interestingly, both motives include the tritone, and only differ with respect to the former including a tone and the latter a semitone. (This motive is also the principal motive in Déserts.)

Example 8. Integrales. Developments of the 3-5 pitch class set.


In Ionisation the set theory analysis reveals little about the structure except that the entrance of the tuned voices at the close of the work are considered to be no more than
another percussive sonority. Precise pitch is only employed to supplement and support the structure at the close, and the pitch class set which is constructed as figure 13 does not alter at all over the concluding 17 bars of the work. Once again, the 3-5 set plays an important role in the construction of this sonority, a role that continues in Density 21.5 and is developed to the full in Déserts.

In Density 21.5 pitch class set analysis reveals a wealth of motivic relationships, in which the 3-5 and 3-1 pitch class sets dominate once again. The overall form is suggested by the return of the opening 3-1 motive, in a variety of transpositions and registers.

By Déserts it is evident that the musical language of Varèse has undergone a number of changes. The overall structure may still be defined by the placement of large nine and ten note vertical pitch patterns, but these are somewhat contradicted by two non-structural twelve note ideas. The harmonic language has altered, with a move towards more spartan textures. Dense harmonies become the exception rather than the rule, despite the large number of instruments employed. The emphasis now seems to shift towards the textural development of vertical sonorities, and this accounts for the relatively few pitch class sets that are presented melodically. The motivic structure is complicated, including the 3-1 and 3-5 sets heard so frequently in the earlier works, and additionally a 3-3 set which rises in
importance as the work progresses. (See Chapter 15 for more
detail.)

In Nocturnal these changes appear to have been taken a stage
further and the texture becomes even more spartan and temporally
expansive. Although each sound mass and section moves towards
a harmonic close, the sets are not particularly large (six or
eight notes only) and similar harmonic textures can be found
within the various sections which partially negates the impact
of the closing vertical pitch patterns. There do not appear to
be any recurrent motives. The 3-1 and 3-5 pitch class sets both
occur in similar structural roles to the previous works but are
no more significant than any number of other small sets. Each
sound mass seems to contain its own distinct material and
inclusion and similarity relations are far less frequent. It
also seems that the transference of material from the harmonic
to the melodic plane seldom occurs, ideas now seem disjunct and
the integration that was so evident in all the earlier works is
now showing signs of dissolution.

Chou's completion of Nocturnal is easily distinguished from
the preceding material. The harmonic language alters
considerably and the progressive construction of richer and
thicker harmonic textures occupies most of the final eighty
bars of the work. Again there is little evidence of either
motivic structure or the transference of material from one plane
to another. Certain new motivic ideas do arise but seldom do
they remain important for more than a few bars duration.

Thus, pitch class set analysis is a useful tool in the unveiling of the music of Varèse so long as it is viewed within the context of other analyses. In Hyperprism, Intégrales and, to a lesser extent, Déserts this analysis indicates the overall structure of the work. However, it primary importance is in the way in which it helps to identify many of the foreground phenomena, emphasising the motivic structure and revealing a wealth of similarity and inclusion relations between apparently unrelated material.

Certain Varèsián characteristics are apparent through pitch class set analysis and these appear in the early Amériques and continue right through to the incomplete Nocturnal. These are: the creation of large vertical sonorities by the progressive introduction of more and more voices to the texture; the dependence on motivic development, and particularly the 3-1 and 3-5 pitch class sets; the use of the 2-1 set as a primary constructional unit; the transference of melodic material into the harmonic plane and vice versa. However, it also appears that the methods by which material is developed gradually change throughout his life as melodic development becomes increasingly rare and harmonic textures more spartan. Naturally, this supports my initial premise that the musical language of Varèse can be seen to be both unified with regards to an overall style, and gradually changing and evolving throughout his life.
CHAPTER SEVEN.

MOTIVIC ANALYSIS.

All of Varèse's works contain a number of motives, and motivic development is one of the primary means by which the foreground musical structures are developed. Motives can be either pitched or rhythmic, and in the majority of cases both elements are combined, the rhythm being an inherent part of the movement between the various pitches which define a statement of the motive.

The identification of motives is dependent on a number of factors. Pitch class set analysis is helpful in this process, but it does not necessarily follow that every set which is a superset of a particular motive should be considered as a motivic development. Similarly, identification by pitch class set alone can ignore many developments which are clearly motivically based. For example, in Amériques the opening motive on the flute is a 5 - 23 set but by no means can all of the various developments of this motive be reduced to the same pitch class set. (See Example 1. Page 150. Ex.1, iii is 6-Z24, iv is 7-27, v is 6-Z36, etc.) Therefore, many other factors have to be taken into consideration: the register; the texture; the timbre; the dynamics; the articulation; and the function within
the sound mass or sound area.

Although the works of Varèse are varied, the simplicity of some of the motivic forms employed result in similar motives occurring in a number of works. It also appears that, following the expansive *Amériques* where motives are often extended and often develop into prolonged themes, the structure of Varèse's music becomes increasingly dependent on a more precise and integrated form of motivic development which permeates all aspects of the musical structure.

In *Déserts* the pitched motives are all simple three note ideas, which appear both melodically, harmonically, and in a combined manner. This means that motivic recognition can occur almost irrespective of the order in which the notes occur or the octave in which they are placed. This marks a change from *Amériques* where motivic recognition is dependent on a linear succession of notes, a maintenance of intervallic spacing and the majority of motives are presented melodically.

The change in Varèse's musical language is therefore evident, through changes in the types of motives within the various works and changes in the manner in which they are employed. With the exception of *Amériques* the pitched motives tend to be short three note ideas, and the majority include semitone or tritone intervals which challenge traditional harmonic expectations. Similarly the rhythmic motives usually combine duple and triple
rhythms, or develop quintuple rhythmic ideas which maintain
temporal development but resist the establishment of meter.

Whilst motivic analyses of all of Varèse's music is beyond
the scope of this thesis it is interesting to note similarities
in the way in which motivic development takes place, and the
similarities or "borrowing" of motives that is evident,
particularly in relation to Déserts. (See Chapters 16 and 18.)

Motivic development in the music of Varèse is not restricted
by the necessity for precise repetition, inversion, etc. Varèse
freely develops motivic ideas with regards to the intervallic
content, rhythm, timbre, dynamics and articulation, as can be
seen from the following variations (1) on the opening motive of
Amériques.


i. Original.  
Flute. Bar 0.1

\[ \text{Example 1. Amériques. Opening Motive.} \]

\[ i. \text{ Original.} \]
\[ \text{Flute. Bar 0.1} \]

ii. Trumpet 1.  
Bars 5.14 - 5.17 (Also 18.14)

\[ \text{Example 1. Amériques. Opening Motive.} \]

\[ ii. \text{ Trumpet 1.} \]
\[ \text{Bars 5.14 - 5.17 (Also 18.14)} \]

iii. Trumpets 1 and 2.  
Bars 21.8 - 21.10

\[ \text{Example 1. Amériques. Opening Motive.} \]

\[ iii. \text{ Trumpets 1 and 2.} \]
\[ \text{Bars 21.8 - 21.10} \]

iv. Trumpet 1 and Clarinet 1.  
Bars 16.2 - 16.4

\[ \text{Example 1. Amériques. Opening Motive.} \]

\[ iv. \text{ Trumpet 1 and Clarinet 1.} \]
\[ \text{Bars 16.2 - 16.4} \]
In these examples it can be seen that the developments are increasingly wide ranging, altering both rhythmic and pitched content. They are considered as distinct motivic developments not only because of the similarities they show to the original, but also because of the context in which they appear. For example, the viola "motive" at figure 7 occupies an identical role to the solo flute in the previous bars. Additionally, many of the independent linear developments contain major sevenths, fourths and fifths which point to their motivic origins.

Amériques contains many other motivic ideas which reoccur in various forms throughout the work. For example, the two part descending semitone figure in perfect fifths, which is usually associated with the wind and normally occurs at points of closure. This is also the 3-(12) motive which appears in the majority of Varese's other works in different guises. (See bars 4.6, 5.12, 6.29, 18.12, etc.)
Example 2. Amériques. Trumpets 1 and 2. Bars 49.2 - 49.3

There are many other motives and blocks of music which are repeated within Amériques. (The brass idea in bar 1.4, the bassoon melody in bar 3.4, the whole of bar 1.1, etc.) The majority of these ideas have their origins in the music presented in the opening few bars of the work, and this is a common feature in all of Varese's music. Also, the various motives are dominated by the intervals of the fifth and the semitone, and interestingly these are the two intervals which control the structure of Déserts.

In Hyperprism, Intégrales, Ionisation and Density 21.5 the motivic structure is no less complex, but the music develops fewer motives and far simpler motivic ideas. As the majority of motives contain only three notes they can be more readily identified through pitch class set analysis. The motives tend to be developed through changes of timbre, dynamics and articulation rather than the altered and elaborated forms heard in Amériques. Once again, the rhythmic characteristic is inherent in the structure of the motives, and the context in which the motives occur is an important pointer towards identification of the various motivic statements.
Example 3. Integrales.

i. Original.  
**Eb Clarinet. Bars 0.1 - 0.3**  
Bars 0.10

ii. Trumpet in C. (Extended)

iii. Horn.  
**Bar 3.2**  
Bar 16.8 - 16.9

iv. Horn. (Partial)

v. Trumpet in C.

vi. Tenor Trombone and Horn.  
**Bars 18.7 - 18.8 (Similar to ii)**

vii. **Eb Clarinet.**  
**Bars 19.4 - 19.5**

In *Déserts* the motivic structure appears to be more fully integrated into all aspects of the composition (even into some of the passages of organised sound). The three pitched motives account for practically all of the horizontal and vertical developments demonstrated in Chapter 16. Unusually, the principal motive is not presented right at the start, in fact the opening idea seems to have little bearing on the overall structure. The major change in the motivic structure arises from the fact that so many motives are presented vertically or
in a combined manner. This tends to destroy the inherent rhythmic characteristic of the motives which is so noticeable in the earlier works. Thus, in Déserts pitched and rhythmic motives are distinct, and only tend to coincide in a few important structural points in the work. (See Chapter 18.)

Throughout Varèse's music it is apparent that motives are not the only source of foreground development. All pitched motives contain a number of intervals and frequently a single interval derived from the motive is responsible for foreground development. These recurrent intervals (or cells) have a symbiotic relationship with the motives from which they arise. This has already been demonstrated in Hyperprism with regards to the semitone, and in Déserts this process reaches its logical conclusion. Similarly, in Nocturnal the opening sound mass is controlled by the interval of a minor tenth, and this is developed through inversion, diminution and with regards to changes in the octave placement, register and dynamics.

Example 4. Nocturnal

However, in the following sound masses other intervals seem to be of more structural significance, namely the fifth and the semitone. I consider the lack of cellular or motivic synthesis in this work to be reflective of the compositional problems the work posed Varèse which resulted in it being unfinished some four years after it had received its "first performance"(2).

It has been observed that Varèse was not averse to "borrowing" material from other composers (See Chapter 2), and therefore it is hardly surprising that a number of Varèse's own motives recur in more than one composition. Whilst the following examples are by no means exhaustive, they do indicate a number of pitched and rhythmic similarities with the motives contained within Déserts and are therefore particularly relevant to the discussion regarding the overall development and evolution of Varèse's musical language. (For a more extensive examination of these factors see Appendix 10.)

Example 5. Quintuplet Rhythmic Motive.

Arcana. Trumpet 1. Bar 27.4

\[\text{\textbf{Arcana.}}\]
\[\text{Trumpet 1. Bar 27.4}\]

\[\text{\textbf{Déserts.}}\]
\[\text{Trumpet 1. Bar 49}\]

\[\text{\textbf{Example 5. Quintuplet Rhythmic Motive.}}\]
Example 6. Rising Semitone Motive.

Trombone. Bar 0.3 Piccolo. Bar 0.2 Horn. Bar 80
(Note also the rhythmic similarity to Ex. 5.)

Example 7. Falling Semitone Motive. (At point of closure.)

Bars 4. - 4.7 Bars 242 - 243

Example 8. Semitone/Tone Motives.
(These are the inverted form of the opening motive of Density 21.5 which is also common throughout Varese's music.)

Ecuatorial. Déserts.
Piano. Bar 0.6 Bass Clarinet. Bars 119 - 120

Ecuatorial. Déserts.
Piano. Bar 0.7 Bb Clarinet. Bars 205 - 206.

Example 9. Major Seventh/Minor Ninth Motives.

Octandre. Déserts. (Retrograde)
Bar 0.1 Piccolo. Bars 185 - 187
CHAPTER EIGHT.

NOTE ORDERING ANALYSIS.

From my early work on *Intégrales* (1) it became apparent that the music of Varèse is structured in the way in which notes are added to both the melodic and harmonic textures of his music. Naturally, the introduction of new notes is intrinsically linked with the motivic, rhythmic and pitched development of the music. However, closer examination reveals that this progressive introduction of new notes is far from a random occurrence, indeed it seems to take place in all of his works, and at various hierarchical levels.

To what extent note ordering was a conscious means of structuring the music, or merely the consequence of other forms of development, is debatable. We know Varèse had little time for the constraints of serialism or any other system, yet there seems to be a great deal of evidence that note ordering of a freer and more intuitive type does occur throughout his music. However consciously the technique was adopted by Varèse, what is immediately obvious is that analysis of the way in which notes are introduced is another useful and complementary tool which helps towards an understanding of his music.
Background.

The concept of note ordering was initially suggested by the fact that *Intégrales* employs eleven instruments with precise pitch and all of the key "cadential" harmonies in the work are eleven notes chords. None of the notes are doubled. Although the structuring of these harmonies, and the choice of notes employed, can usually be accounted for through motivic and intervallic development, the "missing" note is normally significant in the consequent development. In the following example the opening and pivotal note of the extensive oboe solo that follows the eleven note chord is the "missing" F.

Example 1. *Intégrales*.

Vertical Pitch Pattern. Bar 15.3 Oboe Solo. Bars 16.1 to 16.3

Similarly the eleven note harmony after figure 12 omits the note
D which is the opening melodic note of the following march theme on C trumpet and Eb clarinet.

Example 2. Intégrales


This led me to examine the "cadential" harmonies in other works and in a number of cases similar structuring was found. I also started to examine the interaction between harmonic structures and melodic lines, as suggested by Example 1 (above), and was surprised to find the extent to which this form of structuring seems to have been employed. Examples can be found throughout his music from the early Amériques right through to the unfinished Nocturnal.

Amériques.

In Amériques examples of this structuring are not difficult to find. The first sustained and dynamically emphasised harmony
that has the "cadential" quality is found in bar 4.7. The ten
note harmony that is constructed omits the notes B and C. These
are the melodic notes that open the following phrase on the alto
flute, and have reoccurred throughout the opening section.

Example 3. Amériques.
Vertical Pitch Pattern. Bars 4.7 - 4.8  Alto Flute Motive.

In Amériques the orchestral forces employed are huge. Varèse
obviously had the capability of writing eleven and twelve note
chords whenever he wished. Nevertheless, vertical pitch
patterns of this scope are rare. One example is the final chord
of the work which employs eleven distinct pitches, and
considerable octave doubling. The pitch which is not used is G
and this is the note which concludes the woodwind development
immediately prior to the harmonic close. (Note also the overall
rising semitone progression from the F♯5 on trumpets in bar
49.2, through this established G5, to G♯5 of trumpets in
bar 49.9. (An augmented and retrograde statement of the
recurring wind motive. See also Example 5)
Example 4. Amériques.

Woodwind Bars 49.7 - 49.8  Closing Vertical Pitch Pattern.

Another example is the dynamically emphasised chord at bar 6.25. Here the "missing" notes from the eight note chord are A, Ab, Eb and E, the dominant notes of the following brass motive. (i.e. they present the notes which have been omitted and then return to notes derived from the chord, with the underlying unity provided by the recurring harp and string sound idea.)

Example 5. Amériques.

Vertical Pitch Pattern. Bar 6.25  Brass Motive. 6.29 - 6.30
An example of the structuring of notes occurring between harmonic and melodic material is found at Figure 12. Here a languid horn melody contrasts with slow moving string harmonies. Although these harmonies appear quite dense they each only contain four notes, the density of the texture being created by doubling and internal movement. The four "missing" notes are the principal notes around which the horn melody develops. (See also Fig. 22)

Example 6. Amériques.

Vertical Pitch Patterns. Horn Melody. Bars 11.10 - 12.6
Bars 12.1 and 12.2

Many other examples of this type of structuring of all twelve pitches can be found in Amériques, a few of which are cited below.

1. The passage at Figure 5, which drew so many comparisons with Le Sacre du Printemps. Until bar 5.11 the entire passage has only presented 9 different pitches, despite the density of the harmonic textures. The "missing" notes are B, Ab and G. The B is the dominant melodic note on the flute melody which
precedes this passage, and the Ab and G are the dominant melodic notes of the brass motive that closes this passage in bars 5.12 - 5.14.

2. The harmonic cadence in bars 18.12 and 18.13 employs eleven different pitches, the "missing" note B is the first note of the following pitched motive on the C trumpet. (Similar to Example 3.)

3. The passage that emerges from the cadential vertical pitch pattern at bar 21 (starting with the harp attacks in 21.3) presents nine different pitches. The "missing" notes are C, Db and Ab, the notes of the following motive on the trumpet.

Hyperprism.

In Hyperprism there are only nine instruments with precise pitch. In this instance all the "cadential" harmonies are nine note chords. Both the closing harmony and the harmony which occurs at figure 5 show evidence of this type of structuring. In both cases the notes which are omitted occur in prominent melodic sound ideas immediately prior to the construction of the cadential harmony. The "missing" notes from the closing chord are D, G# and C# and it was no surprise to discover that the unison passage on the three horns that introduces this large chord uses these three notes to the exclusion of all others.
Example 7. Hyperprism.


Similarly, the vertical pitch pattern in bars 5.4 - 5.5 omits E, G and Ab, which are the prominent notes of the melodic phrase on trumpet that introduced this harmonic development.

Example 8. Hyperprism.

Trumpet 1. Bars 5.1 - 5.3 Vertical Pitch Pattern.

An example of melodic and harmonic interaction is found in the march idea at figure 4. The melodic line on the 1st horn develops over two four note chords in the lower brass. The "missing" notes from the harmonic texture are Gb, Eb, D and C, all of which occur in the horn melody.
Example 9. Hyperprism.

Lower Brass Harmonies. Fig. 4. 1st Horn Melody. Bars 4.1 - 4.4

(See also Appendix 2 for further examples)

Intégrales.

It has already been stated that Intégrales was the composition that led to my examination of Varèse's music with regards to note ordering. Besides Examples 1 and 2 there are many other instances where note ordering of this type occurs.

1. The eleven note vertical pitch pattern at bar 18.10 omits the note F#, the first note of the following oboe solo.
2. The eleven note vertical pitch pattern in bars 2.7 - 2.9 omits the note C which is found at the beginning of the following passage as a pedal point on the trombones.
3. Each of the repetitions of the motivically constructed vertical pitch pattern between bars 3.1 and 5.2 contains all twelve notes, with remarkably few doublings or repetitions.
4. Each of the repetitions of the rhythmically developed vertical pitch pattern between bars 10.6 and 11.7 contain a single statement of all twelve notes.
Déserts.

The incidence of note ordering will be discussed in full in Chapter 17 and is therefore not included at this juncture.

Nocturnal.

Although Nocturnal remained unfinished at Varese's death there is still evidence of this form of structuring in the ninety or so bars that were completed.

In Nocturnal the first major "cadence" (in bar 28) presents a ten note chord. The "missing" notes are F and Ab, the very two notes around which the preceding passage centred. It is interesting to note in this example that apart from rhythmic repetition each of the twelve notes occur only once before the passage closes.

Example 10. Nocturnal. Bars 19.4 - 30.4

\[
\begin{array}{cccccccccccc}
& 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12 \\
F & Ab & F\# & G & C & B & Eb & A & E & C\# & Bb & D \\
\end{array}
\]
This concise statement of all twelve notes, free from octave doubling or reiteration seemed to suggest that in the later works Varèse had adapted and refined the technique, a point supported by other passages in Nocturnal and in Déserts.

Another example is found at bar 65 where a prolonged harmonic development is concluded with a vertical pitch pattern containing eight notes. The "missing" notes are Eb, the principle note of the following melodic line of the soprano, and A, C and Bb which open the following passage on the piano in bar 78.

Thus, examination of the music with regards to the structured introduction of notes quickly led to the realisation that it did not only occur at cadential harmonic points but could also be seen at many other places in the music. Extended melodic passages, antiphonal fragments, polyphonic passages, contrasting harmonic blocks, all showed evidence of this form of structuring of the notes. It also became apparent that this method of organising notes did not only occur at an immediate (foreground) level, but in many cases at increasingly established levels (middleground and background).

From these initial examinations a number of questions arose. Did the concept of note ordering apply to all the material in Varèse's music? As harmonic and melodic material "transmute" would Density 21.5 show evidence of note ordering? How does one
develop an acceptable analytical technique based on these principles?

The answer to the first and second questions were positive. Note ordering seemed to be evident in most of Varèse's music, although there is a notable change in how the principle is applied from the early to the late works. However, the method does not seem to be rigidly applied throughout his music, but rises into prominence in certain sound areas, and is superseded by rhythmic, pitched or dynamic development in others. This was only to be expected as we know of Varèse's dislike for systems (2). Thus, this technique is a means by which Varèse's fluid atonal (3) musical language can be examined. It is not the "key" to understanding how his music is developed but does prove useful in highlighting larger scale formal structures, and motivic and cellular development at levels other than in the foreground.

The answer to the final question was not so simple.

Methodology.

Other theoreticians have recognised this form of structuring but with the exception of L.Stempel (4) few have attempted to develop this into a more comprehensive method of analysis. R.P.Morgan commenting on the opening of Hyperprism says,
"The first pitch, the C# persists throughout and largely dominates the section. Although it is transferred up an octave it remains as a fixed and stable element around which the other pitches assume their own positions. The unfolding of this section is brought about by the gradual addition of new pitches, positioned so as to expand the musical space outwards from the opening C#, until a sort of spatial-tonal saturation point is reached." (5)

Having recognised the existence of this type of structuring it therefore followed that a technique of analysis would need to be developed to examine this aspect of the music.

Initial attempts at developing a technique proved frustrating. My experience with Intégrales had suggested that all twelve notes were structured in many passages but when trying to apply this technique to other pieces, and in particular the later works, it sometimes seemed that the technique was somewhat forced (especially in the middleground). I then realised that to expect the method to fit completely (all twelve notes) in all works was unreasonable. This would have suggested that there was only one form of structuring in Varèse's music and, as I have been at pains to emphasise, this is not the case. Thus, it is to be expected that some passages may only employ nine, ten or eleven notes, in particular when other forms of structural development are more prominent. Having recognised this factor the development of a simple methodology to examine this aspect of the music was of little problem.

To avoid any possible confusion I decided to employ the well established terminology of foreground, middleground and
background to define the different hierarchical levels in the music. (Although these terms are common in Schenkerian analysis the definitions I attach to them here differ slightly, see Glossary.)

In the foreground notes are defined by any occurrence, however prominent or subordinate it may be. This includes grace notes, and does not distinguish with regards to dynamics, duration or timbre. Glissandi are not considered to present all of the notes within their compass. Normally only the note to which they lead will be considered in the foreground, however in some instances repetition causes the opening note of the glissando to be considered as well. (Each case has to be viewed in context.) It is possible that a particular note may occur a number of times within a passage through rhythmic development or through the transfer of a pitch level from instrument to instrument. In this case only the first appearance of the note will be marked.

In the middleground notes must be established. For a note to be perceived as established it must be sustained, penetrating, of pitched or harmonic importance. At a background level the process is further extended with the established notes usually being key structural notes, repeated melodic notes, harmonic pedal points, prominent pitch levels, or notes that emerge from the "cadential" harmonies.
Naturally, much of the hierarchical analysis is subjective, and thus I make no excuse for the large number of examples included in the remainder of this chapter. In addition, a complete analysis of Hyperprism is included in the appendices to provide an overview of the method distinct from the later examination of Déserts. (See Appendix 2.) To differentiate between the various levels on the complete analyses a numerical system of ordinary, circled and boxed numbers is used for the foreground, middleground and background levels respectively.

**Melodic/Linear Note Ordering.**

In the music of Varèse the approach to the linear aspect of his music changes quite markedly throughout his life. The extensive melodic development of Amériques is superseded by a more restrained and pitch oriented form of writing in Hyperprism and Intégrales. However, there are still extensive linear and polyphonic passages contained in these works, and the peak of this type of development can be seen in Octandre.

In Density 21.5 Varèse's approach to the linear aspect of his music can be clearly seen, but being scored for solo flute it is only partially representative of the melodic development found in its neighbouring works. Although it can be argued that Density 21.5 consists solely of melodic invention it is evident
that this development is not of a conventional manner. At times rhythmic, dynamic or registral aspects are the focus. These other forms of development take over from the melodic unfolding of notes (the expansion of pitch areas) so common in the earlier works. Thus, in a sense, Density 21.5 illustrates a halfway point in terms of melodic development between the early and late works.

In Deserts and Nocturnal extended melodic lines and independent polyphonic development is rare. Many of the melodic lines that do occur result from the temporal expansion of a harmonic structure, or the gradual expansion of a sound area. It is unusual to find these lines employing more than five or six different notes.

In the early (surviving) works of Varèse there are a number of instances of extended melodic development, both on a single instrument and passing between a number of voices in the ensemble. In many of these passages the music develops through the gradual introduction of new notes until the required texture has been achieved. These developments often employ all twelve notes, and even if all twelve notes do not appear in a single voice the "missing" notes are usually significant in the surrounding passages. This is a way in which the gradual expansion of pitch and sound areas can be investigated.
Example 11. Octandre

3rd Movement. Canonic entry on the Oboe. Bars 1.1 to 1.8

In most instances where the music develops more limited collections of notes it is usual to find the "missing" note(s) are significant in the accompanying or surrounding passages.

In the following example from *Hyperprism* the solo trombone presents an extended melody accompanied only by percussion which slowly unfolds ten notes through semitone melodic development. The "missing" notes are D and D♭ and it is interesting to note that the final note on the bass trombone, that concludes the melodic development, and then acts as a pedal point in the consequent rhythmic woodwind passage is actually marked D♭\{\text{7/4}\}, subsuming both of these "missing" notes. The glissando at the opening of the phrase (although written out in full in the new edition of the score) does not really present the D, D♯ or E as distinct notes, and it is only with the reiteration of the Eb
and Db\# in bar 9.1 that the phrase ends.

Trombones. Bars 7.8 to 9.1

To always require melodic development to work with all twelve notes would inhibit the working process and detract from the variety of texture that is such a feature of Varèse's music. However, it can often be seen that smaller melodic phrases can be read together and in combination the structuring becomes clear.

Towards the end of Intégrales there are two oboe solos both of which introduce seven note groups before developing the material rhythmically. When combined the two phrases use eleven notes and it is no coincidence that the "missing" Eb is the sustained note which appears on the horn in bars 19.9 - 19.10 and links the two passages.
Example 13. Integrales.

Oboe (Horn) Figures 19 and 20

In the later works this progressive development of all twelve notes on a single instrument seldom occurs. Extended melodic lines are uncommon yet most linear progressions still employ the principle of note ordering. Thus, a similar "unfolding" of notes is still evident in the later works suggesting that melodic passages do not necessarily have to strictly use all twelve notes but may, on occasion, employ much smaller groups on which to base their development.


Double Bass. Bar 43
There are no extended melodic lines in *Déserts*, bearing out A. Whittal's description of the work as being "atematic" (6), but there is one single, extended melodic line in *Nocturnal*. It occurs just prior to the point where the work was left unfinished. It is almost as if this apparent contradiction in style is an indicator of the insurmountable problems facing the composer in trying to complete the work to his satisfaction. It is also extremely unusual in that it is doubled, not just by a single voice as occasionally happens in *Déserts*, but by the violas and all of the woodwind, and is played in three different octaves simultaneously. Although the phrase employs ten notes the "missing" notes appear, once again, in the accompanying trombone chord (Bar 85). (The "missing" C# and B being the top and bottom of the three note chord.) Thus, in some ways this passage appears to employ the note ordering technique as found in *Hyperprism* and *Intégrales* whilst the actual melodic line is unlike anything that has preceded it.

*Example 15. Nocturnal.*

Soprano. Bars 82 to 87.

\[ \text{Example music notation} \]
In many cases note ordering seems to develop away from immediate foreground levels, and helps in the definition of larger structures. (The principle of "hierarchical" note ordering will be discussed later.) This can be seen in the following example taken from Density 21.5.

In Density 21.5 the major sections are formed from numerous brief sound areas employing a limited number of notes. At first the choice of notes seems to be derived solely from motivic development. However, closer examination reveals that the development is often governed by a combined realisation of a gradually widening spectrum of notes, and it is the introduction of the phrase containing the twelfth note which brings the sections, or in this example the entire work, to a close.

I consider the final section of Density 21.5 starts at bar 50.2. I am aware that there have been many different analyses of this work (See Appendix 3) but the change in the pattern of development at this point is marked. This section is also indicated by a change of tempo, dynamic emphasis and by a drastic drop in register. The last twelve bars are formed from a number of smaller three and four note sound areas, and although there is considerable rhythmic development only nine notes are used in the first eight bars of the section. The final notes enter in the closing ascent, with the final note to be introduced (B) being the last note of the work.

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In the earlier works there are also many examples of note ordering occurring between polyphonic lines. In the following example from Intégrales the movement towards the central and final cadences develops from complex polyphonic lines which come together in a chorale like brass idea. The various lines split and become rhythmically independent again immediately prior to the creation of the closing vertical pitch pattern. In each case there is a short, dynamically emphasised sound idea on the woodwind, which seems to bear little relation to the underlying development. These interjections, on three different voices, contain ten notes and no repetitions or doubling. (The first E on the clarinets is played simultaneously.)
Example 17. Integrales.

Woodwind Interjections. Bars 12.1 and 21.8
Oboe. Eb Clarinet. Bb Clarinet.

As expected the "missing" notes are prominent in the underlying material, the A appearing on the tenor trombone in bars 11.10 and the C on the horn in bar 12.1 with a sound idea which introduces the brass "chorale".

In Hyperprism there is a similar example where the central cadential vertical pitch pattern is preceded by independent linear development. Again, the relationship between the instruments seems to be based on note ordering principles. The majority of lines contain four or five notes, yet there is remarkably little doubling or repetition of notes particularly between instruments of a similar timbre.


Trumpets 1 and 2.
In this example the "missing" notes are Eb and A, the top and bottom notes of the vertical pitch pattern on Eb clarinet and trombone respectively.

In the later works the fragmentation and condensation of linear material means that examples of this scope are rare. Interacting linear material will almost always use a contrasting spectrum of notes but the number of notes employed is usually far fewer, normally five or six notes only.

**Harmonic Note Ordering.**

A number of the examples that have already been included indicate that note ordering can occur in harmonic as well as melodic material. This is to be expected as we know that material is constantly shifting from the horizontal into the vertical plane, and visa versa. There are numerous examples that can be found, but, unlike the linear and polyphonic examples, the incidence of harmonic note ordering increases in the later works. This indicates that Varese was concentrating more on timbral, textural and harmonic development rather than linear development common in the earlier works.

Before considering these examples I wish to emphasise once again that I am not suggesting that Varèse consciously worked through all of the different notes before concluding a pattern of development. But he does seem to have consciously avoided
duplicating notes, and therefore when pitch or sound areas are expanded the consequence is that forms of note ordering will often manifest themselves in the music.

The following example shows how a sound mass in Intégrales is developed through the addition of harmonic blocks which increase the overall spectrum of pitches included, with the appearance of the twelfth note Gb instigating the construction of the cadential eleven note vertical pitch pattern.

Example 19. Intégrales.

Contrasting harmonic blocks. Figure 7.

In Déserts there are a number of examples of the planned introduction of all twelve notes. Often each note only occurs once within the sound area and then the development continues
along a different path.

Example 20. Deserts.

Vertical Pitch Pattern. Bar 204 Vertical Pitch Pattern. Bar 270

The previous independent examinations of melodic and harmonic material do present a rather simplistic view of the way in which Varese explored and developed material within the sound masses. In reality the development of the music, whether presented horizontally or vertically, is far more complicated and is dependent on a number of factors. Timbre, rhythm, dynamics, and articulation all combine with the principle of note ordering in the development of sound areas and sound masses in the music of Varèse.

Hierarchical Note Ordering. (The Creation of Form)

It has already been inferred through many of the previous
examples that "note ordering" can occur at various levels within a composition and not simply in the foreground. The exclusion of certain notes can help to instigate new sound masses; the creation of large vertical pitch patterns often define the various sections of a work; the dominant or established notes within a particular development can present motivic or cellular ideas at a higher level.

The realisation that the principle of note ordering could occur at higher structural levels first came about through trying to account for the "missing" notes in various developments. I was left wondering why, in the early works, the pattern of melodic unfolding sometimes seemed to stop when it might have seemed logical to continue the passage until all twelve notes were introduced. In the following example the long oboe solo unfolds eight different notes with the B, A, Bb and C being the "missing" notes. The oboe sustains an F# and small polyphonic fragments are introduced on C trumpet, horn, tenor trombone and D trumpet respectively. Interestingly these developments each centre on one of the "missing" notes, once again serving to conclude one passage and pivot the music into a new pattern of development. Therefore, it is not an immediate foreground presentation of the four "missing" notes but a more drawn out and established hierarchical level providing a balance with the previous extended oboe melody.
Therefore, it seemed logical to continue the examination with regards to the creation of sound masses and sound areas. What were the dominant notes within the various developments, and was there any evidence of note ordering to be found?

Once again the evidence seems to be positive. Although statements of all twelve notes are not always clear in the middle and background levels there is evidence that Varese consciously avoided using the same notes as the basis for related sound areas. Furthermore, the progressions outlined by these established notes are often motivic.

This concept is examined in depth in the analyses of Hyperprism and Déserts. (See the over-views of motivic and cellular relationships in the middle and background levels. Appendix 2 and Chapter 17 respectively.)
Conclusions.

From these examples it is clear that the introduction of the various notes at different hierarchical levels is not simply coincidental in Varèse's music but a precise and ordered way in which form and structure is defined.

This form of analysis is useful for a number of reasons: it re-emphasises the structures outlined by other methods; it explains the internal structure of many sound areas which had previously been identified only by tempo, textural or dynamic change; it provides an understanding of how many of the sound masses are developed; it indicates that levels other than the foreground were planned and are not just coincidental.

Although it seems unlikely that note ordering was to the forefront of his mind when composing, I do consider Varèse was aware of this type of structuring, regardless of how intuitively it may have arisen. The principle of note ordering is used to link sound masses; develop the internal structure of sound masses; delineate the various sections; transfer (transmute) material from harmonic into linear planes, and vice versa; enhance and create form. Thus, note ordering analysis should be seen as a comparable technique to the other forms of analysis employed, each of which reveal different facets of Varèse's musical language.
CHAPTER NINE.

RHYTHMIC ANALYSIS.

The foreground rhythmic structure of Varèse's music can be examined through motivic and cellular analysis. Whilst rhythm always remains the motive force behind the development of the sound masses, the manner in which the rhythmic structure is organised and developed gradually changes throughout his life. This is reflected in changes in the role of the percussion, the rhythmic independence of the percussive developments, the integration of pitched and rhythmic motives and the way in which sound areas within the sound masses interact.

Through the addition of new instruments and the vast expansion of existing percussive forces Varèse elevates the importance of the percussion section so that it is equally capable of generating structure and form alongside the woodwind and brass. However, this does not simply result from the size of the forces but rather the manner in which they are employed.

In Amériques we have the first surviving statement of this aspect of his musical language. Whilst the percussion does occasionally act in the traditional manner of colouring climaxes and highlighting structural developments, it is more often
employed presenting contrasting, and rhythmically independent material. The percussion acts as "stimulus" or a foil to the developments in the strings and wind, and in this respect its remains unchanged throughout his life. Paul Le Flem commented in the programme note for the performance of the second version of Amériques in Paris in 1929,

"There are two densities at work above all in Amériques: the orchestra proper and its stimulant, the percussion. The role of the percussion is not to provide rhythmic punctuation or to accentuate certain cadences, but to penetrate into the masses of instrumental sound, to lend them special and varied vibrations. The percussion element will thus be sometimes deep, sometimes flexible and light, the rhythm explosive and nervous." (1)

This role continues, and is gradually refined, throughout Hyperprism and Intégrales, and perhaps reaches its peak in Arcana.

"Varèse... gives us a rhythm shaken, contracted, twisted by intersecting vibrations and resonances. Those hackle-raising syncopations, those arched and straining triplets, listen to them shake at their bars like wild beasts in a cage .... and these musical incompatibilities are mirrored in a spiritual divergence too." (2)

In Ionisation the rhythmic structure emerges from the interaction between contrasting groups of percussion (often of a similar timbre), rather than from the opposing wind and percussion of the previous works. However, there are two distinct changes in the style of percussive writing that are evident. Firstly, contrast is supplied through the interchange of rhythmically independent and unison passages. Although
rhythmic unison does occur in the earlier works, nowhere else in Varèse's music is it used to this degree. Secondly, the repetitions of the "subject" and "counter-subject" described by N. Slonimsky (3) combine to establish a regular meter, and throughout the work there is an interchange between metrical and ametrical material. Once again, similar contrast can be found in the earlier works, but in none of the works (perhaps with the exception of Amériques) does the concept of meter appear to play such a significant role.

In Déserts the role of percussion has changed considerably. Percussive development is normally an integrated part of the sound mass, providing temporal development when the wind is relatively static and visa versa. In addition, it is often an integrated part of a sound area, and separate percussive developments are less common than in the earlier works. The percussion also seems to play an important role in defining and developing the various sound masses and sound areas. The changes between the sound masses are often marked by the appearance of a percussive texture, and the changes in the relative stability of these developments are usually the direct result of percussive activity.

Thus, there is a marked change from the interactive percussion of Hyperprism and Integrales to the integrated percussion of Déserts.
These changes manifest themselves analytically in a number of ways. The early works often create instability through contrasting duple and triple attacks, which creates a constantly shifting rhythmic texture and resists the establishment of meter.

Example 1. Hyperprism. Bars 0.4 - 0.5

Indian Drum. Cymbals, Tambourine and Chinese Blocks.

Example 2. Integrales. Bar 21.7


In the works written before Deserts the majority of motives integrate the pitched and rhythmic characteristics, so that one seldom arises without the other. For example, the opening motive of Integrales always appears as the three brief attacks and then a more prolonged note, regardless of where it occurs within the work.
Example 3. Integrales. Opening Motive.

Bar 0.1   Bar 0.4   Bar 3.2   Bar 18.7   Bar 19.4

(See also the opening motive of Density 21.5, Page 126)

But in Déserts rhythmic and pitched motives are clearly separated (See Chapter 18) and integration is a comparatively rare occurrence. The instability of sound masses and sound areas still arises from percussive activity, but rather than contrasting duple and triple ideas the developments seem to be more fragmented, with written silence playing a major role. Percussive textures tend to be thin and the establishment of meter is avoided by the predominance of triplet, quintuplet and septuplet rhythms. Furthermore, this method of rhythmic development occurs just as frequently within the wind and piano as it does within the percussion section. Therefore, all of the instruments are equally capable of being the rhythmic "stimulus" within the music, and this accounts for the large number of bars in which the percussion section is totally silent. (i.e. In Hyperprism the percussion without precise pitch is present in...
79% of the work, but in Deserts this figure has dropped to only 51%.

Example 4. Deserts. Bars 202 - 203

Therefore, the rhythmic development of Varèse's music remains relatively constant throughout his life.

"Rhythm derives from the simultaneous interplay of unrelated elements that intervene at calculated, but not regular, time lapses." E. Varèse. (4)

The differences that are apparent between the early and late works derive from changes in orchestration and the role of rhythm within the sound masses, and this is dependent on changes in many of the other elements of Varèse's music.

However, the quotation above makes it clear that rhythm cannot simply be seen as the organisation of attacks in the surface configurations of the music. Rhythmic organisation permeates through many hierarchical levels within the compositions and this is evident in the rate of change between the various sound masses and sound areas. This means that rhythm is synonymous with the development of structure and form.
Rhythm can arise through dynamic, timbral, articulative and textural change in addition to the relationship between the various attacks. Thus, rhythm cannot readily be analysed as a separate element, and needs to be viewed within the context of the other analyses, for as G. Tremblay notes,

"We may say that durations give sound its dimension in time, whereas dynamics shape its volume. Here, the rhythm of the music is created by the combination of the two and is centred on the formation of the sound, since in Varèse's work it is the sound which is the master of everything else." (5)
CHAPTER TEN.

SUPPLEMENTARY ANALYSES.

Within a broad analytical technique which purports to examine all of the elements of Varèse's musical language there is a requirement for supplementary analyses to those already outlined. The two elements that can be readily analysed in a graphical manner are pitch and texture.

Pitched Analysis.

Analysis of pitch provides a clear idea of the overall structure of all of the works, indicating the changes in sound masses and sound areas, and the changes in the types of development employed. Varèse expands the range of pitches that are available to him through the addition of "new" instruments (ie. The Ondes Teremine, contra bass trombone, etc.) and throughout his orchestral and ensemble compositions he employs a pitch range of seven octaves or more. Pitched organisation is also extremely important within the instruments that do not have precise pitch. This will be shown through the analyses of Déserts contained within Chapter 19. This form of structuring
has been recognized by many previous authors, and in particular Chou Wen Chung (1).

To illustrate how pitched analysis can lead directly to an understanding of the structure and form within the work the following analysis of Density 21.5 has been included, not only to illustrate the methodology, but also to provide a basis for comparison with the analyses of Deserts. To a large extent the graph is self explanatory. It provides an immediate impression of a gradually ascending pitch area at the start, a number of independent developments within confined pitch areas in the main body of the work, and a return to a gradually ascending pitch area at the end.

The opening bars employ a narrow range of pitches which move upwards until the C5 is established in bar 8. Next, a restricted pitch area of three notes (C5, Db5 and D5) is contrasted with a rhythmical development covering the widest range of pitches heard thus far (D#4 - G#5) before concluding by coming to rest on the upper pitch level E6.

The two passages which follow (bars 15 - 17 and 18 - 21) are similar as they both begin with a confined pitch area and then conclude with a rapid transfer into the upper register.

Between bars 24 and 53 the majority of developments can be seen to develop within clearly defined and static pitch areas. These vary with regards to the size of the pitch area employed
Pitch Level Graph: Density 21.5
but once defined the rhythmic and melodic development does not change. In bar 41 there appears to be a return to the opening ideas of the work with another restricted pitch area being concluded through transferring to a sustained upper pitch level. In this instance the response is an extended rhythmic development in the highest pitch area in the entire work, and the most restricted (only a minor third).

From bar 53 onwards the linear progression ascends, but unlike the opening of the work the lower pitches are referred to throughout the development, widening the pitch area until the final ascent to the upper pitch level B6.

Therefore, pitched analysis can provide a clear idea of the movement between the various sound areas and sound masses as well as the changes in the types of development employed. However, to develop this into a more accurate perception of the overall form requires consideration of the other elements, or comparative analysis. For example, the distinction between bars 8 and 9 is not clear from the pitch graph but is obvious when the elements of rhythm, dynamics and articulation are considered.

Example 1. Density 21.5 Bars 8 - 9.
Density 21.5 has been used to demonstrate the form of pitched analysis I have adopted as, being written for solo flute, the graphs can be easily followed, rather like a score. This is not always the case within the ensemble, orchestral and electronic works. However, the distinctions between sound areas and sound masses suggested through pitched analysis become increasingly apparent in these works as there are so many more instrumental lines which all point towards the same structural reading. (See Chapter 19 and the previous analysis of Hyperprism, pg.118)

Textural Analysis.

Major changes in texture normally coincide with changes in the sound areas and sound masses. Textural analysis alone can provide a clear insight into the overall structure of a work but, in common with the pitch analysis detailed above, when viewed in isolation some significant structural changes may be overlooked. Once again, the following textural analysis of Intégrales has been included to help outline the technique and to provide a basis for comparison with Déserts.

From this textural analysis the majority of sound masses are easily distinguishable. The major structural vertical pitch patterns can be identified as points where all eleven wind instruments coincide followed by a major change in the texture. (Bars 2.7, 7.8, 12.6, 15.3, 18.10 and 22.3) Differences in the
types of foreground development employed are evident as some of the sound masses contain rhythmically developed or fragmented textures and others are more sustained. Textural analysis also reveals changes between harmonic and linear developments as well as demonstrating the independent role of the percussion section (i.e. it rarely coincides with the changes of texture in the wind).

However, textural analysis alone can supply little of the foreground detail and some obvious differences in types of development can be overlooked. For example, there is no way of telling whether a sound mass contains homophonic or polyphonic developments, and yet contrast of this nature occurs throughout the work. Thus, the significance of textural analysis is as a supportive technique capable of reinforcing other analytical findings but is only of limited use when viewed in isolation.

Rhythmic Density.

Line graphs of rhythmic density are similarly helpful in supporting the distinction between sound masses and sound areas. The majority of sound masses can be identified by major changes in the rhythmic intensity. For example, rhythmically frenetic passages contrast with sustained linear developments, or independent percussive developments contrast with homophonic wind sonorities. The analysis also helps towards an
understanding of the overall structure of the work and the way in which sound masses combine and interact. In Déserts, in addition to the distinctions between sound areas and sound masses, changes are evident between the rhythmic intensity of each of the major sections. Thus, this type of analysis can be supportive of many different forms of analysis and many different hierarchical levels of analysis as will be demonstrated in Chapter 19.
Initially the idea of comparative analysis was to bring together analyses which had examined the music of Varèse from different perspectives. Through comparison the key points in the construction of the music should become apparent as points where the various techniques coincide must surely be of structural significance. Thus, it was hoped that the analyses would combine to create a single reading of the structure.

In reality it became immediately apparent that the agreement between the various analyses was extensive. Furthermore, comparative analysis could not be dealt with as a separate part of the analytical technique. The remarkable way in which all the elements interact and are synthesised within the music requires constant cross referencing and comparison. Varèse does not compose with rhythm, pitch or timbre but with sound and all of the elements are equally important to the structure of the various sound masses. Thus, the concept of comparative analysis within the following examination of Déserts will occur
throughout the analyses and will not be dealt with solely as a separate consideration that is "tagged" on the end.

The previous chapters have indicated that, whilst composing within a single compositional style, the musical language of Varèse undergoes a number of changes throughout his life. In many ways Déserts can be seen as the pinnacle of his musical achievements (See Chapters 12 and 13). Through the following chapters I shall demonstrate that Déserts is the most intense, emotional and "complete" musical expression within Varèse's surviving works. It reveals a remarkable compression of thought, and the integration of the various musical elements is at its most advanced stage. Therefore, it is almost impossible to consider any single element in isolation. For example, the analysis of pitched motives includes considerations of timbre, register and, to a lesser extent, dynamics and articulation. Similarly, the analysis of rhythmic motives is integrally linked to dynamics and articulation, and the analysis of sound areas and sound masses must of necessity consider all of the elements of Varèse's musical language.

Thus, in methodological terms, it is only through the broadening of techniques that may appear to be specific to a single element that aspects like dynamics, articulation and timbre can be included as these elements are not readily susceptible to quantifiable and accurate analysis. In this
way it is ensured that all of the various elements which construe Varèse's musical language have been fully considered, and examined from a number of different perspectives. This will be demonstrated throughout the following analyses.
PART THREE.

ANALYSIS.
CHAPTER TWELVE.

DÉSERTS: BACKGROUND.

Introduction.

_Déserts_ was chosen as the principle work around which this thesis was to be based because of its significant role within the limited output of the music of Varese. Firstly, it marked the end of a long period of compositional silence. Secondly, it allowed Varèse to synthesise electronic and instrumental music for the first time. Thirdly, the structure and form reveal a total integration of all of the elements of his musical language, an ideal he had been moving towards throughout his earlier works. Fourthly, the reaction it caused, both in Europe and America, helped to re-establish Varèse's reputation and reassert his importance as a major force in twentieth century music. Fifthly, _Déserts_ has been recognised as the summit of Varèse's achievements, and hailed as a masterpiece.

"He (Varèse) played me a score in which the taped music makes its entries with such spontaneity and takes its place in the midst of that large orchestra with such unprecedented ease. I went to visit him a few months ago and begged him to let me hear _Déserts_ again. My impression on this second hearing was even stronger than the first; I am convinced that in this case we may fearlessly employ that awesome term masterpiece." L. Dallapiccola. (1)
"The name Varèse is synonymous with a new intensity and a
new concretion, and the best things in his music - the
first seven measures from No 16 in Arcana, the whole of
Déserts - are among the best things in contemporary music." I. Stravinsky. (2)

The Significance of Déserts in the Output of Varèse.

The significance of Déserts in reaching an understanding of
Varèse's music has been widely recognised. I consider it to be
the key work from the rather limited number of compositions that
have survived. Déserts represents the fulfillment of years of
musical development, research and experimentation: a complete
statement of the mature Varèsian compositional language. Thus,
through a detailed examination of Déserts an understanding of
his musical language should be achieved.

"It was during the years of silence that Varèse must have
refined his conception of form, for his next work, Déserts,
was the most perfect example of the integration of form and
content." D.H.Cox. (3)

The freedom afforded Varèse by the ability to work with
electronic and pre-recorded sound appears to have been the
stimulus for a new period of compositional creativity. He was
finally able to realise concepts and ideas he had envisaged some
thirty years earlier. His initial attempts in the medium centred
on the realisation of the taped interpolations for Déserts.
Although he rejected the first three versions of these passages,
through this work he developed a method of composition in the
medium that resulted in Poème Électronique and La Procession de
Verges. Varèse also demonstrated that electronic music could be employed to create music in a similar manner to his instrumental music, a clear contrast with his contemporaries who were mainly working with music concrete.

"Only in the early fifties did he begin writing again, and his large scale Deserts presents the most successful integration of pre-recorded electronic sound with the normal symphony orchestra that I have heard." R.Henderson.(4)

"Significantly, the first work to appear - Deserts, combined both instrumental and electronic elements, as if Varèse wished to demonstrate once and for all that there was no inherent contradiction between what he had previously done with old instruments and what could be done with the new." R.P.Morgan.(5)

It would be foolish to consider Deserts simply as a collection of "organised" sounds. All of the music of Varèse represents his life and his personality, and thus the struggles and torments of the previous years all "pour out" in Deserts.

"In order to understand him as a man.......the story of his inner being is of primordial importance; his silent struggles, the great blows in his being, his loves, his own aggressiveness - all that has shaped the inward being, and that being cannot seriously be dissociated from the man as creator." F.Ouellette.(6)

But Deserts does more than simply reflect the feelings and emotions of the composer. It is constructed specifically to cause a reaction, to transfer the emotion, and this can be seen in the response the work invoked.

"After hearing Deserts for the first time I wrote to Varèse to tell him of the shock it caused, of its great effect as a cry comparable to Picasso's Guernica. ... Throughout Deserts what we hear is not only the tragedy of man but also the tragedy of the elements, of the animals, of the plants, of the stars; it is an expression of all that is suffering, evil, despair, nothingness." F.Ouellette.(7)
Déserts also demands examination because of the new concepts of structure and form it employs. In Déserts Varèse has managed to develop a composition which completely rejects previous formal constraints, and by so doing has created a work which exemplifies many of the trends that were present in "modern" music at the time.

"Déserts is profoundly anti-classical in that its concern is with arrival, not with departure and return. It is this organic force in the music which makes it such a valuable study for composers today, as they struggle to discover new large forms which are not disguised carbon-copies of the old." A. Whittall. (8)

The construction of the music is clearly based on principles of structuring and organising sound that Varèse had been developing in the nineteen-twenties and thirties. Déserts seems to represent the culmination of this process, as the synthesis of the elements, and the precision of the individual sound masses and sound areas, is unrivalled elsewhere in his music. The form arises from the interaction of these sound masses and sound areas, providing a constant change in the relative stability of the music.

"It is the alternation of violence and repose which gives the work logic and coherence, and the insecurity of the latter is a tribute to the conviction of the former." A. Whittall. (9)

Varèse made a number of well publicised comments regarding the construction of his music, and in particular Déserts, and the following analyses have been developed around these
"Déserts is such an original composition that one can only understand its constructions through the mind of Varèse by adopting the terms he used of his musical structure." D.H.Cox. (10)

Thus, Déserts can be seen to be an important work, not only within the context of the music of Varèse, but within the whole of twentieth century music.

"After Déserts, no composer could remain ignorant of the power of sound or the possibilities offered by new techniques." F. Ouellette. (11)

Towards an Analysis of Déserts.

Bearing in mind the statement above, it is surprising that Déserts has attracted so little analytical attention. (See Appendix 12.) The number of dedicated analyses of Déserts are extremely limited, and I am not aware of any significant attempt to analyse the whole of Déserts (ie. including the passages of organised sound).

This is probably because Déserts poses so many problems to the analyst, not least of which are the sections of organised sound. Various methods have been employed but most, in my opinion, fall short of being comprehensive as no single technique can fully reveal the structure of the music. This is compounded by the fact that the music seems to be highly complex and capable of a number of different interpretations.
Analysis of *Déserts* must consider sound and not music per se. Whilst, the previous chapters have detailed the various techniques I shall use to examine *Déserts*, they do not encompass the passages of organised sound. Any analysis must be capable of dealing with the passages of organised sound on an equal footing with the instrumental music. To achieve this I have had to develop "scores" for these passages (See Chapters 14 and 19) as Varese's original sketches and graphs are not available. The background to the development of these "scores" is described below.

**Analysis of the Passages of Organised Sound.**

The passages of organised sound contain a variety of sound sources: industrial noises, recordings of various musical instruments and studio generated sounds. They are not purely electronic nor are they music concrete. The analyses of the instrumental sections centre on consideration of pitch, rhythm, timbre and texture and these elements were used to form the basis of my examination of the sections of organised sound. Thus, the fundamental problem was how to develop a form of graphic notation capable of representing these elements.

There are various ways in which to tackle this problem. The examination could have been undertaken in a "scientific" manner. For example, one can detect that sine waves and square waves are
used in certain places, or that various forms of modulation, distortion and white noise are employed. This approach was rejected for two principle reasons. Firstly, I could only account for a small amount of the material in this manner. How does one analyse pre-recorded machinery in these terms? Secondly, the resultant analysis would not be directly comparable with the instrumental sections, thus defeating the whole purpose of the analysis.

I have chosen to adopt a more subjective style whilst maintaining as much "scientific" accuracy as possible with regards to pitch and rhythm. I decided upon a number of graphs, to be displayed concurrently, that detail pitch, rhythmic density, texture and timbre on the vertical axis, and duration on the horizontal axis.

Some of the sounds present few problems of identification. For example, the organ is clearly distinguishable, and the various pitches can be calculated and copied. However, the majority of the sounds cannot be identified or described so precisely. The graphs were created by emulating as closely as possible the various sound ideas on a synthesiser and then transferring the notes and textures to the graphs. By changing waves, adding noise, modulating, distorting, etc., it was possible to obtain a fair copy of most of the sounds. Through this I was able to identify the various sound areas within the...
sound masses. The first passage of organised sound is not only the most complex, but also the most resistant to this form of analysis. Fortunately, for no real reason, I had started my analysis on the third passage, and by the time I reached the first passage I found I was sufficiently steeped in a way of hearing that made it possible to transcribe these sounds.

The use of the synthesiser was the key to understanding the passages of organised sound. It enabled me to notate the sound areas that include precise pitch levels; obtain an idea of pitch area for the more complex sounds that do not contain recognisable pitches; experiment with harmonics and overtones, which provided another insight into the sounds used both in the sections of organised sound and the instrumental sections; experiment with various ways of treating sound, much as Varese must have done. It also made me recognise how much we take modern technology for granted, and left me wondering what Varese might have achieved had his life span been twenty years later than it was.

It should be remembered that the graphs are not a score, but are my own subjective interpretation of the content of these sound masses. They do not represent a complete picture as dynamics, articulation(12) and the differences between the left and right channels have not been included (13). Nevertheless, I do consider that the graphs represent the sounds within these
passages as accurately as possible, and trust they will provide a useful basis for analysis and comparison.

Pitch.

All sounds where precise pitch can be identified have been precisely notated using a single line at the appropriate level on the graph. Imprecise pitch was calculated by experimenting with clusters on the keyboard, and once a similar sound was found the range of the cluster was transferred to the graphs. This has been notated as follows.

Example 1.


Rhythmic Density.

Rhythmic density was ascertained by counting the number of attacks and noticeable changes in intensity, dynamics or timbre within a two second period. This enabled a standard line graph to be drawn. (This is discussed in more detail in Chapter 19.)
Timbre and Texture.

The texture arises from the interaction of the various individual timbres and sound areas. Thus, the most difficult problem to tackle was that of identifying the different timbres. It is immediately obvious that there are not enough adjectives to describe the various nuances within the sounds, and this assumes that one can even come to a definition of what the basic sound is.

My training as a percussionist has resulted in a particular approach to this problem, and I appreciate that others might use different methods. I chose to describe the majority of sounds in terms of their similarity to percussion, and supplemented this with a few broad descriptive terms. There are sounds based on machine noise, various type of generated noise, and various studio generated sounds from oscillators, radio dials, etc. It seemed that to try and break these categories down any further would be impossible to support, and extremely difficult to notate. Finally, there is the recognisable sound of the organ, and a prominent generated sound that is clearly designed to emulate the human voice. The distinction of different timbres is extremely difficult primarily because of the ways in which the sound is treated. Sounds can be distorted, the attack can be removed, harmonics can be enhanced and the fundamental removed, and so on.
The result of these considerations was the identification of eight broad bands of sound. However, the descriptive capability is considerable as each band has been given a range from high to low (depending on the notation), and a number of sounds are considered to include more than one of these descriptive categories. This can be seen from the following example taken from the middle of the second passage of organised sound. (Sound Mass 16.)

At the opening the timbre is a relatively high wooden sound, this brings a response from a low sound which combines wood and machine characteristics. The next entry is a high pitched metal sound, and so on.

Example 2. Timbre and Texture.

The graphs of the passages of organised sound have been included in their entirety in Chapter 19 and should be referred to throughout the following analyses.
CHAPTER THIRTEEN.

DÉSERTS: CONTEXTUALISATION.

The appearance of Déserts in 1954 marked the end of eighteen years of compositional silence for Varèse. Although he had not stopped composing during this time he had become enmeshed in complex projects that were to prove impractical. Through Déserts he managed to re-establish himself as a leading twentieth century composer, and in a compositional sense he managed to get a hold back on reality.

"The Abyss" (1).

The progression into the period of Varèse's life that Ouallette describes as "the abyss" was not caused by any single event, but was the result of a coming together of a number of factors. His compositional output was never very large, but following the creative burst initiated by his move to America when Amériques, Offrandes, Hyperprism, Octandre and Intégrales all emerged within a five year period, the process of composition obviously became increasingly difficult, and completed works far more sporadic. Performances of his music became equally sporadic, and from his letters it is clear that Varèse fought a constant battle to get his works performed both in America and Europe.
His emotional psyche also contributed to the prolonged silence. Varese was always subject to depression, but during this period his depressions frequently approached suicidal proportions. It is also known that he suffered considerable financial worries during this time, and this is one of the reasons why he later turned to teaching and lecturing.

The Second World War must have been a major influence, and it is interesting that a number of observers see Déserts as a direct representation of the horror of the holocaust. His work on Espace was clearly affected by the outbreak of war, as noted by F. Ouellette,

"It was war that brought about the metamorphosis or transition from Espace, a work celebrating brotherhood, to Déserts, a work that is like a cry against all that is barbarous, savage and absurd." (2)

However, the principal reason for his silence was the inability to realise his acoustical dreams; to generate new sounds; to create new instruments.

"In those days the situation seemed hopeless. I'm afraid I developed a very negative attitude towards the whole musical situation... The frustration of having my work ignored was only part of it. I had an obsession: a new instrument that would free music from the tempered system." (3)

The Search for New Sounds.

It might initially appear strange that the search for new instruments and new sounds could have such a profound effect on
Varèse. However, the failure to develop this aspect of his music was not simply an inconvenience, but a challenge to his entire musical philosophy.

"Varèse stopped composing in 1937, for he felt that without electronic means he could go no further without compromising his integrity." M.Wilkinson. (4)

It should be remembered that Varèse did not actually stop composing until the very end of this period. Throughout his life Varèse was involved in composition, the fact that there are so few surviving works is a testament to the fact that he was also highly selective. When some of his earlier works were described as "experimental" he quickly rebuffed this, stating his "experiments" were consigned to the bin. Thus, throughout this period he continued this process of experimentation, it was merely that he was always dissatisfied with the result that gives the illusion of total silence.

"It seems that Varèse felt increasingly in need of new kinds of instruments as time went on, especially after about 1930, and as his attempts to interest foundations, sound studios, and other commercial enterprises in subsidising research into and construction of such instruments were repeatedly rebuffed, he sank into a state of discouragement which led eventually to creative paralysis. He still composed, but "would tear up at night what I had written during the day and vice versa." As a result, almost nineteen years elapsed between the premiere of Density 21.5 and that of Déserts." J.Bernhard. (5)

Electronics.

Varèse had envisaged electronic instruments for a number of
years. His early work with sirens arose from a desire to be able to create curves of sound rather than exact pitch within a tempered system, and the use of organ and Ondes Teremine in *Ecuatorial* show how eager he was for the introduction and development of new electronic instruments. Louise frequently comments that Varèse was excited by the sounds of the city of New York, and yet without electronic means he was unable to reproduce or develop any of these ideas.

"All the river noises entered his room and he discovered the music in the foghorns, whose nostalgic ghost walks so poignantly through *Déserts.*" L.Varèse. (6)

His ideas regarding electronic instruments were highly advanced, they were not pipe dreams but had been carefully considered with regards to the acoustical effects he desired. He was able to give quite specific details of how he thought they might be developed, and what their capabilities should be.

"And here are the advantages I anticipate from such a machine: liberation from the arbitrary, paralysing tempered system; the possibility of obtaining any number of cycles or still desired subdivisions of the octave, consequently the formation of any desired scale; unsuspected range in low and high registers, new harmonic splendours, the possibility of obtaining any differentiation of timbre, new dynamics far beyond the present human power orchestra, a sense of projection in space, cross rhythms unrelated to one another." (7)

It is interesting how many of these factors are realised in *Déserts*, both in the instrumental music and the passages of organised sound. The clarity of this vision must have made it all the more frustrating when he was constantly refused access
or grants from various organisations working in the field.

Varese was under no illusions that electronic instruments would suddenly result in "instant" compositions. He realised that the output could only be as good as the ideas fed or programmed in by the composer.

"We must not expect our electronic devices to compose for us. Good music and bad music will be composed by electronic means, just as good and bad music have been composed for instruments. The computing machine is a marvellous invention and seems almost superhuman. But, in reality, it is as limited as the mind of the individual who feeds it material." (8)

However, one of the main virtues of electronic instruments was that they were capable of transmitting the composer's thoughts direct to the listener. Varese had a preoccupation with interpretation. His scores are packed with dynamic and articulative detail to try and leave as little to chance as possible, similarly he was known to dislike vibrato both on instruments and the human voice.

"No matter how consummate a work of art may seem it is only an approximation of the original conception." (9)

But through electronics, Varese envisaged that he would be able to reach the listener "unadulterated by interpretation". Ironically, even in Poème Électronique, he was not able to fully realise this ideal, as Ouellette has noted the marked differences between the performances when Varese was engineer and when he was absent.
Espace.

Although Espace was never finished it is important to examine the work as it provides an insight into many of the themes and ideals which were carried over into Déserts. The work had been envisaged as early as 1929, and underwent a number of transformations over the following years. In 1936 the work aroused some considerable interest, and was apparently scored for chorus and orchestra (10). By the end of 1937 he described the work to J. Salinger and it has obviously changed considerably as he now describes it more in terms of an unrealised piece of electronic music, using loudspeakers to project the sound around the auditorium. (He later achieved this ideal with Poème Électronique.) Elliot Carter's recollections of a performance of fragments of the score at a concert in 1947 reveal the work has changed once again.

"I remember particularly a concert organised in 1947 at the New School to present extracts from his Etude for Espace, apparently never completed, for chorus singing and speaking in several languages at once and accompanied mainly by percussion. It proved a most stimulating score, suggesting a whole world on new possibilities not thought of at that time." E. Carter. (11)

Yet between these two periods he also envisaged a performance that would link countries, an idea that arose from the "manifesto" on which the work was based.

"Voices in the sky, as though magic, invisible hands were turning on and off the knobs of fantastic radios, filling all space, criss-crossing, overlapping, penetrating each
other, splitting up, superimposing, repulsing each other, colliding, crashing. Phrases, slogans, utterances, chants, proclamations. China, Russia, Spain, the Facist states and the opposing Democracies all breaking their paralysing crusts. (12)

It is interesting how many of these descriptions of the movement of sounds, expressed in 1929, can be seen to be realised in the movements of sound masses and sound areas in Déserts. Also, how akin this is to the process of composition that Anaïs Nin observed in her diary after a visit to Varèse in 1941, and which surely continues on with Déserts.

"On the music stand there is always a piece of musical notations. They are in a state of revision, resembling a collage: all fragments, which he arranges, displaces, cuts, glues, reglues, pins and clips until they achieve a towering construction." A. Nin. (13)

(See also footnote 29 regarding Thrunn)

Déserts.

The initial concept of Déserts was as a sound track to accompany a film of the same title, to be made after the sound score was completed.

"Visually, the film was to reveal several aspects of the desert or wilderness: the deserts of earth, the deserts of sea, but particularly the deserts in the mind of man." (14)

The "abyss" had certainly put him in contact with the latter, and his knowledge of the "wilderness" was strengthened by the time he spent living in Sante Fe in the 1930s.

"It was not by chance that he had moved so physically close to the desert at that time. The desert was becoming the symbol of the reception that was being given to his boldest
ideas, to his dreams, to his inner world, to his works. It was because Varèse felt himself living in a desert that he moved to the desert. He felt the need for some harmony between the nature surrounding him and the despair he felt within. The desert one finds in a city such as New York is of another essence. It is the desert of multiplicity, of paroxysm. But the real desert was to become the physical and symbolic site of his "Passion", of his suffering. "(15)

The eventual release from this period of "suffering" was brought about by a number of factors all of which combine in the consummate musical expression which is Déserts.

Varèse's knowledge of the film industry was extensive. Louise Varèse tells of a number of occasions shortly after his arrival in America when Varèse appeared in silent movies. In 1939 Varèse was living in Los Angeles and was trying to influence filmmakers in his ideas in the hope that they would provide him with the resources he required. At this time he produced an article for The Commonweal entitled Organized Sound for the Sound Film. In this article he expressed many of the ideas that were to come to fruition in Déserts. He described what he considered to be the contradiction between contemporary images and eighteenth and nineteenth century instrumental scores, and then continued to discuss his views on how a contemporary sound score should react to the images.

"Between this sound score and the dramatic continuity, the relation must be one of intimate and interacting connection: a relationship of unity, of form and of rhythm. But this weaving together of the disparate sonorous and visual elements which will make of a film a unified whole cannot be achieved by the device of an imitative repetition of the visual. Although certainly unintentional, there is
something very comical, even in the nature of parody, in the usual musical procedure: the music scampering to keep up with the action, increasing in volume and tempo in an impossible effort to express exactly the same thing in the same way." (16)

These ideas remained constant throughout the following years and thus in Deserts the music was designed to contrast with the visual material, and not to act merely as a wash of film music highlighting the visual images. Varèse explained the symbiotic relationship between sound and images,

"Visual image and organised sound will not duplicate each other. For the most part light and sound will work in opposition in such a way to give maximum emotional reaction. Such contrasts achieved through the synchronisation of simultaneous, unrelated elements would create a dissociation of ideas which would excite the imagination and stimulate the emotions." (17)

The instrumental music had been started in 1950 and was completed by the end of 1952. The taped interpolations were finished in France in time for the first performance given by the RTF orchestra in December 1954. Although the film never came to fruition the music remains coherent and effective as Varèse had always seen the music and the film as parallel artistic statements, also it had always been the intention that the score would be finished first.

The reactions it caused were varied but, in common with his earlier works, they were always powerful whether positive or negative. The critic at the first performance in Paris wrote as follows.
"The audience contributed generously to the event, murmurs at first, then, crescendo, waves of vociferous protest mingled with wavering applause." (18)

Perhaps the response was somewhat predictable, especially as the work was sandwiched between works by Mozart and Tchaikovsky. The American premiere caused a similar reaction,

"There was booing in the Philharmonic Hall last night and from the sedate Boston Symphony audience.... During the performance there was considerable laughter and talking. At the end there was a volley of boos. There were also cheers from several young people in the audience." (19)

It is interesting to compare these critics' comments with those given to the work after its first performance in England in 1961. By this time the reputation of Varèse was established, and the performance also incorporated the re-worked passages of organised sound.

"Déserts is the most satisfying artistic exploration in electronic music I have heard." (20)

Whilst Déserts can obviously be considered to be "ahead of its time" there is a certain irony in that it was through the events of the years during the "abyss, and the physical separation of Déserts from his earlier works, that Varèse's music started to become acceptable "modern music". It is as if, through waiting twenty years, he had allowed the rest of civilisation to catch up with him and attain the same level of artistic understanding that he had shown in the twenties and thirties.

On hearing a recording of Varèse's early works the novelist
Henry Miller immediately wrote to Varèse,

"(I was) in fact, knocked out. I had the definite impression that twenty five or thirty years before the horrible discovery of the powers of the atom, you were already in the new age." (21)

The first taped interpolations for Déserts were not completed to the composer's satisfaction, and in the eight years after the completion Varèse was to work on three more versions of the organised sound passages. The fourth (22) interpolation was considered to be definitive, with regards to the technical equipment available at the time, and it was in this form that he allowed Robert Craft to record the work in 1962. Within these taped sections we can see Varèse at his most lucid, working with colour, timbre, intensity, pitch, dynamics and rhythm with a freedom of technique he had never quite attained before. The links between taped and orchestral passages are masterly. Some of the changes are so subtle that one is not even aware that the ensemble has stopped playing, whilst others contrast so violently so as to demand your immediate attention.

Although Varèse had spent so many years dreaming of the freedom electronics would provide, the reality was somewhat different. His dissatisfaction with the first versions of the taped sounds in Déserts stem from the fact that he was working under guidance of people whose work was focussed on music concrete. We know of Varèse's violent opposition to "schools"
and "isms", and thus his anger when these interpolations were referred to as music concrete is hardly surprising. It was only in the nineteen sixties that he was given total freedom, and this resulted in the accepted and approved versions that have been analysed within this thesis.

"We gave Varèse the possibility to work on the revision. The fact was, of course, that Varèse did most of that tape in France with the assistance of people from music concrete. I do not think it was a thoroughly harmonious association. Neither was his association with Philips Laboratories where he produced Poème Électronique." (23)

Nevertheless, Varèse then turned his back on this medium and returned to instrumental and vocal writing in the two unfinished works Nuit and Nocturnal that were to occupy him for the rest of his life. F. Ouèlette explains this apparent "about turn".

"We must not forget that the instruments of the future would be expected to serve the imagination, the sensibility, and the quest for new sounds of a twentieth century genius.... Even after Poème Électronique for which Varèse had the most advanced techniques at his disposal, he was not satisfied. He had still not succeeded in realizing the sounds he could hear inside himself. Even in 1965, the available techniques were still not sufficiently developed." (24)

Varèse on Varèse.

Throughout the previous chapters I have emphasised that the best way to gain an insight into the music of Varèse is by examining it using his own terms and ideas. Whilst I do not wish to requote the many comments regarding the structure and form in his music, and Déserts in particular, the identification
of these factors is not necessarily straightforward.

F. Ouâlette observed that Varèse was known to enjoy teasing and confusing interviewers and that,

"it was necessary to have known him a long time to be able to tell when in his replies he was telling the truth." (25)

This is further compounded by the Varèse's frequent use of analogies, and his apparent dislike for any descriptions that were based in purely musical terms. This can lead to differences of opinion depending on your interpretation of the various analogies. However, whilst taking this fact into consideration there are still two apparent contradictions which need to be considered before progressing on to the following analyses. The first regards his definition of "interval". I consider the interval to be a vital factor in the creation of the structure of Déserts but,

"In a letter to Luigi Dallapiccola, Varèse denounced "the intellectualism of the interval" and promised that it would play no part in his new piece (Déserts)." (26)

Yet in his programme note for Déserts he writes,

"The work progresses in opposing planes and volumes. Movement is created by the exactly calculated intensities and tensions which function in opposition to one another; the term intensity referring to the desired acoustical result, the word tension to the size of the interval employed." (27)

The second apparent contradiction arises from the crystallisation analogy. The much vaunted concept that form emerges from the interaction of the "crystals", and is not
pre-planned, is put paid to both by AnaIs Nin's observation (quoted previously, No.13) and that of his pupil and friend Chou Wen Chung.

"Chou Wen Chung has revealed that Varèse did indeed draw up all-inclusive designs when he began work on new projects but then constantly revised these designs as he composed."(28)
CHAPTER FOURTEEN.

DÉSERTS: STRUCTURE AND FORM.

Background.

Déserts consists of approximately twenty five minutes of complicated and concentrated music. There are no major discernable breaks in the flow of the music, yet it is still possible to identify a number of sections, each of which pursue a particular mode of development. In this sense Déserts is similar to many of the earlier works, but it also represents a major step forward in Varèse's musical language because of the way in which the various elements are synthesised, and because he was able to employ electronic sounds for the first time.

Déserts contains four instrumental passages interspersed with three passages of organised sound. The obvious form would seem to be based on these seven sections. Previous analyses have primarily focussed on the instrumental music giving weight to the argument that these are independent sections that gain an overall sense of unity through the commonality of material employed.

The passages of organised sound present the analyst with many problems and consequently have often been ignored. This exclusion of three major parts of the work has been justified by
the fact that the work can, and has been performed on numerous occasions as an orchestral work, excluding the sections of organised sound. Whilst I agree that this form of performance is better than no performance at all it does seem rather analogous to performing only the first and last movements of a symphony. Agreed, the music can be substantive and interesting but it cannot be a complete representation of the composer’s intentions.

In support of this approach one is often reminded that the instrumental parts of Déserts were completed long before the fourth and acceptable version of the passages of organised sound were finished. Yet this argument seems to demean the Varèseian process of composition. We know that Varèse had been developing concepts and material for the sections of organised sound for many years, and the fact that they were not completed until a later date does not mean that they were not an integral part of Varèse’s overall conception of the work.

The significant role that Trinium played in both the development of the passages of organised sound and the ideas that are examined through the instrumental music of Déserts, supports the notion that both aspects are symbiotic and integrated within the musical structure. It is possible that the instrumental and electronic music act as parallel statements of the central issues of the composition, but equally
one can view them in a linear manner as 'complimentary and progressive developments of the same musical material, regardless of the textural and timbral differences.

**The Relative Stability of Sound Areas and Sound Masses.**

The form of *Déserts* arises from the way in which the sound masses within it interact. Each of the sound masses contains a number of sound areas and these are distinguished by textural, pitched, rhythmic or dynamic differences. Sound areas can occur simultaneously or consecutively and this helps to develop the temporal aspect of the music. (See Chapter 18). Varèse stated that when sound masses and sound areas "collide" they can either penetrate or repulse one another, but what does this actually mean in musical terms?

My understanding of this "phenomena" is based around the relative stability of the material within the sound masses, and thus I prefer to use the terms stability and instability rather than using the terms penetration and repulsion which stem from a visual analogy. In addition, it helps to overcome the problem of defining "collision". How close do two sound masses have to be to be considered in collision? For example, the closing sound mass of *Déserts* is separated by written silence from the preceding material but surely it still interacts with it.
There are various ways in which sound areas can interact. For a sound mass to be stable either a single sound area must dominate and be unchanging, or two or more unchanging sound areas must be balanced so that neither dominates. When a sound mass is unstable either a single rapidly developing sound area is employed or, more commonly, two or more sound areas are in conflict which does not resolve. Instability can also be created by the rapid succession of a number of sound areas of brief duration regardless of their own individual stability.

Sound masses usually progress through a variety of states, at one time being stable, at another unstable, and so on, and the rapidity of the change helps to generate the forward temporal progression of the music.

Each of the major sections of *Déserts* starts with a period of stability, then progresses through a number of increasingly unstable developments before returning to relative stability at the close. These ideas will be discussed throughout the following analyses, and can be clearly seen in the graphs detailing the interaction of sound masses and sound areas.

The relative stability of a sound mass at any given time does not stem from any single element. Conflict between sound areas, and hence instability, can arise from a contrast in an individual element, or any combination of elements. This can be demonstrated through the following examples, and will be
re-emphasised throughout the following analyses.

Example 1. Conflicting Pitch, Timbre, Texture and Dynamics.
Bars 182 - 187. Low Register. SM 12:3 Upper Register SM 12:4

Example 2. Conflicting Rhythm, Timbre, Texture and Pitch.
Bars 132 - 134. Woodwind and Piano. SM10:4 Percussion. SM10:5
Therefore, pitch, texture, dynamics, articulation, rhythm and the use of various cells or motives are all means by which sound areas can be distinguished. Whilst conflict can arise through the manner in which these elements combine, it should also be remembered that they are also the elements which create unity and stability. Thus, to gain an insight into the music of Varèse one must progress beyond simple identification of the "constituent parts" and try and gain an understanding of the way in which these elements interact.

The Form of Déserts.

Déserts: A Composition in Seven Sections?

Déserts consists of four instrumental sections interspersed with three taped interpolations. Most descriptions discuss the music in terms of these seven sections and this has resulted in the overall form being considered to consist of seven sections. My initial approach to the analysis of Déserts was based along similar lines, but the further I progressed the more factors arose that seemed to contradict this reading of the overall form. I was led to the conclusion that the idea that Déserts is constructed from seven independent sections is a form born of convenience rather than from consideration of the actual material.
My initial scepticism of the seven section form stemmed from a number of factors. Firstly, it has often been noted how well the passages of organised sound blend with the instrumental passages.

"the unity that Varèse had achieved between the orchestral sections and the taped interpolations was an astonishing tour de force." (1)

This is understandable as we know he liked to consider himself a composer of "organised sound", regardless of whether he was working in an instrumental or electronic medium. F. Ouallette supports this concept when discussing performances of both Poème Électronique and Déserts in which Varèse himself controlled the intensities and volumes of the passages of organised sound.

"The sounds did, in fact, do violence to the listener's body. The sound was concrete, and present, no longer a thing of chiaroscuro but a wave displacing air in order to strike us. That is why, for Varèse, there was no appreciable difference between a traditional instrument and an electronic instrument or sound recorded on tape. For him it was a question of intentions, of a sound's power and quality." (2)

Thus, if instrumental and electronic music are integrated, and considered to be fundamentally the same in the eyes of the composer, then what is the justification for treating them analytically as separate entities?

Secondly, towards the end of the work there are whole blocks of instrumental material which are repeated either side of a passage of organised sound. Although there are many examples of
musical material being repeated in different locations that can be found in the earlier works, in *Deserts* this is quite unusual. Repetition, whether exact or transposed, must occur for a reason and I do not consider that a satisfactory explanation for this phenomena can be reached within the seven section form.

Thirdly, there are no closing harmonic constructions to be found at the end of any of the instrumental sections, yet this is a common feature in his previous music. The cadential harmonic construction has always seemed to be the summation of an extended pattern of musical development. Pitched, dynamic, motivic and textural development are all brought together in a large rhythmically unfolded vertical pitch pattern that either concludes the entire work, or acts as a basis for ongoing development of another section through the exclusion of important notes from the texture. Three harmonic constructions of this type are present in *Deserts* but they occur within the second, third and fourth passages of instrumental music. What is their significance within a seven section form?

Fourthly, there are a number of instances where musical material transfers from electronic to instrumental passages. How can this be explained if the instrumental and electronic music is considered to be separate. Admittedly the passages of organised sound may employ different timbres, but the manner in which the material is developed is the same. The only
perceptible structural difference is that taped interpolations tend to focus and concentrate the musical expression and can therefore appear to be more intense than the surrounding material.

"The shorter the sections are, the more they will be intensified and contracted into a state of extreme concentration." E. Varèse. (3)

Fifthly, the seven section form would seem to contradict Varèse's own intentions in that he considered himself a composer of organised sound working with "frequencies and intensities". Why, therefore, should a change of texture be sufficient to delineate one section for another? In all of his previous works sections have been identified by a combination of factors. There are usually changes of texture, rhythm, dynamics and pitch so why should the criteria change just for this work?

Thus, whilst recognising that there are a number of arguments to support the reading of a seven section form I remained unconvinced as to this solution. We know that Varèse created a new form for each work but nevertheless it would seem strange that previous concepts of structure and form would be ignored and rejected if we are to accept this interpretation.

**Déserts: A Composition in Three Sections.**

The structure I wish to propose is much simpler, comprising three major sections each encompassing a passage of organised
sound. The remainder of this thesis will justify this interpretation.

There are many factors to support the form outlined below. Some of the evidence is derived from the way in which works written before the "abyss" were structured. Whilst these factors are significant, as I don't consider Varèse would have fundamentally changed his musical language during this period, one must also recognise that Déserts represents a major step forward in Varèse's musical language. Therefore, it is important to balance the concepts of musical structure and form derived from his earlier music with the new, progressive, succinct and integrated methods of musical construction displayed in Déserts.

Whilst the following analyses examine the content of the music through the, "breaking down of a whole into its constituent parts" (4) it should not be forgotten that there are a number of over-riding concerns which unite the work. Analysis can tend to make one view the composition as a number of separate units and ignore the overall synthesis and unity within the work. What is remarkable about Déserts is the way in which all of the diverse elements are used to explore different musical and emotional ideas. Yet, despite the enormous variety of material, Déserts still projects a single, forceful exposition of Varèse's
musical language and the desolation and despair from which it arose.

"Deserts is not an anecdote, Deserts is not a description, Deserts stands beyond events. It is suffering, horror, and desolation themselves that Varèse is expressing, insofar as any work of art can take such things upon itself." (5)

The overall form of Deserts is based on three major sections. Each section encompasses a passage of organised sound, and each section follows a logical process of motivic, textural, rhythmic and dynamic development before concluding in a large harmonic construction. Similar methods of structuring can be found in many of his earlier works (6). The work contains three substantial harmonic cadences. They each contain nine or ten note harmonies, with the "missing" notes being significant at the start of the following section. They are all dynamically emphasised, constructed through the normal motivic introduction of notes with the last note being sustained, and, in common with the earlier works, the woodwind join the texture last of all and percussive activity stops.

Each section consists of a number of interactive sound masses which in turn contain a number of sound areas. The distinction between sound masses is made through—a combination of major changes in texture, dynamics, pitch or rhythm, and often is reinforced by the physical separation of silence. The sound masses follow similar patterns of internal development and yet
the variety of material is almost limitless due to the simplicity of the basic cells from which the music is created. Sound areas and sound masses can be static or moving resulting in the penetration and repulsion that Varèse describes. Sound areas can occur concurrently, and can overlap, but the sound masses are distinct.

In each case the passages of organised sound show a remarkable similarity in structural and motivic content to the surrounding instrumental material. The transitions between these passages are carefully prepared and it is interesting to note that the function of these sound masses are hard to explain unless one considers them in relation to the organised sound.

At either end of the three section structure there is a single sound mass. The first acts as an introduction, presenting the concepts and material for subsequent development. The purpose of the final sound mass stems from the nature of the subject matter. To have closed with a large harmonic construction would have given the composition an air of finality and completeness. Through the return of the sound mass which opens the third section, albeit in a contracted form, Varèse seems to leave the concepts and ideas open for further discussion. It is as if the questions he poses, both musical and emotional, are deliberately left unanswered.
<table>
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<td>Introduction.</td>
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<td>Presentation of material for consequent development. Motivic, harmonic, melodic textural, pitched and rhythmic concepts are all introduced in their basic forms.</td>
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<td>Section One.</td>
<td>30 - 117 (Inc. OS1)</td>
<td>SM2-SM9</td>
<td>Initial examination of the principal three note motive (A or 3-5 in set theory). Conflict then arises with another three note motive (B or 3-1) which becomes dominant during the first section of organised sound. This material is then superseded by the return of the opening motive. An extended harmonic and motivic sound mass closes the section with the A motive finally gaining dominance in the final cadence. The section opens with a stable sound mass and becomes progressively unstable, culminating in the passage of organised sound, until the final stable reassertion of Motive A temporarily concludes the development.</td>
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<tr>
<td>Section Two.</td>
<td>118 - 247 (Inc. OS2)</td>
<td>SM10-SM17</td>
<td>Section Two concentrates on linear and rhythmic developments through which the relative stability of the sound masses is challenged. This is emphasised by a large proportion of percussive sound areas, the majority of which arise as independent constructions which interact with the pitched material. No single motive is dominant, all three pitched and both rhythmic motives appear in equal proportions. The central passage of organised sound contrasts with the previous taped interpolation as it concentrates on the linear development of studio generated sounds, rather than &quot;music concrete&quot; of Section One.</td>
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</table>
Section Three. Bars 244-309 (Inc.OS3)  

Section Three presents numerous brief and oppositional sound areas. It opens with the sound mass which is repeated in conclusion. It then progresses through a number of relatively brief sound masses which culminate in the intense vertical pitch pattern which occurs at the close of Sound Mass 23. The remainder of the instrumental sound masses mirror the development of the passage of organised sound, leading to another dynamically emphasised cadential pitch pattern where Motive A reasserts itself once again.

Conclusion. Bars 310-325  
The return of the sound mass which opened Section Three. It is a conclusion only in the sense that it occurs at the end. Its content is inconclusive and represents the unfinished and unanswerable nature of the musical and emotional ideas Varese has been exploring. It does not sum up or bring together previous material but is designed to leave the listener in a state of expectation. This is further emphasised by the fact that it is separated by written silence at both ends of the sound mass, and that its musical content is in total contrast with SM25.

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**Analysis of Sound Areas and Sound Masses.**

The remainder of this chapter will concentrate on detailed descriptions of the various sound masses and sound areas, their content; how they develop; how they interact; what their function is within the overall structure. These written descriptions are meant to complement the graphs of sound masses and sound areas. They will highlight points of particular
interest, comment on the interaction between the sound masses and sound areas, and provide a synopsis for the development within each sound mass.

This is bound to include concepts and ideas that will be examined in depth in the following chapters. Thus, initial statements of the various motives and cells will be explained but the reader will have to refer to the appropriate chapters for more in-depth analysis and justification of my various interpretations of the substance of Déserts. (One can also refer to the Glossary for more detailed explanations.)

It should be remembered that the graphs are not meant to be comprehensive analyses of Déserts, they only act as an initial stimulus for the following discussions. They do not include dynamics, texture, timbre, articulation, motivic or cellular development, and were not designed to do so. Their purpose is to examine the way in which the overall form of Déserts develops from the interaction of the sound areas and sound masses. (See also the graphs in Chapter 19.)

It also becomes abundantly clear in the following written commentaries on the graphs why the passages of organised sound are so difficult to analyse. During instrumental music the timbre of a sound can simply be referred to by the instrument or instruments on which it appears. With the organised sound all verbal descriptions of the complex timbres are bound to be woefully inadequate and in this sense the graphic "scores" contained in Chapter 19 can prove more enlightening.
Deserts. Analysis of Sound Masses and Sound Areas.

SOUND MASS 1

SOUND MASS 2

UTIUNED PERC. HIGH
PITCH MED.

PITCH LOW

B A R  N U M B E R S

- 245 -
Deserts. Analysis of Sound Masses and Sound Areas.
Deserts. Analysis of Sound Masses and Sound Areas.
Deserts. Analysis of Sound Masses and Sound Areas.

SOUND MASS 7

C8
C7
PITCH C6
C5
C4
C3
C2
C1

DURATION

- 248 -
Deserts. Analysis of Sound Masses and Sound Areas.
Deserts. Analysis of Sound Masses and Sound Areas.
Deserts. Analysis of Sound Masses and Sound Areas.

[Diagram showing bar graphs for Sound Masses 11 and 12 with various areas labeled and pitch levels indicated.]
Deserts. Analysis of Sound Masses and Sound Areas.
Deserts. Analysis of Sound Masses and Sound Areas.

**Diagram: Sound Mass 15**

- **Pitch** (C): C1, C2, C3, C4, C5, C6, C7, C8
- **Duration**: 0" - 40"
- **Areas**: Area 1, Area 2, Area 3, Area 4
Déserts. Analysis of Sound Masses and Sound Areas.
Deserts. Analysis of Sound Masses and Sound Areas.

**SOUND MASS 16**

```
<table>
<thead>
<tr>
<th>C8</th>
<th>C7</th>
<th>C6</th>
<th>C5</th>
<th>C4</th>
<th>C3</th>
<th>C2</th>
<th>C1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td>8</td>
</tr>
</tbody>
</table>

**DURATION**

AREA 9

AREA 10

AREA 11

2'00'' 2'10'' 2'20'' 2'30'' 2'40'' 2'50'' 3'00'' 3'10''
Deserts. Analysis of Sound Masses and Sound Areas.
Deserts. Analysis of Sound Masses and Sound Areas.

SOUND MASS 18

AREA 1

AREA 2

BAR NUMBERS

- 257 -
Deserts. Analysis of Sound Masses and Sound Areas.
Déserts. Analysis of Sound Masses and Sound Areas.

DURATION
Deserts. Analysis of Sound Masses and Sound Areas.

Diagram showing different areas and their corresponding pitch and duration.
Deserts. Analysis of Sound Masses and Sound Areas.
The Internal Structure of the Sound Masses.

The following descriptions are meant as a commentary to be viewed in parallel with the previous graphs. Although the following chapters will provide in depth analyses of motivic and cellular structures, and the principle established notes, some knowledge of these factors is required before embarking on the following material. I consider there to be five motives contained within Deserts. These are the three pitched motives identified by pitch class set names \([0,1,6]\) Motive A, \([0,1,2]\) Motive B, \([0,1,4]\) Motive C and the less common adaption of Motive A \([0,1,5]\) which is referred to throughout as Motive A'. These motives are all developed from two basic intervallic cells, Cell 1 being the interval of a perfect fifth and Cell 2 the interval of a semitone. The final two motives are both rhythmic ideas. Motive D is a three note rhythm characterised by short and long intervals between the attacks. Motive E is the quintuplet figure which first appears on the trumpet in bar 49.

The final concept which requires explanation is the principle of established notes or pitch patterns, which will be fully examined through the following note ordering analyses. Not all notes are of the same structural significance. Some notes are particularly penetrating, through dynamic, timbral or
articulative emphasis, and these notes normally rise into a dominant role during particular sound areas. Thus, an overall progression of the musical material can be perceived over the entire sound mass based on an examination of these established notes and pitch patterns. Finally, for convenience, the abbreviations SA and SM have been widely used for the terms sound area and sound mass respectively.

Introduction.

Sound Mass 1. 1.1 - 29.4

The opening sound mass introduces the majority of the musical ideas from which subsequent material is developed. Intervallic cells, pitched and rhythmic motives are all presented within a stable sound mass which contrasts texture, pitch and dynamics with various harmonic, melodic and rhythmic developments.

Sound Area 1. 1.1 - 21.4

The opening sound area develops two cells of a perfect fifth, although this does not reveal itself until the entrance of the central note C5 in bar 7.2. This three note idea undergoes considerable textural and dynamic development, passing between the voices of tuned percussion and woodwind, and is reinforced
by high pitched metal percussion. The dynamic level and attack of the tubular bells remains constant throughout. Development occurs by varying these elements in the woodwind, piano, xylophone and vibraphone. This creates a static pitch area, with a relatively uniform overall dynamic level complemented by subtle changes in timbre and texture as the various voices interact with the tubular bells.

Sound Area 2. 6.4 - 13.5

This sound area is another symmetrical construction based on two cells of a fifth. It copies the pattern of development found in SA1, passing between low brass and piano, and is again emphasised by metal percussion. The rhythmic interaction between the sound areas is such that development occurs consecutively and not simultaneously, ensuring the sound areas maintain a balance and do not upset the stability of the sound mass.

Sound Area 3. 14.1 - 21.4

SA3 takes over the role of SA2, containing almost identical forms of development but basing them around a low register cell of a minor ninth (Augmented semitone cell). The C#4 which joins the texture in bar 17.3 serves three purposes. Firstly, it unfolds a horizontal major seventh (inverted semitone cell) with the C5 in bar 14.1, and so doing unites the sound area with SA1.
Secondly it enlarges and concludes the vertical pitch pattern that has been developing since the beginning. Thirdly, it pre-empts the melodic and motivic construction of the vertical pitch pattern that follows.

**Sound Area 4. 21.1 - 29.4**

A new vertical pitch pattern is created. The development is based on Motive A (Pitch classes 0, 1, 6) with a melodic motive on lower brass transferring into a sustained harmonic texture, and then being answered by another motive which unfolds in the upper register. This creates a sustained harmonic texture which is symmetrical around the important note C5, which also acted as the central pivot of SA1.

Although this sound area presents new material it does not destroy the stability of the opening sound mass as it emerges from the dying sustain of SA1 and 3, replacing it with another static vertical pitch pattern. The two pitch patterns do not conflict as they develop consecutively, using the C#4 as a pivot between the two sound areas, and show a similarity in many of their elements (texture, range of pitch pattern, duration, etc.)

**Sound Area 5. 23.3 - 29.4**

This sound area complements SA4 and develops the material rhythmically, dynamically and texturally presenting fragments of material on clarinet, percussion and timpani. These fragments
are based on rhythmic Motive D (short-long) and pitched Motive A. It is interesting that no new notes are added to the harmonic texture presented by SA4, although the various fragments do enlarge the vertical pitch pattern through octave doubling. A dynamically emphasised restatement of Motives A and D on timpani concludes the sound area and the sound mass.

Synopsis.

Sound Mass 1 can be seen as a symmetrical unfolding of two vertical pitch patterns around the central pitch of C5. The initial vertical pitch pattern is contrasted with two lower register three note ideas which lead to the pivotal note C#4 which concludes one pitch pattern and instigates the next.

This sound area opens with another motivic harmonic construction which is constantly shifting as it moves into the upper register. No harmony is established for any significant period, and as the pitch pattern disintegrates it leaves the pitch levels D5 and Eb6. The upper note then unfolds a prolonged statement of Motive C (0,1,4) on piccolo and flute over the sustained D5, building dynamically and rhythmically towards the close in bar 38 where it is reinforced by the piano.

The score of Deserts, as published by Ricordi and then Colfranc Music Publishing, contains a number of misprints. Some are obvious, such as missing ledger lines, but others are difficult to prove or disprove conclusively. In this sound area it would seem logical for the piano to repeat the pitches sustained on the flute and piccolo and not to present them in a lower octave. Octave doubling is not common in the music of Varèse, and throughout Deserts the piano's role is primarily to reinforce material presented elsewhere in the ensemble. Thus, it would be more logical if the score read 15va... above the right hand of the piano and not 8va. (See Appendix 11.)
Sound Area 2. 32.1 - 40.5

This sound area consists of a number of fragments based on major seventh and augmented fourth intervals. The brass intervals are emphasised by metal percussion (like SM1:2 and SM1:3) and the gaps are filled with brief rhythmic interjections based on Motive D on the timpani. Both of these ideas react rhythmically to SA1, being at their most active when the upper notes are sustained, and vice versa. The sound mass is unstable as both of these sound areas try to achieve dominance. In bar 38 it seems that SA1 has succeeded, and then in bar 40 SA2 re-asserts itself and concludes with two statements of Motive A on the timpani. (Similar to SM1:5)

Sound Area 3. 41.1 - 45.3

Another inversionally equivalent vertical pitch pattern is developed based on two statements of the adapted form of Motive A (MA' = 0,1,5) which slowly evolves into a second symmetrical harmony based on the original form of Motive A. The pitch pattern at the start is widespread, and contracts by a perfect fifth in both dimensions as the second harmony evolves, moving towards the central notes F#4/G4. Both harmonies are symmetrical around this point. The two four note groups which form the closing harmonic structure of this sound mass are also symmetrical, consisting of two overlapping statements of Motive A. In fact, the harmony is so perfectly constructed that it is...
possible to distinguish six harmonic motives within the eight note harmony.

Synopsis.

Sound Mass 2 introduces the first element of instability, with the interaction between SA 1 and 2 being resolved through the re-assertion of Motive A which develops a stable vertical pitch pattern at the close. The sound mass opens with two consecutive sound areas presenting a wide range of pitches. This is gradually contracted towards the close in a contrary motion to SMI.


Sound Mass 3. 45.4 - 65.3

Sound Area 1. 45.4 - 47.5

The horn and clarinet present a brief pivotal sound area which links the two sound masses with the final note penetrating
and then absorbed by the following sound area. It was initially considered that this sound area continued until bar 53.5. However, the way all the diverse ideas balance within the next sound area, and the octave leaps in the melodic line, identify the remainder of this line as part of SA2 which similarly contains many octave transfers. This brief melodic interjection consists of two statements of Motive A passing from 2nd Horn to Bb Clarinet and "transmuting" the previous harmonic statements of Motive A into the horizontal plane.

**Sound Area 2. 47.1 - 53.5**

A complicated, yet stable sound area constructed from a number of elements: a minor ninth in the low brass; augmented fourths on the horn; a rhythmic development around Motive D on tubas and timpani; upper register semitones in the woodwind. The sound area also introduces the second important rhythmic motive, the quintuplet figure on trumpet in bar 49, or Motive E.

The sound area is brought to a close by the motivic expansion of the melodic line, filling in the pitch area previously defined by the octave transfers. The sound area remains stable as all of the elements are balanced, each sound idea emerges from the overall texture through dynamic emphasis before returning to the texture as another sound idea emerges. The rhythmic interaction is similarly designed to complement rather than conflict. Thus, when one sound idea is rhythmically active
the others are sustained, and so on.

Sound Area 3.  54.1 - 59.1

An upper register pitch level is developed through octave transference, and then by the addition of semitone cells in the upper woodwind, piano and tuned percussion. This occurs over a static harmonic repetition of Motive C. The addition of the semitone cells in the upper register increase the rhythmic density, and initiates the breakdown of the sound area. Conflict arises in the upper register which is unresolved as the next sound area enters, overlapping with the dying sustain. Therefore, after initial stability, the rhythmic density increases and the sound area becomes increasingly unstable, instigating the following rapid interchange between a number of brief sound areas.

Sound Area 4.  58.4 - 60.1

A harmonic construction based on overlapping statements of Motive A' in the upper register and Motive C in the lower register.

Sound Area 5.  60.2 - 62.4

Another shifting harmonic development based on Motives C, A' and A which follow in quick succession and leave the upper D5 to act as a pivot into the next sound area.
Sound Area 6.  63.1 - 63.4

A brief sound area in the woodwind developed from two statements of Motive C. This sound area is interesting not only for its brevity but also the fact that it is symmetrical in both dimensions. The pitched response is an inversion of the flute and piccolo material, and rhythmically the response is an exact retrograde statement.

Sound Area 7.  64.1 - 65.3

The closing vertical pitch pattern of this sound mass is created from two statements of Motive C, unfolded in the upper and lower brass respectively. The complex interaction between the voices means that initially Motive A is stated, then Motive B, before Motive C finally establishes itself. This conflict reinforces the instability in the sound mass which has been gradually increasing since the beginning of SA3. (This material appears similar to that in bar 213 which is also preceded by fragmentary sound areas.)

Synopsis.

At the beginning the sound mass is basically stable, with a number of sound ideas being balanced. During the second area this balance is upset by the addition of the upper register semitone cells, and this initiates an number of brief sound areas, all of which fail to establish themselves, progressively
increasing the instability of the sound mass. This instability is reinforced by the number of different motives and cells which occur in quick succession and the brevity of the final vertical pitch pattern.

The over-view of dominant pitches is similarly complex and unstable. Numerous pitch levels appear only to be quickly succeeded by another development. The interesting point to note is how many cellular progressions can be observed at this higher level. The upper register unfolds an inverted 5th, a series of rising semitones, and concludes with a falling fifth. The lower register is also cellular in much of its construction. There is a falling fifth between the first and last notes of the sound mass, and internally there is a falling fifth from E2 to A1 which rises through an augmented major seventh interval to G♯3 in SA 3.


Stable ............... Unstable ......................
Sound Mass 4. 65.4 - 82.4

Sound Area 1. 65.4 - 76.7

The opening sound area is similar to SM3:1 in that it contrasts a number of seemingly independent sound areas around a central point, this time the pitch level G#. At the opening the pitch level is established through a rhythmic development based on Motive E. This pitch level is replaced by a succession of textural developments focussed on the note G# which appears in various octaves: on the contra bass tuba (bars 69 and 70); the trumpets (bar 72); the horns (bar 73); the trumpets (74 to 76) and the horns (bars 75 and 76).

The sound area contrasts many semitone and augmented fourth ideas with this central pitch area (G4 - G#4), creating a wide ranging and shifting vertical pitch pattern that does not establish itself until the entrance of the piano and timpani in bar 71.4. From here on it remains unchanged, developing rhythmically, texturally and through changes of register. The addition of pianissimo metal percussion concludes the development in bar 75.

The passage describes an overall semitone progression from the G to the G#. The interaction of the fragments mean that the sound area is basically unstable at the start, but becomes stable by the close as the G# pitch level is established. This transient stability is important to provide contrast with the following fragmentary sound areas which precede the first passage of organised sound.

Sound Area 2. 77.1 - 78.4

A shifting harmonic idea, transferring from low brass to the
upper woodwind. The development is motivic, the opening statement of Motive C being quickly succeeded by Motive A in the upper brass and the woodwind. The instability is emphasised by the rapidly changing dynamic levels.

Sound Area 3. 78.4 - 82.4

This sound area contains three separate sound ideas which interact texturally and dynamically. The first sound idea on the horns is repeated in a different order in bar 80 and then inverted and transposed in bar 82. The tubas accompany the first two statements of this sound idea with a harmonic Motive A'. This is interrupted by the piano, clarinets and horn stating a dynamically emphasised sound idea based on Motives B and D.

Thus, the sound area contains considerable conflict as a number of harmonic and melodic fragments develop based around Motive B. This increases the instability of the sound mass and drives the music towards the passage of organised sound.

Synopsis.

Following an initial period of instability the opening, extensive sound area becomes stable through the establishment of a static vertical pitch pattern centred on the pitch levels D4 and G#4. The final two sound areas reverse this trend as first harmonic and then melodic ideas occur in quick succession.
The over-view once again reveals a wealth of cellular activity at an established level, with fifths in the bass and semitones in the upper register.


![Musical notation]

Unstable ............ Stable .... Unstable ............

Sound Mass 5. OS1. 0'00" - 0'52"

Sound Area 1. OS1. 0'00" - 0'12"

A rhythmically and texturally dense sound area based on percussion sounds (drums, cymbals, etc.) combined with a hammering noise. The whole texture is distorted yet certain timbres and pitches are still identifiable. The rhythmic development of a metallic woodblock sound presents the pitches Eb4 and Bb3 which, when combined with the recognisable A2 of the underlying timpani note gives a harmonic unity to the sound area based on Motive A.

- 277 -
Sound Area 2. OS1. 0'10" - 0'52"

Two similar sound ideas, based on white noise and high pitched metal sounds, are interrupted by SA 3 and 4 but then return over the top of SA5 and 6. The timbre is constantly shifting, in places it sounds like cymbal based sounds, in others machinery, and these changes in timbre create the temporal development within the sound area.

Sound Area 3. OS1. 0'20" - 0'27"

SA3 contrasts with SA2, appearing to be almost melodic. The sound is distorted and seems to be a studio generated sound rather than a pre-recorded noise. Following some rhythmic repetitions the final note is sustained. This instigates the appearance of upper harmonics, respectively two and four octaves above the pitch level D#3. The two dominant pitches of this sound area are G#2 at the beginning and D#3, presenting an overall progression of a cell of a fifth.

Sound Area 4. OS1. 0'28" - 0'31"

This sound area is similarly brief, opening with generated sound fragments which are based on the second intervallic cell of the semitone. The identifiable pitches being C#4 and D2. This material is combined with low pitched white noise and the whole of the timbre is also subjected to distortion. The development is interrupted by the appearance of SA5.
Sound Area 5. OS1. 0'32 - 0'47"

Two identical rhythmic sound ideas interrupt SA4. The sound appears to be developed from a combination of wooden, machine and generated noise. Precise pitch is not identifiable but the sound idea does contrast high and low pitch areas. SA6 then enters and the statements are temporarily suspended. They return later in an almost identical format, coinciding with the low machine noise in SA6, but the rhythm is slightly altered and the pitch is lower. Although it is difficult to accurately notate the rhythm it is obvious that these sound ideas are based on rhythmic Motive D. The two entries can be interpreted as follows.

Example 7. Rhythmic Motives in Sound Area 5.

\[\text{Example 7 Diagram}\]

Sound Area 6. OS1. 0'36" - 0'52"

This sound area contains three distinctive metal based attacks interspersed with a low pitched generated sound reminiscent of machine noise. All of the metal sounds contain recognisable pitches unfolding a number of cells within the sound area. The first sound idea is a major seventh (Bb2 to A3) which sounds like backwards tape of a gong or deep cymbal. The
second is a distorted gong attack based around the fundamental note of B2 and containing a strong octave harmonic. Then, following the brief semitone based interjection in the low register (around F1), the sound area closes with the third idea, a bell like sound based on the pitch level A1. This idea sounds like a bell which has had the initial attack removed.

Thus, the three metal attacks present a number of semitone cells unfolding throughout the sound area. This material interacts with SA5 both rhythmically, texturally and with regards to pitch. This is considered the final sound area within this sound mass because of the major change of texture, rhythm and dynamics that follows. There is also a noticeable gap between this sound area and the following development in the upper register.

Synopsis.

SM5 is a complicated sound mass which contains major contrasts in texture, pitch, dynamics and timbre. The intensity increases towards the close, as does the instability of the sound mass. This is emphasised by the brevity of some of the sound areas and the overlapping and juxtaposition of others. Although precisely identifiable pitch is not prevalent throughout this sound mass a number of intervallic cells, and pitched and rhythmic motives can be identified despite the various ways in which the sound has been treated.

Unstable ........................................

Sound Mass 6. OS1. 0'52" - 1'19"

Sound Area 1. OS1. 0'52" - 1'19"

A brief rhythmic sound idea created from distorted generated sound is repeated throughout the sound mass. The sound idea closes each time on the pitch level Eb6, with an upper harmonic of Eb7. The sound mass is brought to a close when the sound idea is finally extended, rising to F6 and F7 respectively.

This is the main sound area with which the others interact. The gaps inbetween the statements of the sound idea are filled by the other sound areas which briefly penetrate before being repulsed.

Sound Area 2. OS1. 0'55" - 1'10"

This sound area consists of a static timbre created from metal
and white noise. This is similar to SM5:2 but does not develop rhythmically and texturally to the same extent. Although it interacts with SA1 and 3 this sound area is not forceful or penetrating and merely enriches the overall texture of the sound mass.

Sound Area 3. OS1. 0'59" - 1'16"

A pitch area which combines white noise with machine noises. The timbre develops through rapidly changing dynamics and intensities, creating considerable rhythmic activity within this sustained sound area. The fundamental note around which the development is based is E4, the significance of which is revealed when viewed in combination with SA1.

Sound Area 4. OS1. 1'08" - 1'10"

A short interjection of generated sound, reminiscent of the interruption contained in SM5:6 but in a higher register. The sound is reminiscent of a radio dial being tuned, it penetrates briefly and then disappears.

Synopsis.

This sound mass differs from those heard previously in that it contains one dominant sound area which is penetrated by three other sound areas. None of these manage to destroy the basic stability afforded the sound mass by the consistency of the
development within sound area one. (In this sense it is similar to SM9 which follows shortly.) There are very few identifiable notes, but the few pitches that do occur unfold two semitone cells, and an overall statement of Motive B between SA1 and SA3.


Sound Mass 7 is an extremely complicated combination of overlapping sound ideas. The material could be read in a number of ways and the identification of sound areas is therefore extremely difficult. There are few gaps to assist the process and thus the sound areas I have identified are not necessarily hard and fast, but are designed to help towards an understanding of this complex combination of sounds.

Sound Area 1. OS1. 1'20" - 1'34"

The sound area opens with a single melodic figure of generated sound rising rapidly over two octaves and then
falling. It establishes an upper pitch level of A4 which is reinforced by a metal based hammering sound playing the first harmonic (A5), and linking the opening sound idea to a number of incomplete fragments which emanate from the first sound idea.

**Sound Area 2. OS1. 1'35" - 1'42"

A complicated mixture of machine noises. A constant engine noise is contrasted with a wooden hammering sound, two brief low register engine noises, and high pitched distorted sound of wood blocks. This is combined with high level white noise (SA3), all of which illustrates how complicated the texture has become within a few seconds.

**Sound Area 3. OS1. 1'37" - 2'06"

Sound area 3 is an upper register pitch area containing high white noise. At first this remains constant but, following the statements of SA4 and 5, it returns and is rhythmically developed through changes in its intensity.

**Sound Area 4. OS1. 1'43" - 1'50"

Another complicated sound area, similar to SA2, combining various machine noises which rhythmically interact. The sound area was distinguished from the following material because of the large change in pitch presented by the combined noise and drum sound idea immediately prior to 1'50". It is possible that this sound area combines with SA5 as there is no discernable gap
between the two developments.

Sound Area 5. OS1. 1'51" - 1'59"

This sound area once again develops machine noises, focussing more on rhythmic development in contrast to the textural development of SA2 and 4. The rhythmic intensity rises and falls with the switching noises sounding almost like machine guns. These are succeeded by a low pitched slowly rising machine noise. The sound area concludes with a combination of white noise and an intermittent metal sound, which gradually becomes recognisable as a modified cymbal roll.

Sound Area 6. OS1. 2'05" - 2'06"

This brief sound area concludes the various developments with a dynamically emphasised and intense statement of Motive B in the upper register. The development, which is reminiscent of a scream, contains the only recognisable pitches (D6,C#6,C6,C#6) to be presented within the sound mass since SA1. Thus, the following over-view is somewhat restricted and fails to show the intensity of the textural and rhythmic density which has occurred.

Synopsis.

Following a period of relative stability in sound area 1 the sound mass becomes increasingly complicated and unstable as
numerous sound ideas interact, none of which manage to establish themselves. The development is brought to a close by the appearance of a statement of Motive B in the upper register.


Stable ............... Unstable ........

Sound Mass 8. OS1. 2'07" - 84.3

Sound Area 1. OS1. 2'07" - 2'14"

This sound area develops rhythmic fragments of membraned percussion sounds. The opening timpani roll has been treated so extensively that it is hard to distinguish, yet as the sound area progresses the individual timbres become more easily identifiable.

Sound Area 2. OS1. 2'08" - 2'14"

A contrasting, upper register development of white noise in which the intensity is constantly shifting, with the result that the pitch level C7 emerges, and is briefly sustained.
Sound Area 3. OS1. 2'16" - 2'28"

Following a brief gap the bell sound from SM5:6 returns and is repeated three times. Once again the sound has been modified (it also appears as if the attack has been removed). Although the timbre of this sound area is a complex mixture of harmonics and noise, as is found in all metal based percussive sounds, the dominant pitch to emerge is B2.

Sound Area 4. 83.1 - 84.3

This brief three note sound area on low brass returns the development to the instrumental voices. The brass unfold a harmonic statement of Motive B, and the dominant note of C#4 means that another statement occurs over the entire sound mass.

Synopsis.

This sound mass relaxes the intensity of the previous sound masses by thinning out the texture, simplifying the timbres employed, decreasing the rhythmic intensity, and lowering the overall dynamic level. The sound mass helps to smooth the transfer back into the instrumental timbres, with the transfer between SA3 and 4 being almost indiscernable if performed correctly. Once again in combination the various sound areas define a pitched structure based on Motive B. The opening pitch of C7 from SA2 transfers to the B2 of SA3 and then onto the upper C#4 of SA4.

A sustained development of individual pitched levels, first in the upper woodwind and then in the brass, is brought to a conclusion by the entrance of the piano. This sound area concentrates on contrasting pitch areas through the interaction afforded by changing dynamic levels. It was initially thought that this sound area might belong to SM8 but the rhythmic motives (Motive D) which occur simultaneously in the percussion (SA2) are clearly the same motives which are developed throughout the remainder of this sound mass.

Sound Area 2. 87.1 - 114.4

This sound area, which is exclusive to the percussion section, is the basis from which all the other sound areas develop. The
sound area concentrates on developing a short rhythmic motive (D), increasing the rhythmic density towards the closing cadence and then suddenly stopping altogether to highlight the cadential vertical pitch pattern.

Sound Area 3. 93.4 - 112.4

SA3 restates Motive A in the lower register. This simple motivic vertical pitch pattern contrasts rhythmically with SA2 (particularly the timpani) and SA4. This is the basis for the established pitch pattern which lasts almost until the final cadential close of the section. This is the stable vertical pitch pattern which SA5 and 6 try to disrupt, but with little success.

Sound Area 4. 95.1 - 114.4

Although intrinsically linked with SA3 this pitch level is considered a separate sound area because of the independent nature of dynamic and textural development it undergoes. It unfolds a semitone cell over the whole SA, moving from the established A in bar 95 up to Bb in bar 110. The sound area is essentially a single pitch level (A5) with the upper note acting as a harmonic, which enriches the timbre and assists the textural development.

Sound Area 5. 100.3 - 109.4

A short harmonic interjection. SA5 tries to penetrate the
stable texture established by SA2,3 and 4 with semitone and fifth cells, but fails. However, it does establish a pitch level of Eb4 that continues until bar 110. It is interesting to note that this established Eb combines with A and Bb of SA4 to present another harmonic statement of Motive A. Thus, although this sound area may initially appear to be trying to upset the stability, it is in fact enhancing it at a higher structural level.

Sound Area 6. 105.1 - 106.2

Another brief interjection of a harmonic idea built on semitone cells and Motive B. This material interacts with the established Eb, and its appearance causes the temporary cessation of SA2. However, it is quickly superseded by the return of SA3 and the dominant Motive A on the timpani.

Sound Area 7. 115.1 - 117.5

A ten note closing cadential vertical pitch pattern is created almost exclusively from statements of Motive A which occur both harmonically and melodically. The ten note "cadence" is the largest established vertical pitch pattern thus far, and its importance is emphasised by the cessation of percussive activity. The two pitches that are omitted are dominant notes of the surrounding sound areas, namely the C# that was the root of SA3 and Bb which opens the next Sound Mass. (This will be expanded upon in Chapter 17)
Synopsis.

This sound mass contains two dominant ideas which occur throughout, and create the stability of the sound mass. The first is the extensive rhythmic development centred on Motive D, the second is the textural and dynamic development of Motive A in the lower register. The sound mass is periodically upset and the stability challenged, but the combination of SA2 and 3 is too powerful. Together they drive on, increasing the rhythmic intensity through repetition, until the creation of the cadential vertical pitch pattern becomes the only logical way in which the music can progress. (ie. Closing one mode of development and starting another.) The sound mass reasserts the dominance of Motive A which had been challenged by Motive B throughout SM 5 - 8. The instability of the previous sound masses is overcome and thus the section closes with a return of the material and structures heard at the beginning in SM2.


![Diagram of Stable Pattern]

Stable .........................
Section Two. 118.1 - 247.1

Sound Mass 10. 118.1 - 145.7

Sound Area 1. 118.1 - 124.4

The sound mass opens with melodic and then harmonic developments based on Motive B. These are interrupted by an antiphonal statement of Motive A, passing between trombone and clarinet, and then a final six note vertical pitch pattern is created from successive C and B motives. This sound area challenges the stability of the previous sound mass by presenting three different sound ideas, using three different motives, and employing a variety of contrasting dynamics and timbres.

Sound Area 2. 124.2 - 127.2

The C5 on the horn acts as pivot between the two sound areas. The harmonic development passes into the upper register, first through the brass, and then the woodwind. The development is similar to the previous sound idea being based on Motive C and semitone cells.

Sound Area 3. 125.4 - 132.5

SA3 is a complex sound area incorporating four independent sound ideas. The first is a statement of Motive A in the low brass which is developed through the addition of semitone movement both harmonically and melodically. The second is an upper brass timbral development of a sustained three note idea...
developed from cells of a fifth, this passes to the woodwind in bar 130 and rhythmically combines with the first sound idea. The third is a rhythmic statement of Motive E on the trombone which establishes the pitch level A3. The fourth is a wide ranging vertical pitch pattern which emerges from the interaction of these three previous sound ideas.

The first sound idea is interesting in that it briefly refers back to the previous sound mass, the statement of Motive A using the same pitches and timbres as SM9:3. However, this is quickly overtaken by the semitone harmonic idea, which is the more important figure as it is sustained and dynamically emphasised. It should also be noted that the trombone statement of Motive E is also reminiscent of SM9:4, even though the pitch level is established in a different octave.

The final pitch pattern incorporates a number of differing and unresolved ideas. As soon as one appears to be established it disintegrates. This leaves a lower brass idea centred around Motive E presenting a pitch level of Eb3 which penetrates into the next sound area. The pitch pattern contains fifths and semitones in the woodwind, similar figures in the trumpets, and minor thirds in the lower brass, and no single cell or motive can be seen to be dominant. It is for this reason, and the fact that the pitch pattern overlaps with the following sound area, that this wide ranging vertical pitch pattern is not considered to be the close of the sound area.
Sound Area 4. 132.5 - 136.5

A four note harmonic idea, incorporating Motive A in the low register, interacts with an upper register pitch level of F6. It is as if this high sustained note is a written harmonic of the lower sound idea. The sound area develops texturally and dynamically, and interacts with the rhythmic development on the percussion (SA5) throughout. SA5 eventually supersedes this sound area as the pitch pattern fades and disintegrates.

Sound Area 5. 132.5 - 145.7

This rhythmically active sound area on the percussion is particularly interesting in the way that the small figures from which it is created are developed through inversion, re-ordering the patterns, or retrograde statements. The material interacts with SA 4, 6 and 7, with the final statements being augmented as the sound mass draws to a close.

Sound Area 6. 137.1 - 141.5

A six note sustained vertical pitch pattern which is notable for being created from two inversionally equivalent statements of Motive A. Once again it appears to be an important structure as it is repeated twice on the piano and a third time by the brass over piano sustain. It seems to infer closure, especially as Motive A has had this effect in the previous section, but in this case the point of closure is delayed by the return of the rhythmic fragments of SA5. The development also overlaps with the following sound area as the pitch level Bb3 enters
powerfully over the dying sustain of the third statement of the pitch pattern.

**Sound Area 7. 141.1 - 145.7**

The pitch level Bb3 instigates a number of linear developments based on semitone cells which pass between the lower register brass and woodwind. These all serve to re-establish the pitch level, and lead to a closing low pitched harmonic and melodic structure. This initially appears to be based on semitone cells but Motive A then returns and reasserts itself as the percussive development in SA5 stops.

**Synopsis.**

A complicated sound mass which contrasts a number of static vertical pitch patterns with brief harmonic ideas and independent rhythmic developments in the percussion section. The interaction of the sound ideas at the start makes the sound mass unstable, but during the third and fourth sound areas the balance between the sound ideas provides an air of stability. By the close this has been disrupted again, primarily by the way in which SA5 challenges the pitched material with which it coincides.

The sound mass appears to be reaching a point of closure on a number of occasions but these are always delayed by the appearance of the next sound idea. When the close finally does occur it is quite unexpected, and although Motive A does occur the actual vertical pitch pattern is comparatively small. The
dominant notes of the various sound areas outline a number of cellular and motivic relationships as follows.


Unstable ............ Stable ........ Unstable ........

Sound Mass 11. 146.1 - 167.4

Sound Area 1. 146.1 - 152.5

A four note pitch pattern is created from two separate intervals, a diminished fifth in the flutes, and a major seventh in the horns. The two ideas combine with a central pitch level of B3 creating a statement of Motive A in combination with the flutes and Motive C in combination with the horns. The two sound ideas interact rhythmically, increasing the movement towards a large vertical pitch pattern in the tutti ensemble.

Initially this pitch pattern seems divorced from the previous material, however the first established note of this harmonic construction is the pitch level B3. Although the pitch pattern is not precisely symmetrical the B3 is the central note around

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which the development occurs, continuing its role from the previous bars.

Sound Area 2. 150.1 - 164.5

SA2 is another sound area which is exclusive to the percussion section. It contains complex rhythmic fragments which occur under the sustain of SA1. When SA1 dies away the rhythmic development continues until it is interrupted by the appearance of SA3. Once again SA3 creates a large vertical pitch pattern and the percussive development returns once the harmony has been established. It continues until bar 165 where the entrance of the closing dynamically emphasised vertical pitch pattern finally stops its development as the sound mass draws to a close.

Sound Area 3. 156.1 - 164.5

A linear statement of Motive B is quickly overtaken by a wide ranging eight note symmetrical vertical pitch pattern. The A0 at the bottom of this sound area is the lowest note to be found in the work. The harmony arises from two statements of Motive C, and then a final expanded interval of a diminished fifth. The upper C7 is sustained and developed as an independent pitch level being rhythmically developed by the piano and xylophone. It interacts with SA4, presenting another semitone cell between the two established notes.
Sound Area 4. 157.5 - 164.3

A pitch level of C#4 penetrates the previous sound area and interacts with the upper register sustained C7. Once again this is considered to be a separate sound area because of the independent nature of the dynamic and timbral development to which it is subjected. (Similar to the A5 in SM9:4.)

Sound Area 5. 165.1 - 167.4

The cessation of the percussion section seems to infer that an important harmonic construction is about to occur. Although the pitch pattern does conclude the sound mass it develops in an amorphous manner and no individual motive is dominant. It opens with Motive A, but this is contrasted by various cellular developments before the dynamically emphasised climax of this pitch pattern is reached at the end of bar 166. In keeping with the other vertical pitch patterns in this sound mass the harmony does not stop cleanly, and four notes bridge the gap between this sound mass and the next.

Synopsis.

The sound mass basically consists of three large vertical pitch patterns, each of which is sustained and each of which develops from a variety of contrasting and conflicting sound ideas. These outline the vertical aspect of the sound mass and the temporal side is developed through the rhythmic fragments contained in SA2 which interact with the sustained pitch levels that emerge from the vertical pitch patterns.

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The over-view is remarkably simple, with the central B of the first sound area moving to the upper established C of SA3 and then on to the C# of SA4. (A statement of Motive B despite the octave displacement.)


Sound Mass 12. 167.4 - 193.7

Sound Area 1. 167.4 - 174.7

This sound area opens with a rhythmically decorated harmonic statement of Motive A in the brass. This pitch area is then expanded through semitone cellular developments in the upper and lower register. Rhythmic interest is sustained by a repeated G#2 on the timpani. In bar 171 there is a written silence but then the material returns and is texturally and dynamically developed, rising to a peak in bar 173 and then gradually fading away.

Sound Area 2. 175.1 - 178.2

A rhythmic development based on semitone cells and an augmented fourth on clarinets and tuned percussion. Following a number of metrical repetitions the addition of a sustained minor...
ninth brings the SA to a close. The rhythm is upset as the final repetition is brought forward by a triplet quaver and this coincides with the appearance of SA3.

Sound Area 3. 178.1 - 185.1

This sound area consists of an extended harmonic statement of Motive A. This is developed through a trill on the horn, and finally passes to the bass clarinet before overlapping with SA4.

Sound Area 4. 185.1 - 193.7

An upper register rising semitone (or Motive B) development which unfolds through consecutive semitones, regardless of octave, until a high pitch area of Db6 to D7 is outlined. SA5 then enters on the percussion and causes the rhythmic development in this SA to stop temporarily. In bar 189 it resumes, establishing the lower Bb5, but in bar 190 it stops again as SA5 becomes rhythmically active once more. Thus, these two sound areas are in conflict, with SA4 finally superseding and drawing the sound mass to a close through a dynamically emphasised harmonic restatement of Motive C. It is interesting that although this sound area opened with semitone cells and ideas based on Motive B, it actually closes with a dominant Motive C.

Sound Area 5. 187.1 - 191.5

This sound area consists of various percussive sound ideas which contrast with SA4. In the first two bars it seems as if a regular metre is being established once again (like SA2), but
this is broken up by the return of the rhythmic development in SA4. In the final two bars quintuplet ideas return. These were first heard in bar 187 and appeared to be developments of Motive E. The percussion used are all instruments with clear and precise attacks, providing maximum contrast with the sustained notes of the woodwind.

Synopsis.

The sound mass contains four simple pitch patterns which, once established, do not change until they either fade away or are overtaken by the next sound area. Thus, the sound mass is essentially stable, all of the sound ideas in sound areas 1 to 3 are balanced. However, the interaction between SA4 and SA5 causes the sound mass to increase in rhythmic intensity, increasing the temporal development towards the close. Although this makes the sound mass appear temporarily unstable, the fact that SA4 is dominant at the close reasserts the overall stability of the sound mass.


Stable .........................

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In common with the previous opening sound areas in Section Two this sound area presents numerous motives and sound ideas. It begins with another semitone based pitch pattern, this time in the brass (Like SM12:4). As before, the outer pitches are defined first, and then the inner notes join the pattern, regardless of the octave in which they appear. This similarity between opening sound areas and the preceding sound mass is quite a common feature in Déserts, providing an overall sense of temporal development and unifying sound masses within the various sections. The response to this opening sound idea is a diminished fifth interval in the flutes and a minor ninth in the horns. This combined four note pitch pattern is penetrated by a linear statement on the clarinets which combines pitched Motive B and rhythmic Motive D before establishing the upper register pitch level of Bb5 heard at the close of the previous sound mass. This instigates rhythmic fragments in the percussion similar to SM12:5, a linear statement of motives B and E on the horn, and a harmonic statement of Motive A in the low brass. Thus, the conflict between all of these ideas is left totally unresolved when the next sound area enters.

I did initially consider breaking down this sound area into two or three separate blocks. However the interaction and overlapping of the various sound ideas made it seem that they were all contained within some over-riding constructional unit.

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and it was therefore easier to group them together. This ensures that the contrast, both with SMI2 and the following sound area is all the more marked.

Sound Area 2. 199.1 - 199.11

A unique textural and registral development which really unfolds a single melodic line between the ensemble. There is a predominance of Motive C within this bar, and the contrast in all aspects of the music (particularly dynamics) with the previous sound area is quite remarkable. The conflict and instability is immediately dispelled and, in a sense, all forms of linear development within Déserts are summarised by this sound area. It employs both intervallic cells, motives A and C, changes in timbre, changes in texture, and concepts of symmetry. (See piano part, the second three notes are an inversion of the first three notes.)

Sound Area 3. 200.1 - 203.7

A brief percussion interlude which continues in the same vein as SA2. Note how the opening material is inversionally equivalent. The sound area develops fragments based on motives D and E, increasing the intensity towards the entrance of SA4.

Sound Area 4. 204.1 - 205.3

A closing harmonic "cadence", featuring numerous statements of Motive A. Motives can be perceived between trumpets 2 and 3, trumpet 1 and trombones and the low brass. The development
employs all twelve different pitches but the coincidence of all twelve notes is transitory, the lower register Motive A drops out, leaving a nine note chord to be sustained into the following bar.

Synopsis.

Following an initial period of "controlled chaos" three completely contrasting and independent sound areas conclude the sound mass. Each of these sound areas is quite unique. It is almost as if this sound mass (at a central point in the entire work) breaks down the various forms of development and tries to present them in a "pure" state. SA2 epitomises linear melodic development, SA3 summarises rhythmic development and SA4 fulfils the same role for harmonic or vertical development.

The established notes of the various sound areas outline a number of cellular progressions as can be seen below.


Unstable...... Stable .................
Sound Mass 14. 205.4 - 224.2

An intermediate sound mass which links the previous stable sound area to the following passage of organised sound. It consists of numerous fragmentary sound ideas, and in this sense is similar both in its developmental structure and content to SM4 which similarly preceded a passage of organised sound.

Sound Area 1. 205.4 - 211.4

Once again the opening sound area contrasts numerous sound ideas, beginning with two harmonic statements of augmented fourth intervals in the lower brass which accompany, and combine with, the melodic Motive B on the horn. This is penetrated by an upper brass statement of Motive A, and the F#2 from the first sound idea is rhythmically developed on the timpani in a similar manner to SM12:1. This idea is then extended by passing into the percussion section which links into the closing sound idea. This repeats the previous pitch patterns and is joined by an upper register woodwind and piano figure, reminiscent of the close of SM 12:4 (also Motive C), which emerges from the pitch pattern and slowly fades away as the next sound area begins.

Sound Area 2. 212.1 - 215.5

Once again this sound area is constructed from numerous brief sound ideas. It concentrates on timbral and textural development based mainly around simple motivic statements. The first two sound ideas are displaced statements of Motive B (like bar 81), and this leads to a six note vertical pitch pattern on
the brass which combines motives A and B. A trill on the trombone then creates another harmonic statement of Motive B before passing into the upper register woodwind to close the sound area.

**Sound Area 3. 216.1 - 217.5**

A sudden change of texture and dynamics occurs through a bold reassertion of Motive A on the low brass, and then the timpani. This brings a response of a low minor ninth on tubas and a high pitched four note harmonic construction in the woodwind that is similarly based on semitone cells. Although this sound area is brief its importance is as a unifying structural element. It appears again, following the passage of organised sound, in bars 225 and 238 where it acts as the basis for more extensive developments.

**Sound Area 4. 218.1 - 224.2**

An unusual sound area which seems to establish a metre and pivots around a central attack on the slapstick. It only employs percussion with a clarity of attack and the contrast with the previous sound area is marked. In this sense it blends better with the following sound mass which opens with similar metallic and wooden based rhythmic attacks.

**Synopsis.**

This sound mass contains lots of contrasting fragments, many of which are reminiscent of previous ideas. The combined effect of all these familiar ideas, which briefly appear and are then
superseded, is to destroy the stability of the sound mass as well as act as a link to the passage of organised sound. In this sense it fulfils the same purpose as SM4.


Unstable ........................................

Sound Mass 15. OS2, 0'00" - 0'45"

Sound Area 1. OS2, 0'00" - 0'11"

The passage of organised sound opens with rhythmic sounds which seem to be based on wooden and metallic noises. These appear to have been created rather than pre-recorded. This sound idea interacts with a higher register burst of white sound and metal until it is interrupted by SA2 and SA3.

Sound Area 2. OS2, 0'12" - 0'25"

This sound area opens with a lower register rhythmic idea similar to SA1, but more contracted. This leads to a low humming noise which is recognisable as a metal based noise.
during the gap between the two concurrent sound ideas from SA3. Thus, the two sound ideas interact rhythmically and dynamically with SA2.

Sound Area 3. OS2. 0'12" - 0'43"

This consists of a cymbal roll which transforms slowly through the way in which the sound has been treated. After a brief gap it returns, overlapping with the final sound idea which is a low pitched treated gong sound. This presents the first clear pitch levels of the sound mass with the F#3 falling to E3 and then returning to the F#3 at the close.

Sound Area 4. OS2. 0'20" - 0'45"

The upper register fragmentary sound ideas within this sound area seem to be studio based treatments of high pitched wooden or metal attacks. They sound rather like the teeth of combs which have been distorted. The sound appears in two distinct registers although the sound source is obviously the same. The sound ideas are placed so that SA2, 3 and 4 all rhythmically interact, with the upper register comb idea returning independently to close the sound mass.

Synopsis.

The opening sound area continues the rhythmic development heard at the end of the previous sound mass, but is then interrupted by more sustained metal based sounds. The material appears to consist of studio based noises rather than
pre-recorded sounds that were so prominent in the previous passage of organised sound. The way in which they have been treated makes individual timbres hard to identify and precise pitch can only really be discerned on the low gong sound idea in SA3. Thus, it is not really possible to provide an over-view of dominant pitch levels as in the previous sound masses.

**Sound Mass 16. OS2. 0'46" - 3'17"

This extensive sound mass was initially viewed as two separate sound masses, divided by the silence which occurs after 2'00". However, the material in SA3 and SA9 is so similar, and the woodblock sound idea at 2'12" obviously restates the previous material, and so this notion was abandoned. The extensive duration of this sound mass is a result of the way in which the majority of sound areas concentrate on linear and rhythmic development rather than textural or timbral contrast. Previous sound masses (Eg. SM4 and SM14) have contained a similar diversity of material, but neither have focused the attention so specifically on development in a single horizontal plane. Note how all the sound areas overlap, and often two or three sound areas occur simultaneously (Similar to the previous sound mass). The inevitable result of concentrating on linear development will be that the duration of the sound will be extended, and it is for this reason that SM16 is the longest in Déserts.
Sound Area 1. OS2. 0'46" - 0'55"

Two ambient xylophone or marimba ideas employing the pitches Eb4 and A##4, an augmented fourth, the second of which seems to instigate the rhythmic developments in SA2 and 3.

Sound Area 2. OS2. 0'52" - 1'08"

Lower register rhythmic ideas employing wooden or generated noise of imprecise pitch. They contrast pitch levels and interact with SA2. The final sound idea might be a distorted bass drum roll, but is hard to distinguish.

Sound Area 3. OS2. 0'57" - 1'57"

A repeated metal hammering noise on the pitch level C5 which expands to include the upper D5 towards the end. The statements are fragmentary and interspersed with silence, which is an important if unrecognised element throughout this passage of organised sound. When the statements do occur the "hammering" is persistent and rhythmical.

Sound Area 4. OS2. 1'08" - 1'17"

A clear, and undistorted rhythmic figure on two drums, based on Motive D and contrasting high and low sounds. This fills in the gap between the reiterations of SA3.

Sound Area 5. OS2. 1'17" - 1'51"

An almost inaudible background timbre to the other sound areas consisting of low level sustained metal percussion, (Gong and cymbals) which occasionally increase in level during the
gaps between the other linear developments.

**Sound Area 6. OS2. 1'19" - 2'09"

More imprecise low register percussive sounds, similar to SA2, but revealing itself to be metal based (gongs, etc.) as the timbre becomes more apparent in the second statement at 1'48".

**Sound Area 7. OS2. 1'33" - 2'15"

An ambient repetition of a woodblock sound idea. The blocks are presumably temple (or Chinese) blocks as the pitches Bb3, F3 and C3 can be discerned. The three repetitions of this idea are widely spaced and fill in the gaps between the hammerings of SA3.

**Sound Area 8. OS2. 2'05" - 2'17"

A low register sustained, and dynamically emphasised, idea which seems to inject a new urgency into the various linear developments. Its source is indefinable, due to the distortion factor, but again it seems to be a studio generated noise rather than a pre-recorded sound.

**Sound Area 9. OS2. 2'10" - 3'17"

This sound area is almost identical to SA3. The pitch area is slightly altered and three notes are discernable in the opening, B4, C#5 and D#5 respectively. At 2'41" it is joined by a similar development in the upper register. They interact rhythmically, but are so similar in all other respects that I have considered a single sound area. The "hammering" becomes
increasingly persistent, and the dynamic level increases, until finally the lower B\textsubscript{3} emerges as the dominant sound and links back into the instrumental sound mass. It is interesting that B\textsubscript{2} is the opening note of the rhythmic development which opens SM17.

\textit{Sound Area 10}. OS2. 2'31" - 2'45"

Two metal based sounds which are repeated and have no precise pitch. The function, like SA11, is simply to contrast with SA9 and punctuate it rhythmically and dynamically.

\textit{Sound Area 11}. OS2. 2'49" - 3'06"

Two low and two high sharp wooden attacks (a slapstick?) which occur in the gaps in SA9, and assist in increasing the rhythmic intensity towards the close.

\textit{Synopsis}.

An extended linear development centred on two rhythmical hammering sonorities. These interact with a number of contrasting sound areas but are never superseded. The rhythmic intensity progressively increases as the hammering idea becomes dominant and this results in the thinning of the accompanying textures until, for the final ten or fifteen seconds, the hammering is heard alone.

A number of precise pitch levels can be distinguished providing the following over-view. This is obviously restricted due to the imprecise pitch of the majority of the sound areas,
nevertheless there appears to be a number of semitone cells.


![Unstable... Stable...]

Sound Mass 17. 225.1 - 247.1

Sound Area 1. 225.1 - 227.3

A re-ordered and extended statement of the low register Motive A development first heard in bars 216 and 217. This is joined by an upper pitch level of D5 which is dynamically and texturally developed in the brass and acts as a pivot into SA2.

Sound Area 2. 227.3 - 236.2

A five note sustained pitch pattern is created through initial semitone cells in the woodwind. These develop into statements of Motive B on the piano and clarinet, and then passing between the brass. The upper C#6 is extended through a rhythmic statement of Motive E before being taken over by the flute which sustains the pitch level until the following dynamically emphasised return of the material from SA1. The development is reminiscent of the two sound ideas which occurred in bars 213 and 217 of SM14.
Sound Area 3. 232.1 - 237.3

An almost exact repetition of SM14:4, although the second half of the sound area has been slightly contracted. This time the sound area appears during the dying sustain of SA2. Both developments are stopped by the return of SA4.

Sound Area 4. 238.1 - 238.7

Another re-ordered restatement of the material from SM14:3 but this time there is no consequent upper register development. The sound area appears in its "pure" form during this final restatement, and the rhythmic intensity is greatly increased by the constant triplets on the timpani at the end of the bar.

Sound Area 5. 239.1 - 247.1

This sound area contains the closing cadential vertical pitch pattern of Section Two. The harmonic construction emerges from intermediate harmonic ideas on the brass which present motives A and A'. These are answered by Motive B on the woodwind whilst the bottom notes of the closing pitch pattern are established in the lower brass (also through Motive A).

The final pitch pattern then develops through an ascending tutti statement of Motive A and a falling statement of Motive B, creating a complex ten note vertical pitch pattern. The percussion is noticeably absent, and the degree of doubling of the upper melodic line is unprecedented in Deserts.

Four of the notes are reiterated in Bar 244, an upper major seventh and a lower minor ninth, and these create the sustain from which the following sound mass emerges.
Synopsis.

This sound mass clearly tries to bring a degree of structural unity to the material which occurs either side of the passage of organised sound. All of the sound areas prior to SA5 are derived from the Sound Mass 14, although the manner in which they are developed is different. This is obviously a strong argument for these sound masses to be considered as part of the same section as nowhere else in Deserts does repetition occur to this extent.

The sound mass contrasts a variety of ideas, yet each one takes over from the previous development, and they do not challenge one another. The dominance of Motive A in SA5, and the power of the final vertical pitch pattern ensures that the sound mass is essentially a stable development.


Stable ........................................

Section Three. 243.3 - 309.4

Sound Mass 18. 243.3 - 263.4

Sound Area 1. 243.3 - 263.4

The relationship between SA1 and SA2 is symbiotic but, for similar reasons to those stated in SM9 and SM11, the ideas are
separated analytically because of the independent forms of development they undergo. This sound area is a sustained pitch level of F#4 which passes between the various instruments of the ensemble and rhythmically interacts with SA2.

**Sound Area 2. 246.3 - 261.1**

A sustained vertical statement of Motive C based on the lower pitch G2. It is interesting that G and F# were the two notes omitted from the previous vertical pitch pattern. (This will be considered in depth in Chapter 17.) The motive passes between the low brass and piano and is developed in a similar manner to SA1. These two ideas interact throughout, they are in balance, and thus the sound mass is stable.

**Synopsis.**

This is a sound mass designed to offer maximum contrast with the previous vertical pitch pattern. The scope of the pitches is extremely limited and the sound areas focus on linear textural, timbral and rhythmic development.

The sound mass is also designed to provide a transition into the following passage of organised sound. The material is quite unlike that heard in SM4 or SM14, but then so is the following passage of organised sound. Whereas the two previous passages of organised sound continued the fragmentary ideas presented by the instrumental sound masses this third passage of organised sound continues the extended linear development of SM18. Thus, if bars 263 and 264 follow on consecutively there appears to be a marked change between two totally unrelated ideas, whereas the
transition into the organised sound can be almost imperceptible. The limited scope of the material means that a reading of established notes is not necessary, suffice to say that the overall interval is a semitone cell between the G2 of SA2 and the F# of SA1.

**Sound Mass 19. OS3. 0'00" - 0'38"**

**Sound Area 1. OS3. 0'00" - 0'21"**

A linear sound area which contrasts two vocal based melodic developments. The first falls from C6 to B3 and is then interrupted by two metal and white noise sound ideas. The vocal idea returns, and gradually rises to Bb4 where it transfers to an upper harmonic Bb7. Although the sound is generated it is obviously meant to be reminiscent of the human voice, as is the "scream" at the beginning of SM22. It has therefore been described as such on the textural graphs in Chapter 19. When combined the only three sustained pitch levels of this sound area present a statement of Motive B.

**Sound Area 2. OS3. 0'14" - 0'18"**

SA2 is a low pitched "explosion" which interacts with the end of the vocal line of SA1 and is penetrated by the upper harmonic Bb7.
Sound Area 3. OS3. 0'21" - 0'24"

This sound area contains three indeterminate rhythmic attacks which contrast high and low pitch areas whilst stating Motive D.

Sound Area 4. OS3. 0'25" - 0'30"

A similar indeterminate rhythmic development to SA3 but of a contrasting timbre. The statement of Motive D is extended through an additional sustained sound of generated noise.

Sound Area 5. OS3. 0'30" - 0'34"

A brief interjection of a few short notes generated by an oscillator. The five note pattern falls at first but then rises steadily until an upper pitch of C8 is achieved. The notes are B6, F7 and C8, or an extended statement of Motive A.

Synopsis.

Once again these sound masses could be interpreted in a number of ways. SM19 is considered to be distinct from SM20 because of the physical gap which separates them and the drastic change in timbre, dynamics and pitch between SM19:5 and SM20:1.

The five sound areas are contrasting, yet they all follow on from one another and the texture is uncomplicated. Thus, the sound mass remains stable despite the apparently oppositional ideas it contains. The pitched over-view is restricted to SA1 and SA5, but still shows a number of overall semitone cellular progressions.

Sound Mass 20. OS3. 0'35" - 1'17"

Sound Area 1. OS3. 0'35" - 0'41"

The sound mass opens with two statements of a wooden based noise which sounds like a low pitched vibra-slap. The second statement is an echo of the first.

Sound Area 2. OS3. 0'40" - 0'46"

SA2 is simply a descending low register oscillator tone falling from Bbl to Ab1 (a statement of Motive B).

Sound Area 3. OS3. 0'42" - 0'52"

SA3 consists of a contrasting high register oscillator sound which establishes C6, moves up to C#6 and then falls back to the initial pitch level. It is joined by a rapidly rising sound idea of similar timbre which ascends from F6 to F#7 and closes the sound area. Thus, sound areas 2 and 3 are similar developments based on oscillator sounds which move in contrary motion in opposing registers.
Sound Area 4. OS3. 0'53" - 1'03"

SA4 suddenly destroys the stability and calm of the sound mass with a dynamically emphasised complex distorted sound area. It appears to combine many ideas derived from the previous material. It is similar to SA2 and 3 in that it moves outwards in contrary motion, but the upper development is a vocal based sound and the central material is a low pitched generated hum.

Sound Area 5. OS3. 1'00" - 1'03"

SA5 overlaps and combines with SA4. It consists of rhythmic developments on percussion and gongs, cymbals, side drum and claves can all be clearly heard.

Sound Area 6. OS3. 1'04" - 1'15"

Sound area 6 contains a single mechanical rhythmic figure which interacts with SA7 to conclude the sound mass.

Sound Area 7. OS3. 1'06" - 1'17"

SA7 is simply a low machine drone which falls from A3 to G3 and then back to the A. As this sound area varies its timbral quality SA6 varies its rhythmic intensity, although neither sound area achieves dominance.

Synopsis.

The initial period of stability is shattered by the power of
SA4 which defines an intense vertical structure. This then transfers to the horizontal plane in the machine based sounds of sound areas 6 and 7. The sound mass opens with three consecutive stable sound areas but SA4 changes this in an instant, and the conflict is then maintained to the close. The over-view reveals two progressions of a tone in the lower register and a high pitched statement of Motive A.


Sound Mass 21. OS3. 1'18" - 1'56"

Sound Area 1. OS3. 1'18" - 1'30"

The sound mass begins with an upper register linear development of generated sound which contrasts dynamic levels between the two sound ideas and presents a wide ranging pitch area.
Sound Area 2. OS3. 1'30" - 1'51"

SA 2 consists of a short figure on the organ which contrasts a rising and falling motion. The lower notes are recognisable as Abl, G1 and Gbl which are doubled at the octave.

Sound Area 3. OS3. 1'33" - 1'56"

This sound area contains a high pitched vocal "scream" which is both dissonant and sustained. It rises and falls slowly providing a constant timbre with which the other rhythmic sound areas can interact. Its appearance is abruptly concluded by the rhythmic attacks at the end of SA5.

Sound Area 4. OS3. 1'34" - 1'42"

SA4 consists of a number of complicated rhythmic patterns on membraned percussion which add to the overall complexity of the sound mass and increase both the rhythmic and textural density.

Sound Area 5. OS3. 1'42" - 1'56"

SA5 comprises three sharp rhythmic attacks of generated noise. The dynamic level of the first, and the activity of the organ means that it is not particularly noticeable, but the second and third sound ideas are dynamically emphasised and call an immediate halt to the various developments which have occurred.

Synopsis.

Another complicated sound mass which focuses on timbral and
textural development and combines a number of recognisable recorded sounds with studio generated material creating an intense and unstable sound mass. Apart from the falling statement of Motive B on the organ there are no precise pitches that can be identified.

**Sound Mass 22. OS3. 1'57" - 2'30"

**Sound Area 1. OS3. 1'57" - 2'10"

The sound mass opens with a return of the high pitched "scream". This fragments, and brings forth a lower response of a similar timbre, before rising once again at the close. It is interrupted by SA3, and interacts rhythmically with the two sound ideas of SA2.

**Sound Area 2. OS3. 1'59" - 2'08"

This sound area contains two contrasting sound ideas, both of which support and interact with SA1. The first is a pulsating generated noise and metal based sound, the second, following a large gap, consists of three answering notes on the pitch level C#5.

**Sound Area 3. OS3. 2'10" - 2'24"

The "sound" of the four metrical statements which construe SA3 is hard to describe. Throughout my notes I described it as a "heartbeat" because of the uneven attack at the start of each
note and the spacing and regularity with which it returns. It is based on the pitch level B1. Whatever its source it overlaps and combines with SA4 and SA5 and provides the basis for the closing sound areas of this sound mass.

Sound Area 4. OS3. 2'15" - 2'30"

SA4 contains low pitched fragmentary machine noises which respond to SA3 and interact with SA5 to create a dense closing texture.

Sound Area 5. OS3. 2'23" - 2'30"

SA5 is another practically indescribable sound area. It contains two principal evolving sound ideas which contain a wide variety of pitch levels and generated noise. There appears to be some frenetic modified piano sounds contained within the texture. It interacts rhythmically with SA3 and 4 to conclude the sound mass.

Synopsis.

This sound mass continues where SM21 left off, combining a variety of contrasting timbres and textures and encompassing a wide range of pitch areas. At the beginning the vocal idea and the "heartbeat" followed consecutively, but by the close the stability is challenged through the interaction of SA3, 4 and 5. There is no pitched over-view as the only discernable notes are the G#6 of SA1 and the B1 of SA3. The sound mass is separated
from the following material by a noticeable pause. (Written silence once again?)

**Sound Mass 23. OS3. 2'31" - 3'07"**

**Sound Area 1. OS3. 2'31" - 2'35"**

This final sound mass of the passages of organised sound opens with a low pitched ascending machine noise. It rises once, falls back and then rises again.

**Sound Area 2. OS3. 2'35" - 2'44"**

The second sound area continues the textures of SM22:5, combining them in a distorted and ever changing tapestry of sound. From this melee emerge the first pitch levels of SA3. The contrast with the relaxed low pitched machine noise of SA1 could not be more startling. The sudden transfer into the upper register, and the nature of the sound, suddenly increases the intensity of the sound mass and causes the consequent pitch pattern to be constructed.

**Sound Area 3. OS3. 2'36" - 3'07"**

Sound area three concludes the sound mass by constructing a wide ranging vertical pitch pattern from generated sound. It is ironic that, following the multifarious developments which have preceded it, the passages of organised sound should be concluded by a development which is so similar to those found within the instrumental sound masses. The pitch pattern
develops a number of cellular ideas and leaves the pitch level Ab7 to penetrate and sustain into the next sound mass.

**Sound Area 4. OS3. 2'46" - 3'04"

SA4 contains three sound ideas which serve to heighten the intensity. The sound ideas get longer each time they return and employ membraened percussive sounds in combination with generated sound and generated noise. The sound area is superseded by SA3 as it rises into the upper register and the dynamic level becomes increasingly penetrating.

**Synopsis.**

The purpose of this sound mass is to conclude the passage of organised sound through an intense upper register vertical pitch pattern. All of the other sound areas merely support this structure and thus, although the sound is intense and dissonant, SA 3 is dominant throughout and the sound mass must be viewed as stable.

With the exception of SA3 there are no precise pitches in SM23 but the cellular relationships between these notes can be clearly seen.

**Example 22. Sound Mass 23. Closing Vertical Pitch Pattern.**

Stable ........................................
Sound Mass 24. 264.1 - 288.2

Sound Area 1. 264.1 - 269.4

A complicated rhythmic sound area, presented exclusively by the membraned percussion, which contrasts changes of dynamics with fragmentary developments based on motives D and E.

Sound Area 2. 270.1 - 270.5

A twelve note harmonic construction which develops from the pitch A4 in contrary motion. It opens with a statement of Motive C, but then develops through a number of diminished fifth intervals until all twelve notes have entered and an almost symmetrical vertical pitch pattern has been created.

Sound Area 3. 271.1 - 277.2

This sound area contains a number of different sound ideas which appear consecutively. They are considered to construe a single sound area as there is a degree of similarity in the way each sound idea is developed. The first idea is a roll on the field drum which, through changing dynamics, is an augmented version of the dynamic change which occurs during the material in bar 276. The trombones and timpani interrupt this sound idea and present a statement of Motive A which contrasts high and low pitch levels. This passes into the percussion where a similar development occurs. Finally, the third sound idea is a "march like" development in the brass, piano and percussion. This combines the changing dynamics of the first sound idea, and the
high/low pitch levels of the second sound idea and creates a seven note pitch pattern with Motive C in the upper register and Motive A in the lower register.

Two rhythmic fragments in the percussion link this sound area to the next. The first copies the high/low activity from SA3 and the second, a single note on the slapstick, seems to instigate the following development.

**Sound Area 4. 277.3 - 279.2**

A rhythmically constructed upper register vertical pitch pattern based on semitone cells which passes between brass and woodwind. The contrast with the previous SA is marked but the pitch pattern disintegrates almost as soon as it appears.

**Sound Area 5. 279.3 - 286.6**

A melodic statement of Motive B on vibraphone causes a three note harmonic idea (Motive A) to be sustained on piano, whilst the vibraphone continues with more linear developments around Motive B. The sustain of the accompanying metal percussion provides a link into the next sound idea which is a rhythmic elaboration of Motive A on the timpani. This in turn initiates a number of brief rhythmic ideas on xylophone, bass clarinet and timpani which, when combined, can be seen to be yet another development of Motive B.

**Sound Area 6. 287.1 - 288.2**

The previous linear development is violently interrupted by a
fortissimo vertical pitch pattern on the brass created from motives B and A. The pitch levels F4 and B5 are sustained on the pause, and provide the link into the next sound mass.

Synopsis.

The music in both SM 24 and 25 is extremely complicated and difficult to segment. Many sound areas overlap, and yet others can contain three or four apparently unrelated sound ideas. It is possible to interpret bars 264 to 309 as a single sound mass or, conversely, five or six separate sound masses. I do not think the distinction really matters so long as the constructional units help towards an understanding of the music. The two sound masses certainly have a good deal of material in common, but this has happened before between consecutive or closely allied sound masses. Thus, the deciding factor in the division of SM24 from SM25 was the written pause, and the restatement of Motive A at the close of SM24. With the exception of the pause in bar 270, all previous pauses have occurred at the end of sound masses, and this pause is emphasised by being marked "lunga". Also, the return of Motive A is a common feature normally associated with points of closure.

This sound mass opens with violently contrasting blocks of rhythmic, melodic and harmonic material before becoming more stable through the linear developments based on Motive B in SA5. The over-view of established notes shows a number of cellular
relationships unfolding across the entire sound mass despite the material appearing to be so oppositional.


![Musical notation](image)

Unstable.......... Stable ...........

**Sound Mass 25. 288.3 - 309.4**

**Sound Area 1. 288.3 - 289.6**

This sound area appears to repeat the material from SM24:5 but the melodic statement of Motive B fragments rhythmically, and this leads to the following sound area.

**Sound Area 2. 289.6 - 291.4**

A six note vertical pitch pattern is created from motives A and C and is joined by an upper "harmonic" of F#6 on the clarinet. As the sound area appears to be fading the trombones try briefly to rejuvenate it with renewed melodic activity based on semitone cells. This fails, but the upper pitch level D5 (the next SA) does penetrate and continue the development.
Sound Area 3. 291.4 - 294.1

A textural and dynamic development of a sustained pitch level D5, emphasised by percussion and being cut off at its highest point by SA4.

Sound Area 4. 294.1 - 296.1

The response to the previous sound area takes the form of emphasised rhythmic motivic developments on the claves over a sustained low level metal sonority. This leads to an upper register semitone pitch area which is the impetus for the following progressive build towards the closing cadential vertical pitch pattern (SA6).

Sound Area 5. 296.1 - 303.4

Two contrasting semitone cell developments interact throughout this sound area. The dynamic level and the rhythmic intensity increase so that by bar 304 the tension has to be released, or at least redirected, through the development of the final cadential harmonic construction. The rhythmic patterns are based on motives D and E, and the texture is enriched by the piano and bass drums in bars 301 to 303.

Sound Area 6. 304.1 - 309.4

A wide ranging dynamically emphasised cadential vertical pitch pattern is sustained through a pause, and then repeated in a contracted form in bars 308 and 309. The harmony develops exclusively through semitone cells and Motive A, and once again
the notes which are omitted are the structural notes in the following sound mass.

In a sense, this is the true "end" of Déserts. The previous ten bars have slowly increased the dynamic and rhythmic intensity leading to this cadential harmonic construction. Had the work stopped at this point it would have been reminiscent of the close of Intégrales or Hyperprism. The reason for the continuation is the nature of the subject matter of Déserts, and in this sense the close is more like Ionisation.

Synopsis.

The overall pattern of development is almost identical to SM24. At the beginning a number of brief and contrasting sound areas occur. Their interaction causes instability until the linear developments of the semitone cell assert themselves in SA4 and lead to the final vertical pitch pattern. Once again a number of motivic and cellular progression can be perceived between the dominant notes of the sound mass.


Unstable......... Stable ..............
Conclusion. Sound Mass 26. 310.1 - 325.7

Sound Area 1. 310.1 - 314.1

The final sound mass opens with a four note vertical pitch pattern in the upper register constructed from semitone cells. The purpose of this idea is initially unclear, but the entrance of SA2 reveals it to be an introductory development which serves to establish the pitch level Eb4. This type of semitone based harmonic construction has been heard on numerous previous occasions. The dynamic level is static, in contrast to SA2, which also emphasises the importance of the Eb4 pitch level.

Sound Area 2. 312.2 - 325.7

SA2 and SA3 are transposed repetitions of the pitch pattern heard in SM18. The development is identical, concentrating on rhythmic, textural, timbral and rhythmic change without altering the pitch pattern. The two sound areas interact rhythmically, with SA2 once again being left after SA3 has stopped.

Although both of these sound areas are considerably shorter than the development in SM18, the only major change is that this sound area is emphasised by percussion in bars 318 and 319 whereas previously this had only occurred in relation to the underlying harmony (SA3).

Sound Area 3. 317.1 - 324.1

A vertical statement of Motive C which interacts with SA2 and is developed in a similar manner to SM18.
Synopsis.

Through repeating the material that had previously been heard in SM18 this sound mass seems to leave one in "mid air". The two principle sound areas are balanced, but they are not resolved. The sound mass may be stable but the musical questions posed by Déserts seem to be deliberately left unanswered. This is reinforced by the physical silence which separates this sound mass from the rest of the work, and the written silence at the end which separates the material from immediate response by its audience.


Conclusions.

Through this analysis it has become apparent that certain forms of structuring re-occur throughout Déserts. These developments change from sound mass to sound mass and from section to section. It is clear that motives and cells dominate
the foreground and middleground structures. There are pitched as well as rhythmic motives, and the interaction of the cells and motives accounts for the majority of temporal development at an immediate level.

Sound areas and sound masses usually contain contrasting forms of development. They can be distinguished by changes in pitch, dynamics, timbre and texture (See also Chapter 19). Other means by which foreground material can be structured appears to be the concept of organising the notes (Note ordering, Chapter 17) and the frequent use of symmetrical structures (See Chapter 20).

The overall form of Déserts arises from the interaction of these sound areas and sound masses. The interaction is based on concepts of "penetration and repulsion", the relative stability of the sound mass, and the constant changes in rhythmic intensity (See Chapter 18). All these factors will be discussed in more detail during the following chapters.

"Rhythm, Intensity and Tension."(7)

It is known that whilst composing Déserts Varèse was also working on a commission for the Louisville Symphony Orchestra.

"The work was apparently entitled Trinium; it was divided into three sections to be played without a break and was based upon three fundamental elements: tension, intensity, and rhythm." (8)

Oudlette comments that Varèse transformed the work into "organised sounds on tape" and concludes that,
"There is no doubt that the three sections of this work became the three taped interpolations in Déserts."(9)

As the taped and instrumental material in Déserts can be seen to be parallel or symbiotic statements of the same underlying ideas, then how does this concept of "rhythm, intensity and tension" relate to the three sections of Déserts which I have identified?

To simply attach a label to each of the three sections is an overly simplified summary of the actual musical content. All sections will naturally include all three elements. However, an argument can be made for the three sections to be governed by the over-riding concerns of tension, rhythm and intensity respectively.

The tension of the music arises through the way in which the various sound masses and sound areas interact. If they are oppositional or juxtaposed the tension increases. Varèse also described tension as emanating from "the size of the interval employed"(10). Section One can be seen to examine both these aspects of the term "tension". Sound Masses 2, 3 and 4 concentrate on contrasting different sized pitch patterns. The sound areas are brief in comparison with the other sections, focusing on developing the vertical rather than the horizontal plane. In sound masses 5, 6, 7 and 9 this development continues and the tension is increased through the use of simultaneous and juxtaposed sound areas.

The second section concentrates on linear and rhythmic
developments, as epitomised by the extended SM16 in the second passage of organised sound. Rhythm is described as,

"an element of stability and not as meter."(11)

and this concurs with Section Two where the development centres on a constant battle between stable and unstable sound areas, with stability almost always reasserting itself at the close of the sound mass.

Section Three contains a number of brief, and violently opposing sound areas in both the horizontal and vertical planes. The intensity of the various sound areas gradually increases through dynamic and rhythmic developments, and the outlet for these developments seems to be through the construction of extended and intense vertical pitch patterns, as found at the end of SM23 and SM25. However, Varèse did not simply employ the term "intensity" as described above. He commented, with regards to the taped interpolations of Déserts, that intensity simply referred to the "desired acoustical result"(12). Nowhere in Déserts is the contrast between opposing timbres and textures more extreme than during Section Three.

I do not consider it necessary to further investigate this argument as its basis lies in observations made by Varèse's colleagues and to not originate with the composer himself. However, it does provide an interesting viewpoint as well as unexpected support for the three section structure outlined within this chapter.
CHAPTER FIFTEEN.

DÉSERTS: PITCH CLASS SET ANALYSIS.

The initial impression given by pitch class set analysis is that Déserts consists of a number of small fragmentary sets. Melodic sets of more than four notes are extremely rare, and the majority of vertical pitch patterns are similarly restricted. Once again this supports Whittall's observation that Déserts is "athematic". There are very few large or sustained pitch class sets in either the horizontal or vertical planes. The majority of sets of cardinality six and above either occur for a relatively brief period, and are then succeeded by contrasting material, or arise through the interaction of two independent sound ideas or sound areas.

The three major structural cadences can be clearly seen, as can the frequent occurrences of the various motives, identified by the set names 3-1(12) (Motive B), 3-3 (Motive C), 3-4 (Motive A') and 3-5 (Motive A) respectively. Certain blocks of material are repeated in different locations, and in different transpositions throughout Déserts, these are immediately obvious through the similarity in set names. (See bars 216, 225 and 238, or sound masses 18 and 26.) Where material is developed
through inversion, or re-ordering of the notes this also appears through a commonality of set name. (For example, upper brass bars 78 to 82.)

In certain sound areas and sound masses certain sets dominate the development, this is particularly noticeable with the motivic and cellular sets. (For example, bars 294 to 303 only contain 2-2 sets, bars 304 to 310 only contain 3-5 sets.) It is also evident that there are numerous places where material transfers from sound area to sound area, or from linear to harmonic statements, the phenomena Varèse refers to as transmutation.

I do not propose to enter into a detailed commentary on the graphs as they have been included in their entirety in Appendix Five. Readers who are familiar with pitch class set analysis should refer to the graphs, but nevertheless I shall illustrate, by example, a number of points of interest which have arisen. (Initial examples will be given, and then references of similar occurrences which can be located on the graphs.)

**Subsets and Supersets.**

The manner in which Varèse creates the large vertical pitch patterns of *Deserts* through the gradual addition of notes makes it inevitable that many subset/superset relations will occur. These are common throughout Varese's music and do not require
further comment at this juncture. (See Bars 205 and 270.) There are, however, many other subset/superset relations within *Deserts* some of which are particularly revealing with regards to how the foreground structure is developed.

Within many of the sound masses the actual number of vertical pitch patterns presented are limited. The material progresses through the rhythmic development of a number of fragmentary sound ideas. This often occurs against a static vertical pitch pattern, or a sustained pitch level. Although these various sound ideas may seem to be "new" material they are very often found to be subsets of the previous vertical pitch pattern.

The opening sound mass is a good example of this as it actually consists of rhythmic and textural development around three sustained six note pitch class sets. All pitched developments are encompassed by these three sets. An over-view of Sound Mass 1 is as follows:

**Example 1. Sound Mass 1.**

<table>
<thead>
<tr>
<th>Bars 1 - 13</th>
<th>Bars 14 - 20</th>
<th>Bars 21 - 29</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supersets.</td>
<td></td>
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<tr>
<td>6 - 32(12)</td>
<td>6 - Z41</td>
<td>6 - 7(6)</td>
</tr>
<tr>
<td>[0,2,4,5,7,9]</td>
<td>[0,1,2,3,6,8]</td>
<td>[0,1,2,6,7,8]</td>
</tr>
<tr>
<td>Subsets.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-2 [0,2]</td>
<td>2-2 [0,2]</td>
<td>2-1 [0,1]</td>
</tr>
<tr>
<td>2-5 [0,5]</td>
<td>2-5 [0,5]</td>
<td>2-5 [0,5]</td>
</tr>
<tr>
<td>3-9(12) [0,2,7]</td>
<td>3-1(12) [0,1,2]</td>
<td>2-6 [0,6]</td>
</tr>
<tr>
<td>3-11 [0,3,7]</td>
<td>5-14 [0,1,2,5,7]</td>
<td>3-5 [0,1,6]</td>
</tr>
<tr>
<td>4-10(12) [0,2,3,5]</td>
<td>4-8(12) [0,1,5,6]</td>
<td></td>
</tr>
<tr>
<td>5-23[0,2,3,5,7]</td>
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</tbody>
</table>
Similar inclusion relationships can be found throughout the work. (See also SM9:1, SM9:3/4, SM10:6, SM12:3, SM12:4, SM25:5) From the above example it is clear that 6-Z41 and 6-7(6) are also sets of maximum similarity, with five of the six pitch classes coinciding. Similarity relations of this type are common in Deserts, especially in sound areas and sound masses which are juxtaposed. In Sound Mass 10 the final three pitched developments demonstrate both how supersets can control sound areas, and how sound areas are often linked by similarity relations.

Example 2. Sound Mass 10.

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<tbody>
<tr>
<td>Superset. 5-19</td>
<td>6-7(6)</td>
<td>5-19</td>
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<tr>
<td>[0,1,3,6,7]</td>
<td>[0,1,2,6,7,8]</td>
<td>[0,1,3,6,7]</td>
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<tr>
<td>Subsets.</td>
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<tr>
<td>2-6 [0,6]</td>
<td>2-1 [0,1]</td>
<td>2-1 [0,1]</td>
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<tr>
<td>3-5 [0,1,6]</td>
<td>2-2 [0,2]</td>
<td>2-2 [0,2]</td>
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<tr>
<td>4-Z15 [0,1,4,6]</td>
<td>2-5 [0,5]</td>
<td>3-2 [0,1,3]</td>
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<td>3-1(12) [0,1,2]</td>
<td>4-9(6) [0,1,6,7]</td>
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<td></td>
<td>3-5 [0,1,6]</td>
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<tr>
<td></td>
<td>4-6(12) [0,1,2,7]</td>
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</table>

In these two examples the pitch classes are somewhat restricted, and the fact that all developments are subsets of the larger vertical pitch patterns is not really surprising. However, pitch classes are not always so restricted and yet an overall controlling set (1) can still be evident. The opening sound area of Sound Mass 9 contains eight different notes.
Although the two pitch patterns initially appear to be different they are both statements of the 4-25(12) set, and all internal activity is based around the subset 2-2.

**Example 3. Bars 85.1 - 93.3**

---

**Similarity Relations**

Similarity relations can be discerned throughout the work, and particularly within individual sound areas. These relations do not have to be restricted to sets of the same cardinality.

In sound areas where the inclusion relation of subset and superset is not evident it is common to find a great number of similarity relations with regards to the pitch classes. Thus, although none of the following sets are subsets of one another they are all in a relation of maximum similarity with one
The above examples tend to infer that the subset/superset inclusion relation and similarity relations are two opposing ways in which the internal structure of the sound masses are developed. In reality the two factors combine and constantly interchange, providing an overall sense of unity to material that can appear to be unrelated or oppositional.

The following example demonstrates how all sets within a sound mass are related through one or another of these factors. Similarity between pitch classes is not always immediately apparent due to transposition or inversion. Although this principle is clearly outlined by Forte (1) I have indicated both forms below for ease of recognition. All of the major vertical
pitch patterns are in a similarity relation with one another, and in most cases the interim developments of three and four note sets are subsets of both structures.

Example 5. Sound Mass 14. Bars 205 to 225

\[
\begin{align*}
&\{0,1,2,7\} \\
&\{0,1,2,6\} \quad \{0,1,3,4,8\} \\
&\{0,1,2,4\} \\
&\{0,1,2,6\} \quad \text{subset} \quad \{0,1,2,6\} \\
&\{0,1,2,4\} \quad \text{subset} \quad \{0,1,2,4\}
\end{align*}
\]

continued...

\[
\begin{align*}
&\{0,1,2,4,8\} \\
&\{0,1,2,6\} \\
&\{0,1,4,5\} \\
&\{0,1,2,5,6\} \\
&\{0,1,2,3,6,7\}
\end{align*}
\]

Similarity .........................

......................... All subsets of 6 - 5 ......

- 344 -
Transmutation.

There are a number of clear instances where material is "transmuted" from the horizontal into the vertical plane, or vice versa. When the entire pitch class set transfers this is an obvious form of development as the set name remains the same. But often this type of development is extended through inclusion relations, as can be seen at the beginning of Sound Mass 10. This sound area contrasts vertical and horizontal 3-1(12) sets before the set is subsumed as part of the closing motivically constructed vertical pitch pattern.


This type of development is particularly noticeable with the smaller sets, and especially with the various motives. (See 3-5 in bar 30, 3-5 bars 44 and 46, 3-3 in bars 54 and 60, 3-1(12) in
As the majority of vertical pitch patterns are constructed through the gradual addition of notes to a sustained harmonic texture, it could be argued that this form of transmutation is occurring throughout the work. There are also many instances where apparently different sound areas or sound ideas are shown to be similar through pitch class set analysis.

This often occurs at the end of a sound area or sound mass, where the overall temporal development is sustained through a commonality of material. The following example demonstrates this occurring between sound areas where apparently unrelated material, which contrast pitch, timbre, texture, rhythm, dynamics and articulation, are revealed to be statements of the same pitch class set.


Woodwind and tuned percussion. Horn, trombone and tuba.

4 - 5
[0,1,2,6]

(See also the 3-4 in bars 38 and 42, the 6-1(12) in bars 65 and

- 346 -
68, the 4-25(6) in bar 206, the 4-5 in bar 210, the 4-9(6) in bars 274 and 282, the 3-1(12) in bars 287 and 288, etc.)

This type of transference of material also occurs between the sound masses, and is used as a means of creating greater cohesion between the various sound masses and sections of the work. The closing cadential harmony of Section Two is a particularly clear example of this. SMI8 emerges from the dying sustain of the large vertical pitch pattern in bar 243. It seemed somewhat strange that only four of the ten notes are repeated in bar 244, and at a dynamic level that makes them practically inaudible. Why sustain only four notes? Why these particular four notes? Pitch class set analysis identifies them as a statement of the 4-7(12) set which is precisely the same set that is rhythmically and texturally developed throughout the following sound mass.


![Example 8: Sound Mass 17 and Sound Mass 18.](image)

- Piano. Bar 244
  - 4-7(6)
  - [0,1,4,5]

- Brass. Bar 246
  - 4-7(6)
  - [0,1,4,5]
(See also the 3-5 in bars 29 and 30, 3-8 in bars 204 and 205. Some statements even occur either side of passages of organised sound. See 3-1 in bars 82 and 83, 3-3 from the close of SM18 found at the opening of SM24.)

Pitch Class Sets and the Generation of Form.

It has been demonstrated that through the strategic placement of similar pitch class sets various sound masses and sound areas can be linked. This led to a closer examination of the pitch class sets to try and discover whether certain sets had a specific structural role, or returned in similar locations throughout the work. The answer was positive with regards to the motivic sets previously identified, and the extent to which these sets permeate all aspects of the composition will be demonstrated through the following tables and statistics. It will be shown that the majority of the larger pitch class sets are exclusive to particular locations within Déserts and very little material is actually repeated at all.

However, the only larger set which appears to recur in a structural role is the 4-8(12) pitch class set which often arises during the large cadential vertical pitch patterns. If one examines its structure [0,1,5,6] it is hardly surprising. It consists of combinations of the A and A' motive, and as this motive is normally dominant during these sound areas it is inevitable that some statements of the 4-8(12) set will arise.
Statements of this set can be found in bars 21, 30, 289, 304 and all through SM9. It is interesting to note that the statement of this set which led to the conclusion of the introductory sound mass is actually the same transposition as the statement in SM9 which leads to the conclusion of Section One. (ie. The notes are C#, D, G# and A.)

**Motivic Inclusion Relations.**

The following diagrams and tables are a means of examining the influence of the previously identified motives throughout the structure of *Deserts*. Statements of motives, whether exact, transposed or inverted, can be discerned in practically all of the larger sets. The Introduction and Section One have been subjected to a diagrammatic examination of motivic relationships and, having established the high incidence of such relationships, the results have been tabulated and statistically analysed. The remarkably high percentages of motivic inclusion relations reinforce the synthesis of the foreground structures of the work. Also, the variety of different sets that are employed emphasises how simple cells and motives can be used to generate an almost limitless number of differing musical structures. Naturally, both of these facts are supportive of Varèse's analogy that likened the form of his compositions to the process of crystallisation.
### Déserts. Sound Mass 1. Motivic Inclusion Relations.

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<th>[ 0,1,5,6 ]</th>
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<td>Sound Mass (cont.) Motivic Inclusion Relations.</td>
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<td>Motivic Inclusion Relations.</td>
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<tr>
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</tr>
<tr>
<td>---C--</td>
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</tr>
<tr>
<td>-----A'--</td>
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<tr>
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<tr>
<td>--C--</td>
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<tr>
<td>---A'--</td>
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<tr>
<td>6 - Z41</td>
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</table>

The sets of cardinality 7 and above have not been included within these lists as they each contain all four of the motives within their structures. However, they have been included in the percentage statistics included overleaf.
### Déserts. Sets of Cardinality 4 and above. Section One.

<table>
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<tr>
<th>Number</th>
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</tr>
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<td>4 - 8(12)</td>
<td>[0,1,5,6] A',A</td>
</tr>
<tr>
<td>4 - 9(6)</td>
<td>[0,1,6,7] A</td>
</tr>
<tr>
<td>4 - 13</td>
<td>[0,1,3,6] A</td>
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<td>4 - 25(6)</td>
<td>[0,2,6,8]</td>
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<tr>
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<td>[0,1,2,3,4,6,8,9] All.</td>
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<tr>
<td>9 - 7</td>
<td>[0,1,2,3,4,5,7,8,10] All.</td>
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## Deserts. Section One. Bars 1.1 - 117.5

<table>
<thead>
<tr>
<th>Percentage of sets of cardinality four and above which contain one or more motive.</th>
<th>97.7%</th>
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<tbody>
<tr>
<td>Percentage of sets of cardinality four and above of which Motive A is a subset.</td>
<td>76.2%</td>
</tr>
<tr>
<td>Percentage of sets of cardinality four and above of which Motive A' is a subset.</td>
<td>71.4%</td>
</tr>
<tr>
<td>Percentage of sets of cardinality four and above of which Motive B is a subset.</td>
<td>64.2%</td>
</tr>
<tr>
<td>Percentage of sets of cardinality four and above of which Motive C is a subset.</td>
<td>71.4%</td>
</tr>
<tr>
<td>Percentage of sets of cardinality four and above of which 3-9(12) is a subset.</td>
<td>38.1%</td>
</tr>
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</table>

Although it is inevitable that inclusion relations can be found between the majority of three note sets and the larger sets of six or more notes, the final statistic (above) proves that the development of the major structures within the first section of *Deserts* are primarily motivic. Motives can be found in 98% of all pitch class sets of cardinality 4 and above, and the lowest figure for individual motives is the 64% for Motive B. If the same principle is applied to the 3-9(12) set, presented at the beginning of the work, then the figure is noticeably lower. This reinforces the choice of motives, and the motivic structure outlined in the following chapter.
### Deserts. Sets of Cardinality 4 and above. Section Two.

<table>
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<tr>
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<tr>
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<td>4 - 12</td>
<td>[0, 1, 2, 5] B, A'</td>
</tr>
<tr>
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<td>4 - Z15</td>
<td>[0, 1, 4, 6] C, A</td>
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<tr>
<td>4 - 25(6)</td>
<td>4 - Z29</td>
<td>[0, 1, 3, 7] A</td>
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<td>[0, 1, 2, 3, 4] C, B</td>
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<td>5 - 4</td>
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<td>5 - 6</td>
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<td>5 - 14</td>
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<td>5 - 19</td>
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<td>6 - Z44</td>
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### Déserts. Sets of Cardinality 4 and above. Section Two. (cont.)

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<td>[0, 1, 2, 3, 6, 7, 8]</td>
<td>All</td>
</tr>
<tr>
<td>7 - 12</td>
<td>[0, 1, 2, 3, 4, 7, 9]</td>
<td>All</td>
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<td>7 - 19</td>
<td>[0, 1, 2, 3, 6, 7, 9]</td>
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<td>[0, 1, 2, 4, 7, 8, 9]</td>
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<td>7 - Z38</td>
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<tr>
<td>9 - 7</td>
<td>[0, 1, 2, 3, 4, 5, 7, 8, 10]</td>
<td>All</td>
</tr>
<tr>
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### Déserts. Section Two. Bars 118.1 - 247.1

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<th>Percentage of sets of cardinality four and above which contain one or more motive.</th>
<th>98.2%</th>
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<td></td>
<td>Percentage of sets of cardinality four and above of which Motive A is a subset.</td>
<td>75.8%</td>
</tr>
<tr>
<td></td>
<td>Percentage of sets of cardinality four and above of which Motive A' is a subset.</td>
<td>74.1%</td>
</tr>
<tr>
<td></td>
<td>Percentage of sets of cardinality four and above of which Motive B is a subset.</td>
<td>77.5%</td>
</tr>
<tr>
<td></td>
<td>Percentage of sets of cardinality four and above of which Motive C is a subset.</td>
<td>75.8%</td>
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### Deserts. Sets of Cardinality 4 and above. Section Three.

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<td>4</td>
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<td>5</td>
<td>[0,1,2,3,4] C,B</td>
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<tr>
<td>6</td>
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<tr>
<td>7</td>
<td>[0,1,2,3,5,6,7] A'</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>[0,1,2,3,5,6,7,8] A'</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>[0,1,2,3,4,5,6,7,9] A'</td>
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<td>11</td>
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### Déserts. Section Three. Bars 244.1 - 325.7

<table>
<thead>
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<th>Description</th>
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<td>Percentage of sets of cardinality four and above which contain one or more motive.</td>
<td>96.4%</td>
</tr>
<tr>
<td>Percentage of sets of cardinality four and above of which Motive A is a subset.</td>
<td>71.4%</td>
</tr>
<tr>
<td>Percentage of sets of cardinality four and above of which Motive A' is a subset.</td>
<td>71.4%</td>
</tr>
<tr>
<td>Percentage of sets of cardinality four and above of which Motive B is a subset.</td>
<td>60.7%</td>
</tr>
<tr>
<td>Percentage of sets of cardinality four and above of which Motive C is a subset.</td>
<td>75.0%</td>
</tr>
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</table>

These tables clearly show that practically all of the melodic and harmonic material presented in the various sections of Déserts is motivically based. It is interesting to note that during the first section Motive A is dominant. This arises through the important structural rôle given to the motive at the opening and close of the section. In the second section motives B and C are increasingly important. The remarkably high percentage of Motive B reflects the large number of linear, and rhythmic developments which are centred around this motive during this section. The fact that inclusion relations of all of the motives are very much in balance indicates the conflict and instability of much of this section. In Section Three Motive C rises to dominance, and this trend is continued into the conclusion, where Motive C is the repeated vertical pitch pattern which accompanies the sustained pitch level Eb4.
### DÉSERTS. Sets of Cardinality 4 and above. (All Sections.)

<table>
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<th>Location</th>
<th>Set Name</th>
<th>Pitch Classes</th>
<th>Motives</th>
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</tr>
<tr>
<td>2</td>
<td>4 - 2</td>
<td>[0,1,2,4]</td>
<td>B</td>
</tr>
<tr>
<td>1,2</td>
<td>4 - 3(12)</td>
<td>[0,1,3,4]</td>
<td>C</td>
</tr>
<tr>
<td>2,3</td>
<td>4 - 4</td>
<td>[0,1,2,5]</td>
<td>B,A'</td>
</tr>
<tr>
<td>1,2</td>
<td>4 - 5</td>
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<td>B,A',A</td>
</tr>
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</tr>
<tr>
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<td>C,A'</td>
</tr>
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</tr>
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</tr>
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<td>C</td>
</tr>
<tr>
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</tr>
<tr>
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</tr>
<tr>
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<td>C,A'</td>
</tr>
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</tr>
<tr>
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</tr>
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<td>5 - 2</td>
<td>[0,1,2,3,5]</td>
<td>C,B,A'</td>
</tr>
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<td>C,B,A'</td>
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<td>[0,1,2,3,6]</td>
<td>C,B,A',A</td>
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<tr>
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<td>1,2</td>
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<tr>
<td>2</td>
<td>7 - 20</td>
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<tr>
<td>1</td>
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</tr>
<tr>
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<td>[ 0,1,2,4,5,7,8 ]</td>
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<tr>
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</table>
**DÉSERTS. Sets of Cardinality 4 and above. (All Sections.)**

<table>
<thead>
<tr>
<th>Location</th>
<th>Set Name</th>
<th>Pitch Classes</th>
<th>Motives</th>
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<tbody>
<tr>
<td>2,3</td>
<td>9 - 2</td>
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<tr>
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</tr>
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<td>All.</td>
</tr>
<tr>
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<td>12 - 1</td>
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<td>All.</td>
</tr>
</tbody>
</table>

**DÉSERTS. All Sections.**

- Percentage of sets of cardinality four and above which contain one or more motive. (Overall) 97.7%
- Percentage of sets of cardinality four and above of which Motive A is a subset. (Overall) 77.0%
- Percentage of sets of cardinality four and above of which Motive A' is a subset. (Overall) 79.3%
- Percentage of sets of cardinality four and above of which Motive B is a subset. (Overall) 72.4%
- Percentage of sets of cardinality four and above of which Motive C is a subset. (Overall) 75.8%
From these lists it is clear that the motives are the driving force behind the music, and not larger structures. Of the pitch class sets of cardinality 6 or above, in excess of 70% of these pitch class sets are exclusive to one particular section. Although there appears to be some repetition within the larger sets of nine or more notes they are, in fact, similarly confined to one specific location. The doubling is not structurally significant as it only arises through the transitory sets which occur during the construction of the two unique 12 note vertical pitch patterns, in bars 204 and 270 respectively. Whilst these two harmonies are important, they do not have the structural significance of the vertical pitch patterns which occur at the end of each of the sections as they are not sustained for any significant length of time. (See Chapter 14.)

Maximal Motivic Inclusion.

From the previous lists it can be seen that some of the sets are capable of including all four of the motivic ideas. Within the larger sets this not unexpected, but within the pitch class sets of cardinality four to six less than 30% of the sets display this maximal motivic inclusion relation. It therefore follows that placement of these sets might be significant with regards to the development of the musical structure. A simple examination of the location of these sets reveal that they often
occur at key points of transition in the music. The following table lists a few examples of such sets, located in key positions at the opening or close of sound masses or sections.

<table>
<thead>
<tr>
<th>Set Name</th>
<th>Location</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 - 6</td>
<td>Bars 30 - 31</td>
<td>Concluding set of the opening vertical pitch pattern of Section One.</td>
</tr>
<tr>
<td>5 - 6</td>
<td>Bars 146 - 147</td>
<td>Opening material of SM11.</td>
</tr>
<tr>
<td>6 - 5</td>
<td>Bars 216 - 217, 225 and 238.</td>
<td>Important repeated SA on timpani and low brass.</td>
</tr>
<tr>
<td>6 - Z6</td>
<td>Bars 304 - 310</td>
<td>Part of cadential pitch pattern at the end of Section Three.</td>
</tr>
<tr>
<td>6 - Z12</td>
<td>Bars 241 - 243</td>
<td>Closing cadential pitch pattern of Section Three.</td>
</tr>
<tr>
<td>6 - Z36</td>
<td>Bars 123 - 124</td>
<td>First important vertical pitch pattern in Section Two.</td>
</tr>
<tr>
<td>6 - Z47</td>
<td>Bars 172 - 174</td>
<td>First established pitch pattern in SM12.</td>
</tr>
</tbody>
</table>
Conclusions.

Pitch class set analysis is useful in *Déserts* as it supports the other forms of analysis both with regards to the delineation of the overall structure and the identification of methods of foreground development. Many of the outwardly different foreground developments are shown to be synthesised, either through inclusion relations or similarity relations. Furthermore, the extent to which motivic relations permeate all aspects of the work is clear, not only from the frequent incidence of these sets on the graphs, but also from the examination of motivic inclusion relations.

Pitch class set analysis reveals a controlled and methodical exploration of pitched material within the various sound masses. It also provides a pointer towards larger formal structures. Oppositional material creates instability, unified material creates stability, and these factors are fundamental to the development of the sound masses. The major sections are also clearly indicated through the placement of large cadential vertical pitch patterns. Thus, set theory can explain much of the foreground structure as well as indicating aspects of the middle and background levels.

However, the main significance of pitch-class set analysis only emerges in relation to the other analyses. Despite the
different methodology employed, the findings here are in complete agreement with those detailed in the previous chapter, and are also supported by the following analyses.
THE MUSICAL LANGUAGE

OF

EDGARD VARESE.

(VOLUME TWO)

Tim Stephenson.

Doctor of Philosophy.

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CHAPTER SIXTEEN.

THE MOTIVIC STRUCTURE OF DÉSERTS.

The majority of all harmonic and melodic material in Déserts is constructed from a few simple motives. Within Déserts there are both pitched and rhythmic motives, often the two are synonymous, but within this chapter I shall concentrate on the incidence of pitched motives.

The Harvard Dictionary of music defines a motive as,

"A short figure of characteristic design that recurs throughout a composition or a section as a unifying element." (1)

There are certainly a number of ideas that recur throughout Déserts, although whether they act as unifying elements is debatable. Certainly the principal motive has a structural and unifying role, but the other motives often seem to be trying to destroy the unity rather than enhancing it.

Déserts is created from the interaction of three pitched motives, each containing three notes. Motives can occur in harmonic and melodic forms and are identifiable by the unanimity of the pitch classes they contain. Thus, motives can be developed by inverting or augmenting the intervallic content, re-ordering the appearance of the three notes, and through transposition. Due to the simplicity of the structure of the three motives, none of these forms of development are considered to affect the identification of motives in Déserts.

All of the motives are constructed from two basic cells.

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These, I believe, are the "crystals" to which Varèse refers. These cells are the interval of a perfect fifth (Cell 1) and the interval of a semitone (Cell 2). Through combining these cells many different motives can be generated.

"Possible musical forms are as limitless as the exterior forms of crystals." (2)

Motives occur in a variety of ways. They occur melodically, harmonically and in a combined manner. (The criteria by which these motives have been identified will be discussed later.)

Example 1. Déserts. Motive A.

Trumpet 2. Trombone 3 and Tubas. Trombone and Clarinet.

Melodic motives can occur on a single instrument, or can pass between a number of voices. If the latter occurs the voices are usually unified by timbre or pitch area.

Example 2. Déserts. Motive A.

Within a Single Voice. Within a Section. Within a Sound Area.
The Construction of Pitched Motives in Déserts.

All of the motives found in Déserts stem from the two basic cells of the fifth and the semitone. Other intervals may appear to be important at various points within the work, but these usually arise from the combination of the basic cells. (These will be discussed later with reference to the particular motives from which they arise.) Motivic and cellular development usually coincides. There are many instances where the pitched content of a sound mass thins or fragments. If this happens it is usually the cells that maintain the temporal development of the music until the motive returns or re-establishes itself.

Thus, motivic and cellular development seem to have a symbiotic relationship. For example, if a particular motive presents a sustained harmonic texture it is often accompanied by cellular activity which is rhythmically developed. This concept will be examined after the identification of the three motives which follows.

Motive A.

The principal motive A is constructed from a combination of the two cells. Most melodic statements will normally include both a rising and a falling melodic motion. This produces the three note motive identified by the pitch class set name
of 3-5.

Example 3.

Motive A. Original.

\[
\begin{align*}
C & \quad G & \quad F^\# \\
(\text{rise}) & \quad (\text{fall}) & \quad (\text{rise} - \text{fall}) = 3-5 \\
-\text{fifth} & \quad -\text{semi} & \quad (C_1) \quad (C_2)
\end{align*}
\]

The motive undergoes a huge variety of development from which a major part of all the melodic and harmonic material in *Deserts* is created. The main variation is the inversion, which will naturally have the same pitch class set name.

Example 4.

Motive A. Inversion.

\[
\begin{align*}
C & \quad F & \quad F^\# \\
(\text{fall}) & \quad (\text{rise}) & \quad (\text{rise} - \text{fall}) = 3-5 \\
-\text{fifth} & \quad -\text{semi} & \quad (C_1) \quad (C_2)
\end{align*}
\]

Further developments are made by changing the order in which the notes occur and by varying the rising and falling motion within the motives. Intervals can be inverted or augmented and thus a large number of variations of the principal motive (A) are produced. The following table lists some of these variations and the locations in which they occur.
### Deserts: Variations of Motive A. (Original)

<table>
<thead>
<tr>
<th>Variations</th>
<th>Musical Notation</th>
<th>Instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. C - G - F# (rise) (fall)</td>
<td>*<em>( \text{\textcopyright} ) C - G - F# (rise) (fall)*</em></td>
<td>Trombones. Bars 43-46</td>
</tr>
<tr>
<td>3. C - F# - G (fall) (rise)</td>
<td>*<em>( \text{\textcopyright} ) C - F# - G (fall) (rise)*</em></td>
<td>Clarinet. Bars 46-47 Trombone and Cl. Bars 121-122</td>
</tr>
<tr>
<td>4. C - F# - G (fall) (rise)</td>
<td>*<em>( \text{\textcopyright} ) C - F# - G (fall) (rise)*</em></td>
<td>Low brass. Bar 178</td>
</tr>
<tr>
<td>5. C - F# - G (fall) (rise)</td>
<td>*<em>( \text{\textcopyright} ) C - F# - G (fall) (rise)*</em></td>
<td>Piano and Brass. Bar 137</td>
</tr>
</tbody>
</table>
## Deserts: Variations of Motive A. (Original)

### 6.

\[ F\# - C - G \]

(fall) (rise)

\[ \begin{array}{c}
\text{Horns and Bass Clarinet.}\n\text{Bars 181-182}
\end{array} \]

### 7.

\[ G - C - F\# \]

(rise) (fall)

\[ \begin{array}{c}
\text{Trombones.}\n\text{Bars 225 and 238}
\end{array} \]

### 8.

\[ G - F\# - C \]

(fall) (rise)

\[ \begin{array}{c}
3\text{rd Trombone.}\n\text{Bars 239-240}
\end{array} \]

## Deserts: Variations of Motive A. (Inverted)

### 9.

\[ F - C - F\# \]

(rise) (rise)

\[ \begin{array}{c}
\text{Upper register.}\n\text{Bars 21-22 and Bars 116-117 Trombones.Bar 308}
\end{array} \]

### 10.

\[ F - C - F\# \]

(fall) (rise)

\[ \begin{array}{c}
\text{Trombones.}\n\text{Bar 21}
\end{array} \]
## Deserts: Variations of Motive A. (Inverted)

### 11.

<table>
<thead>
<tr>
<th>F - C - F#/(\text{rise}) (fall)</th>
<th>Trumpet 2. Bar 115</th>
</tr>
</thead>
<tbody>
<tr>
<td>(--C_1--)</td>
<td></td>
</tr>
<tr>
<td>(-----C_2-------)</td>
<td></td>
</tr>
</tbody>
</table>

### 12.

<table>
<thead>
<tr>
<th>C - F - F#/(\text{fall}) (rise)</th>
<th>Clarinets. Bars 26-27 Timps. Bar 216</th>
</tr>
</thead>
<tbody>
<tr>
<td>(--C_1--)</td>
<td></td>
</tr>
<tr>
<td>(-----C_2+---)</td>
<td></td>
</tr>
</tbody>
</table>

### 13.

<table>
<thead>
<tr>
<th>C - F#/(\text{fall}) (rise)</th>
<th>Timpani. Bar 283</th>
</tr>
</thead>
<tbody>
<tr>
<td>(--C_2'--)</td>
<td></td>
</tr>
<tr>
<td>(-----C_1'-----)</td>
<td></td>
</tr>
</tbody>
</table>

### 14.

<table>
<thead>
<tr>
<th>C - F - F#/(\text{rise}) (rise)</th>
<th>Trombone 2. Bar 216</th>
</tr>
</thead>
<tbody>
<tr>
<td>(--C_1'--)</td>
<td></td>
</tr>
<tr>
<td>(-----C_2--)</td>
<td></td>
</tr>
</tbody>
</table>

### 15.

<table>
<thead>
<tr>
<th>F - F#/(\text{rise}) (rise)</th>
<th>Piano and Trumpet 1. Bar 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>(--C_2--)</td>
<td></td>
</tr>
<tr>
<td>(-----C_1-----)</td>
<td></td>
</tr>
</tbody>
</table>

### 16.

<table>
<thead>
<tr>
<th>F#/(\text{rise}) (rise)</th>
<th>Trumpets. Bar 210</th>
</tr>
</thead>
<tbody>
<tr>
<td>(--C_1'--)</td>
<td></td>
</tr>
<tr>
<td>(-----C_2'-----)</td>
<td></td>
</tr>
</tbody>
</table>
Before concluding the examination of this motive it should be noted that there are a number of three note groups, of lesser structural significance, but still clearly identifiable as variations on motive A. These variations contain similar cellular content but the pitch class set they create is no longer 3-5, but the altered 3-4. This change of pitch class set results from the combination of original and inverted cells, as outlined below. Thus, these statements should be seen as adapted...
motives rather than true variations on the motive in its prime form.

Through combining inverted and original cells the result is a variation which is diminished in its internal intervallic construction, but nevertheless clearly recognisable as originating from Motive A. These have been termed Motive A'.

Example 5. 3-4 Adaptions of Motive A.

Motive A' (Original)

\[
\begin{align*}
C & \rightarrow F \rightarrow E \\
\text{(rise)} & \rightarrow \text{(fall)} \\
\text{-fourth-} & \rightarrow \text{--semi--} \\
(C1') & \rightarrow (C2)
\end{align*}
\]

Motive A' (Inversion)

\[
\begin{align*}
C & \rightarrow G \rightarrow Ab \\
\text{(fall)} & \rightarrow \text{(rise)} \\
\text{-fourth-} & \rightarrow \text{--semi--} \\
(C1') & \rightarrow (C2)
\end{align*}
\]

These adapted statements of Motive A are far less frequent than the prime form variations previously outlined. They tend to occur during sound masses or sound areas where the 3-5 set is dominant. They are seldom responsible for generating any significant amounts of material in the foreground and they tend to act in a supportive role to the 3-5 motives and seldom appear independently.
### Deserts: Variations of Motive A' (Original)

<table>
<thead>
<tr>
<th>No.</th>
<th>Motive</th>
<th>Musical Notation</th>
<th>Instrument/Bar</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>20.</td>
<td>F - C - E</td>
<td><img src="image" alt="Musical Notation" /></td>
<td>Piano. Bar 42</td>
<td>(fall) (fall) -C1′-- -C2+-</td>
</tr>
<tr>
<td>21.</td>
<td>E - F - C</td>
<td><img src="image" alt="Musical Notation" /></td>
<td>Trumpets. Bars 58-59</td>
<td>(fall) (fall) -C2′-- -C1′-</td>
</tr>
<tr>
<td>22.</td>
<td>E - C - F</td>
<td><img src="image" alt="Musical Notation" /></td>
<td>2nd Horn. Bar 115</td>
<td>(fall) (fall) -C1-- -C2+-</td>
</tr>
<tr>
<td>23.</td>
<td>E - C - F</td>
<td><img src="image" alt="Musical Notation" /></td>
<td>Tubas. Bar 79</td>
<td>(rise) (rise) -C1′-- -C2+-</td>
</tr>
<tr>
<td>24.</td>
<td>E - F - C</td>
<td><img src="image" alt="Musical Notation" /></td>
<td>1st Trumpet. Bars 239-240</td>
<td>(rise) (rise) -C2+- -C1--</td>
</tr>
<tr>
<td>25.</td>
<td>F - C - E</td>
<td><img src="image" alt="Musical Notation" /></td>
<td>Tubas/Horn Bar 240</td>
<td>(fall) (rise) -C1′-- -C2+-</td>
</tr>
</tbody>
</table>
### Desert Variations of Motive A' (Inverted)

<table>
<thead>
<tr>
<th>Number</th>
<th>Motive</th>
<th>Staff</th>
<th>Instrument</th>
<th>Bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>26.</td>
<td>G - C - Ab (rise) (rise) -C1'-- ---- C2+-----</td>
<td>Piano.</td>
<td>Bar 42</td>
<td></td>
</tr>
<tr>
<td>27.</td>
<td>Ab - G - C (rise) (rise) --C2'-- -C1'--</td>
<td>Upper Brass.</td>
<td>Bar 60</td>
<td></td>
</tr>
<tr>
<td>28.</td>
<td>Ab - C - G (fall) (fall) --C1'-- ---- C2+-----</td>
<td>Trombones.</td>
<td>Bar 239</td>
<td></td>
</tr>
<tr>
<td>30.</td>
<td>C - G - Ab (rise) (fall) --C1-- --C2'--</td>
<td>Low Register.</td>
<td>Bar 149</td>
<td></td>
</tr>
</tbody>
</table>

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I do not consider it necessary to differentiate further between the statements of this motive (3). The majority of motives do not have any inherent structural function although some motives do have strong textural or registral associations. It is interesting to note how many motives occur in the low register brass, and the trombones in particular.

The two exceptions to this general rule are variations 1 and 9. Both of these occur almost exclusively at the cadential points of the work and serve to conclude the principal sound masses and sections of the work.

The other factor that emerges from the tables is that, whilst all the variations stem from the two basic cells of the semitone (Cell 2) and perfect fifth (Cell 1), through combination the augmented fourth or diminished fifth interval becomes increasingly important. Throughout the work there are a number of instances where Motive A is dominant yet the supporting material is fragmentary and cellular. Often melodic statements of augmented fourth intervals will be found in addition to the fifth and semitone cells. This new interval obviously arises from this re-ordering of the notes, and is fully integrated into a musical texture based around Motive A. Hence, the augmented fourth does not represent new or conflicting material within a sound mass centred on this motive.

The integration of all of these elements can be seen through
the following example. The cadential close of Section Two is based on Motive A. However, the following cells and motivic variations can be identified within these few bars.

**Example 6. Motives and Cells within a Sound Area. Bars 239-242.**


---

**Motive A (3-5)**

Low brass and piano. Upper register instruments.

---

**Motive A' (3-4)**

The Construction of Alternative Structural Motives.

In addition to Motive A there are two other important three note motives that appear throughout *Déserts*. These motives interact with the principal motive but are usually superseded by the end of each sound area or sound mass. Both motives are capable of generating considerable quantities of foreground material, whether individually or in combination. Numerous variations on each motive can be found throughout the music, and these are created in a similar manner to Motive A, through re-ordering, inversion and augmentation. The structural significance of these motives (B and C) lies in the way in which conflict arises between them and Motive A. It is from this conflict that much of the forward temporal development of the music originates.

If the motives in *Déserts* are developed from the two previously identified cells, there are two obvious three note motives that can be created in addition to the Motive A already outlined. Firstly, the motive constructed from two cells of a perfect fifth, and secondly, the motive constructed from two cells of a semitone. Both of these ideas are stated in the opening sound mass. However, for reasons that will be examined below, only the latter of these ideas is actually developed throughout the work as an independent motive, and this I have termed motive B.
The Motive Constructed from Two Perfect Fifths. (3-9)

The three note idea, stated at the opening of the work, is created from two consecutive cells of a perfect fifth (Cell 1). Both of the opening sound areas employ this "motive". However, the use of this idea throughout the work is extremely limited. Why, therefore does the composer choose not to develop this opening idea?

In most of Varèse's earlier compositions an important structural motive is presented at the beginning of the work. In most cases this motive undergoes considerable development throughout the work, and usually it returns at least once in its original form. (See Appendix 10A.) However, despite this motivic development there are many instances where the opening texture of a work does not return, as in Ionisation, Hyperprism or Integrales.

Thus, it is not unexpected that the opening sound mass of Déserts does not return, but what is unusual is that the motive presented at the beginning seems to have no structural significance outside the opening sound mass. The idea does not seem to be developed as might be expected. The few statements that do occur are restricted to harmonic textures, and there are few variations on the original form of the motive. The motive does not readily lend itself to extensive development as the inversion of the motive would be undistinguishable from the original. Thus, one of the few restatements of this motive arises not from an inversion of the motive but rather it is
developed by inverting the cells contained within it. This would seem to infer that the cell of the fifth is the dominant idea within these structures and not the combination of cells into the 3-9(12) pitch class set. Therefore, this idea cannot truly be termed a motive.

Example 7.

Opening idea. F - C - G (rise) (rise) = 3-9(12)
(Original) -fifth-fifth-
Bars 1 - 19. (Tubular Bells)

Opening idea. F - Bb - Eb (rise) (rise) = 3-9(12)
(Developed by fourth-fourth-
inverting the cells.)
Bars 126 - 129. (Trumpets)

It is possible that the reason this "motive" returns so infrequently, after dominating the opening sound mass, is because of the tonal implications inherent in its structure. Why then was it used so much in the opening twenty bars of Déserts? A possible explanation lies in the particular timbre of the opening sound mass. The "sound" is developed around the tubular bells, and these instruments do not occur elsewhere in the work. The sound of tubular bells is characterised by an extremely strong 2nd harmonic, the twelfth, or an octave and a fifth. (Indeed, if one strikes them incorrectly it is possible to subordinate the fundamental and be left with a sound based almost totally on this harmonic.)

Throughout the work it can be seen that the harmonics created by the various sound masses are calculated and planned. This is
particularly noticeable during the passages of organised sound. Therefore, to create a stable and substantive sound mass around this specific instrumental texture requires the use of this idea. Other motives on the tubular bells would generate complicated and conflicting patterns of harmonics which would interfere with the stability of the opening sound mass that Varese was trying to create.

Motive B.

Motive B is created from two consecutive statements of the cell of a semitone (Cell 2). This gives the characteristic 3-1(12) pitch class set found in so many of Varèse's works. (See Appendix 10B.) This motive occurs throughout his music both as a harmonic and melodic idea. It generates large quantities of material in the foreground and its interaction with motives A and C helps to define the overall structure of *Déserts*.

Example 8.

Motive B.  
C - C# - D  
(Original) (rise) (rise) = 3-1(12)  
--semi-- --semi--

When Motive B is inverted there is no discernable difference in the structure. Thus, to generate a large number of variations the augmented interval of the minor ninth (C2+) is frequently used in addition to the cell of the semitone(C2) and the inverted cell of the major seventh (C2').
Example 9.

Motive B. C - B - Bb
(Inversion) (fall) (fall) = 3-1(12)
---semi--- ---semi---

This motive first occurs in the brass and piano at bar 14 in the opening sound mass. The motive is developed in a similar manner to Motive A, through augmentation, inversion and re-ordering, and thus a number of variations on the original motive are created, all identifiable by the 3-1(12) pitch class set.

Although the initial statement of Motive B is constructed from two falling minor ninths it is common for this motive to incorporate both rising and falling cells. (In common with the Motive A.) This creates a number of variations as detailed below.

<table>
<thead>
<tr>
<th>Déserts: Variations of Motive B.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woodwind. Bar 125</td>
</tr>
<tr>
<td>Woodwind. Bar 278</td>
</tr>
<tr>
<td>Piano/Woodwind. Bar 311</td>
</tr>
</tbody>
</table>
Deserts: Variations of Motive B.

3.

C - C\# - D  
(rise) (rise)  
---C2---- ---C2+++  

Woodwind. Bar 217  
Vibe. Bar 279  
Piano and Wood. Bar 311

4.

C\# - C - D  
(rise) (rise)  
---C2'++---  

Brass. Bar 228

5.

D - C\# - C  
(rise) (rise)  
---C2'---- ---C2'---  

Piano. Bars 37-40

6.

C - C\# - D  
(fall) (fall)  
---C2'---- ---C2'---  

Trumpet. Bar 196

7.

D - C\# - C  
(fall) (fall)  
---C2---- ---C2---  

Upper Register. Bar 242

8.

D - C\# - C  
(fall) (fall)  
---C2+++ ---C2+++  

Brass and Piano Bar 14
continued...

<table>
<thead>
<tr>
<th>No.</th>
<th>Motivic Variation</th>
<th>Notation</th>
<th>Instrument</th>
<th>Bar(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.</td>
<td>D - C - C# (fall) (fall)</td>
<td><img src="image" alt="Notation" /></td>
<td>Piano and woodw.</td>
<td>228</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>C - C# - D (fall) (rise)</td>
<td><img src="image" alt="Notation" /></td>
<td>Piccolo</td>
<td>186</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>C# - C - D (fall) (rise)</td>
<td><img src="image" alt="Notation" /></td>
<td>Horn</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>C# - C - D (fall) (rise)</td>
<td><img src="image" alt="Notation" /></td>
<td>Woodwind</td>
<td>121</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>C# - C - D (fall) (rise)</td>
<td><img src="image" alt="Notation" /></td>
<td>Bass clarinet</td>
<td>183-184</td>
</tr>
</tbody>
</table>
Deserts: Variations of Motive B.

16. C - D - C\# (rise) (fall) ---C2+----- Piano and wind. Bar 81
17. C - D - C\# (rise) (fall) ---C2+----- Brass. Bar 212
    ---C2----- Horn. Bar 197 Bb Clar. 206
19. C\# - C - D (rise) (fall) ---C2'-- Vibe. 280-282
    -----C2------- Eb clar and trpt
    (Augmented) Bars 101-102 Tutti. Bar 105
Varèse's use of this motive in *Déserts* provides an interesting means of comparison with the earlier works, as this motive is found throughout his music. Many of the variations of the motive are almost identical to those found in previous works. For example, variation 2 of the motive is often found during the closing harmonic structures of sound masses; variation 11 is common in melodic developments as is variation 15 (without augmentation).

Despite the many similarities it is unlikely that these motives have been copied from earlier works. Although it appears that Varèse was not averse to repeating material in different compositions, if one accepts the crystalline concept of composition in his music it is inevitable that when the same cells are used for creating a number of works, then similar motives will occur. Thus, when two similar motives occur in different works it is extremely unlikely that the context, rhythm, texture or dynamic will be repeated. Therefore, as Varèse's musical language is a synthesis of all of these elements one should not consider similarity of one element alone as significant.

Although the incidence of Motive B is not as high as that of Motive A there are numerous occasions where the basic cell (C2), its inversion and augmentation, are solely responsible for the development of the music. For example, in sound mass 25 all of the material that precedes the closing cadence is constructed
from semitones, major sevenths and minor ninths.

**Example 10.**


(C2. Semitone) (C2'. Major 7th) (C2'. Major 7th) (C2+. Minor 9th)


There are also many instances where semitone cells and Motive B combine. The following example shows how semitone and inverted semitone cells are combined within a single texture that is created from two overlapping statements of Motive B.

**Example 11.** Woodwind. Bar 121.

Bass Clarinet. Piccolo. Motive B. Motive B.

(C2. Semitone) (C2'. Major 7th) Bb Clarinet. Flute.

The use of overlapping motives is a common feature in Deserts. There are many harmonic structures that develop five and six note harmonies based entirely on consecutive semitone cells. (See Bars 217, 228 and 287.) However, perhaps the clearest representation of the importance of this motive is in the
closing sound mass. At this point, following two large cadential harmonic structures based exclusively on Motive A, the progression towards the established Eb is made exclusively through overlapping statements of Motive B.


Motive C.

The third structural motive found in Déserts consists of a semitone and a major third interval. At first this seems to contradict my previous theory whereby all motives originate from the two basic cells of the fifth and the semitone. The motive is not stated at the opening of the work and only gradually comes into prominence as the Section One progresses.

Example 13. Motive C.

Motive C.  
(Original)  
C - E - D\#  
(rise)  
(fall)  
= 3-3  
--third--semis--

Motive C.  
(Inversion)  
C - Ab - A  
(fall)  
(rise)  
= 3-3  
--third--semis--

The explanation for the structure of this motive can be found
in the first statement which occurs in the upper woodwind between bars 34 and 39. The motive arises from two rhythmic developments of minor ninth intervals. It is through the interaction of these cells that Motive C first arises. The initial statements are transient, emerging from the phrase on the flute and the sustained note on the clarinet. The next statement is more established occurring in a single voice on the piccolo. Hence, this short passage on the upper woodwind presents two inversionally equivalent statements of Motive C, both of which arise from the interaction of the augmented cell of a semitone (Cell 2+). The transient nature of this initial statement of Motive C is further emphasised by the fact that Motive A1 re-establishes itself at the end of the sound area.

Example 14. Woodwind. Bars 34 - 39

Minor 9th Intervals(C2+) Motive C. Bars 35-36 Motive C. Bar 37

Had this motive not occurred elsewhere one could have concluded that this transient three note idea was simply the result of semitone cell interaction. However the constant repetitions of this motive during Sound Masses 3 and 4 establish this idea as the third structural motive of Déserts.
### Déserts: Variations of Motive C. (Original)

1. **E - C - D#**  
   (fall) (fall)  
   --3'--  
   ---- C2+-----  
   1st Trumpet.  
   Bar 60

2. **E - D# - C**  
   (fall) (fall)  
   -- C2+--  
   ----- 3+-------  
   Clarinet, Horn  
   and Piano.  
   Bar 101

3. **C - E - D#**  
   (fall) (fall)  
   --3'-- -- C2+---  
   2nd Trombone.  
   Bar 239

4. **D# - C - E**  
   (rise) (rise)  
   --3-----  
   ---- C2+-----  
   Upper Register.  
   Bar 157  
   Trumpets and Piano. Bar 276

5. **C - D# - E**  
   (rise) (rise)  
   --3-----  
   ---- C2+---  
   Piccolo and  
   Flute. 35-38  
   Low Register.  
   Bars 246-261  
   Bars 317-324

6. **C - E - D#**  
   (rise) (rise)  
   --3-- -- C2'---  
   Woodwind.  
   Bar 210

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continued...

**Déserts: Variations of Motive C. (Original)**

7.  
D# - E - C  
(rise) (rise)  
--C2+-  
---------3'+---------  
Piano. Bar 270

8.  
E - D# - C  
(rise) (fall)  
--C2'--  
---------3'-----------  
Piano. Bar 204

9.  
D# - E - C  
(rise) (fall)  
--C2+---  
---------3------  
Trumpets.  
Bars 124-125

10.  
C - E - D#  
(rise) (fall)  
-----3---  
---C2++---  
Low Brass.  
Bar 64

11.  
D# - C - E  
(fall) (rise)  
-----3+++  
---------C2+--------  
Woodwind.  
Bar 278

12.  
C - D# - E  
(fall) (rise)  
-----3'----  
---C2+++---  
Flutes. Bar 63
<table>
<thead>
<tr>
<th>No.</th>
<th>Motive</th>
<th>Direction</th>
<th>Instruments</th>
<th>Bars</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.</td>
<td>C - Ab - A</td>
<td>(fall) (rise)</td>
<td>Trumpets. Bars 64-65</td>
<td></td>
</tr>
</tbody>
</table>
Motive C obviously occurs in a number of guises but seems to be more distinctly characterised as a harmonic motive than either Motives A or B. There are numerous instances where the motive is used to present a static harmonic texture over which rhythmic and cellular development takes place (See Sound Masses 17 and 26). It is also interesting to note that the first complete statement of the motive, in bar 36, is the same variation that is used to conclude the entire work.

Despite the tendency towards harmonic statements, Motive C is also used melodically and often combines with Cell 2 to create complete sound areas. This can be clearly seen during the extraordinary pianissimo, antiphonal, textural development that
occurs at bar 199. Here three overlapping statements of the motive are interspersed with two semitone cells, one normal (C2) and one augmented (C2+). Note also how the second and third statements of the motive are inversionally equivalent.

Example 15. The Combination of Cell 2 and Motive C. Bar 199.

With Motive A it was observed that the augmented fourth interval became increasingly important, and this arose from the combination of cells from which it was created. However, there is no evidence that the major third is important as a separate entity, as practically all statements of the major third interval occur within Motive C. The probable reason for this is because of the tonal implications of the interval when used independently, which are destroyed when it is combined with a semitone cell. Whatever the reason it does seem to support the notion that Motive C stems from two semitone cells and not from two distinct intervals whatever its pitch classes might suggest.
The Interaction of Pitched Motives in Déserts.

The temporal progression of Déserts is developed from the interaction of the three pitched motives, the two cells of the fifth and semitone, and the rhythmic motives (See Chapter 18). Each of these elements is capable of both interactive and independent development. Thus, to understand how the form of Déserts arises one must examine the manner in which the motives interact.

The previous examinations have shown how single motives can dominate sound areas. In addition, there are numerous instances where all three pitched motives occur within the same sound area. This combination of motives often coincides with the fragmentation of the sound area. Perhaps the best examples of this are found in the sound areas which are next to the passages of organised sound.

If one takes an over-view of the material within these sound areas it can often seem extremely complicated. However, even if motives occur simultaneously it is normal for them to maintain their separate identities. Motives do not often combine to present a single melodic or harmonic phrase. This can be clearly seen at the close of Sound Mass 3 where both of the cells and all three motives occur within the space of two bars and are then repeated during the final four bars of the sound area. Similar developments can be found between bars 156 and 165 (SM 11:3) bars 206 to 215 (SM 14:1 and SM 14:2) and bars

Sound Mass 4. Sound Area 3. (3:4) Bars 77 to 82


By maintaining their independence the interaction of the motives makes the sound mass unstable. When a single motive dominates the sound mass is usually stable. In this manner the pitched motives contribute to the process of penetration and repulsion that has been discussed previously. This would account for the high incidence of all three motives in the sound areas either side of the passages of organised sound, and the dominance of a single motive (Motive A') in the concluding sound masses of each section.
I do not consider it necessary to further describe the many ways in which the motives interact within the sound areas as this should be evident from the graphs. However, the overview of motivic interaction is revealing, and worthy of further consideration.

Motive A seems to function as a motive capable of instigating numerous forms of development and also as a concluding motive that terminates a particular path of development, whether it be harmonic, rhythmic, melodic, etc. Although there are many cases where motives B and C achieve dominance over Motive A, these developments are always transient, and inevitably superseded by the close of the sound mass or section. Thus, the calculated absence of Motive A, and the importance of Motives B and C in the closing sound mass (SM26) emphasises the undefinable and unanswerable concepts that Varèse was trying to communicate in Déserts.

The following graph shows how the motives interact throughout the whole of Déserts. It is important to note the opening sound mass of Section One (SM2) and the closing sound mass of Section Three (SM25) are both places where Motive A is totally dominant. In particular, the finality of the harmony presented at the end of Section Three is emphasised by it being the only sound mass in the whole of Déserts in which only a single motive occurs. Thus, the contrast between sound mass 25 and the concluding sound mass 26 is made all the more marked.

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Interaction of Motives A, B and C.

The graph details all statements of the pitched motives which occur in the instrumental passages of Deserts. Although motives are clearly stated in some of the passages of organised sound, these have not been incorporated into the above graph because of the problems of precise identification inherent in the prepared scores of these passages.
The interaction of motives is closely allied to the stability or instability of the sound masses. Where a single motive dominates the sound mass is usually stable. (ie. SM2, 9, 17 and 25.) Where all three motives are of relatively equal strength the sound masses are often unstable. (ie. SM3, 11, 14.) Thus, the overall stability or instability is indicated through the graph, but it should be remembered that this is a simplification as all sound masses can move through a number of states of relative stability as has been previously shown in Chapter 14.

Nevertheless, the overall progressions are as follows. The introductory sound mass is stable, but immediately Section One begins conflict arises between the motives. This conflict reaches a peak immediately prior to the passage of organised sound where Motive B is established, and consequently resolves during the closing cadence. Despite the obvious differences in the material presented, the overall structure of Section Two is remarkably similar to Section One. In both sections the conflict between the motives progressively increases towards the point where the passages of organised sound enter, Motive B then dominates the taped interpolation, and subsequently Motive A re-asserts itself towards the end of the section.

In Section Three the motives and cells are presented sequentially rather than simultaneously. Thus, conflict does arise but not to the same extent as found in Section Two as
different cells or motives dominate the different sound masses.

In the final sound mass (SM26) although both motives B and C appear, they are balanced, and the sound mass remains stable. Motive B opens the sound mass but Motive C quickly establishes itself as the basis for the sustained pitch level of Eb4.

The following tables summarise the contents of the motivic graphs included in Appendix 6, revealing how the motives interact at a higher level, and consequently how one aspect of the temporal development of *Déserts* is created.

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Over-view of Motivic Structure. (continued)

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Conclusions.

The development of pitched motives in Déserts initially appears to be the means by which material is developed in the foreground. The three pitched motives and the two cells account for the majority of pitched development in the work. However, the significance of motivic development is only revealed when one recognises that motives are capable of generating structure and form at all levels within the composition. The interaction of motives, whether stable or unstable, helps to generate the forward temporal progression of Déserts. In addition, it will be shown through the note ordering analysis that motivic and cellular progressions occur not only in the foreground but at higher structural levels as well.
CHAPTER SEVENTEEN.

NOTE ORDERING ANALYSIS

The note ordering analysis is another means by which we can gain an insight into the construction of Déserts. In the earlier works the majority of sound masses employ all twelve notes in the foreground, the sections present a middleground statement of all twelve notes and the entire work unfolds a single statement of all twelve notes in the background. Thus, the method reinforces the form of the work previously outlined by delineating sound masses and sound areas, and showing how they combine to create the major sections of the composition.

The construction of Déserts is rather more complicated than previous compositions. The musical language is more contracted and compressed, and the various developments seem precise and free from any superfluous material. This is evident in the note ordering analyses as there are a number of incomplete statements in all levels of the composition. Thus, the technique is not so readily applicable to Déserts as it had been to the earlier works. The work is also of considerable duration, and is complicated by the passages of organised sound. Note ordering cannot be applied the three passages of organised sound due to the imprecise nature of the majority of pitches contained.
in them. Nevertheless, note ordering does reveal a number of interesting structures, whereby the internal development of some of the sound masses and sound areas is based on the progressive introduction of all twelve notes which, when completed, causes the development to cease.

In *Déserts* quite a number of the foreground sections are incomplete, and the progressive unfolding of all twelve notes usually occurs through combining a number of sound areas of similar texture. Similarly, the sound masses only present middleground statements when combined. The form revealed by this analysis agrees throughout with that which has been outlined previously. In the first two sections the distinctions between the sound masses are clear, but in the third section the majority of statements, at all levels, are incomplete and therefore the structure is not so conclusive.

Nevertheless, the note ordering analysis is important for two reasons. Firstly, the number of incomplete statements of the twelve notes supports the argument that *Déserts* marks a major change from his earlier music: the way in which the musical structure is generated has altered; the synthesis of the various elements is more complete; the instruments of precise pitch are not so dominant in defining the musical structure as they had once been. Secondly, the middle and background statements of established notes reveal a wealth of cellular
relationships. This demonstrates that motivic and cellular structuring occurs at a number of hierarchical levels, as would be expected if the crystalline analogy is held to be correct.

I do not propose to enter into detailed commentary on the graphs (See Appendix 7) but will illustrate by example a number of key points of interest revealed through the note ordering analysis. The justification for my selection of various notes as established is also given in the appendix.

**Sectional Form.**

The structural importance of the cadential harmonic constructions, identified through the set theory analysis, can be explained through the principle of note ordering. *Déserts* contains a number of dense harmonic textures but only three of these are prolonged, sustained, and texturally and dynamically emphasised. They occur at the close of each of the major sections of the work.

The first cadential vertical pitch pattern in bars 115-117 contains ten notes. Why? In *Intégrales* and *Hyperprism* the cadential vertical pitch patterns contained as many notes as the ensemble allowed. Why, therefore, did Varese not create a twelve note harmonic sound area? There are certainly enough instruments available, so why did he choose to double certain notes when he had so studiously avoided doubling in the past?
The textural aspect of this argument will be examined further in Chapter 19, but the reason for the choice of ten notes, I believe, is revealed by the note ordering analysis which shows the "missing" notes to be important notes in the surrounding sound areas.

The notes that are omitted are C# and Bb. The C# dominated the sound area which preceded this harmonic close being the fundamental note on which sound area 3 is based. The Bb is the first note to be established in the following sound mass. Thus, by structuring the notes in this way the finality of this cadential vertical pitch pattern is partially negated, it concludes but also is placed in the context of a larger scale temporal development which requires continuing development.

Example 1. The Closing Harmonic Construction of Section One.

Section Two concludes with a similar vertical pitch pattern which also contains ten notes. Once again the significance of the "missing" notes lies in the following sound mass where the F# is established and passes between a number of voices during the following twenty bars (SM18:1). The G is the basis for the accompanying harmonic motive (SM18:2).

Example 2. The Closing Harmonic Construction of Section Two.
Vertical Pitch Pattern. Horn 1. SM18:1 Harmonic Motive. SM18:2
Bars 242-243 Bars 244-263 Bars 246-261

The final vertical pitch pattern of Section Three contains only nine notes. The "missing notes" are the principal notes of the following three sound areas which conclude the work. The first is the central C# of the following development based on Motive B in the upper register (SM26:1), the Eb is the rhythmically and texturally developed pitch level (SM26:2) and

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the E is the root of the accompanying harmony (SM26:3). Therefore, it could be argued that the reason this repeated harmonic construction is restricted to only nine notes is because of the three independent sound areas in the final sound mass of the work.

**Example 3. The Closing Harmonic Construction of Section Three.**

*Vertical Pitch Pattern.*  
SM26:1  SM26:2  SM26:3  
Bars 304 - 309  Bars 311-314  Bars 312-325  Bars 317-324

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**The Internal Structure of Sound Masses.**

All of the sound masses in *Deserts* are constructed from a number of contrasting, and interacting sound areas. In most cases the notes employed in individual sound areas are distinct and designed to contrast with the surrounding material. If this is the case then note ordering can often be discerned between the various sound areas, especially when the content of the
juxtaposed sound areas is limited.

In Sound Mass 3 the final four sound areas are brief. Sound Area 5 is a single bar symmetrical statement containing 6 separate pitches. Sound Area 6 is the closing vertical pitch pattern, and also contains six notes. No notes are repeated, and thus in combination a single statement of all twelve notes emerges.

Example 4. Sound Mass 3. Sound Areas 5 and 6. (Bars 63.1-65.3)

Statements as exact as this (ie. containing no repetition at all) are not common in Deserts. However there are a number of instances where it is clear that the content of sound areas is based on the progressive introduction of notes even if there is a limited degree of repetition. Repetition can often be accounted for by the need to establish a middleground note or to emphasise a linear statement of a motive, and thus usually
occurs for a reason.

Example 5. Sound Mass 3. Sound Areas 3 and 4. (Bars 58.4-62.4)

In this case the final note D closes the development in bar 61, but had been pre-empted by the grace note in bar 59. The triplet sound idea on trumpet in bar 60 simply restates material, acting as a pivot between the two sound areas. (See also SM10:2 and the opening two sound ideas of SM10:3.)

The internal structure can also develop by the specific exclusion of certain notes from foreground developments. (This is the same principle outlined above with regards to sectional form.)

In Sound Mass 11:3 the development pivots around a central wide ranging symmetrical chord containing eight different notes. The "missing" notes are the G♯, B♭ and B of the previous bass
clarinet phrase (Bar 156), and the C# (SM11:4) which penetrates this sound area and is texturally and rhythmically developed over the following five bars.

Similarly, the unusual sound area in bar 199 (SM13:2) contains eleven notes. The "missing" note is G# which is the opening note of the following pitched sound area (SM13:4).


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Thus, in some instances note ordering contributes to the development of the sound masses by providing a basis for the interaction of sound areas. However, note ordering is more commonly found within the sound areas.

The Internal Structure of Sound Areas.

In some cases individual sound areas are developed from
statements of all twelve notes. The clearest example of this is the motivically constructed single bar vertical pitch pattern, which occurs in bar 270 (SM24:2). The individuality of this statement is emphasised by the fact that it is surrounded by percussive activity, and that it is the first pitched development to be heard following the third passage of organised sound.

A similar statement containing all twelve notes occurs in bar 204. Once again this complicated vertical pitch pattern is preceded by a sound area consisting exclusively of percussion, and is followed by a written silence before the next sound area commences. Both of these vertical pitch patterns have already been quoted in Chapter 8, Example 20.

It should be noted that the score of Deserts contains a misprint in the piano at this point. The G3 should be E3, doubling the trombones. There are in fact a number of obvious misprints in the score as well as a number of places where I suspect misprints but cannot prove their existence conclusively. These have been listed in Appendix 11.

Many of the sound areas are created from a number of smaller sound ideas, and often the relationship between these sound ideas is based on the principle of note ordering.

The opening sound area of Sound Mass 10 (Bars 118.1 - 124.4) is a good example. The sound area contains four separate sound ideas. Firstly, the opening melodic development of Motive B.
Secondly, the repetition of the first sound area as a harmonic statement. Even the notes used are exactly the same, a clear example of "transmutation" to which Varese refers. The third sound idea is an antiphonal statement of Motive A, with the clarinet phrase echoing the opening sound idea. The fourth sound idea builds a six note vertical pitch pattern in the lower brass based on motives B and C. Thus, the motivic content is varied, the textural, timbral, dynamic and articulative content is varied. What defines this as a single sound area is firstly the way in which the sound ideas overlap and blend, secondly the unifying force of semitone cells and Motive B, and thirdly the principle of note ordering.

With the exception of sound ideas 1 and 2, each of the twelve notes is played only once within this sound area. The final note C is the last note to occur on the horn, and also acts as a pivot into the next sound area. Note how the differing dynamics of the unison C on the horns are designed to make the placement of this note ambiguous.

Bass Clarinet. Bar 119. Woodwind. ("Transmutation")

1. A  2. Bb  3. G#  (1.) A (3.) G# (2.) Bb (1.) A
Example 7. continued...
Trombone/Clarinet. Motive A. Closing Vertical Pitch Pattern


Another example is found in Sound Area 3 of Sound Mass 2. This sound area concludes the sound mass with the construction of two vertical pitch patterns which slowly evolve from one another. Both pitch patterns are symmetrical and both contain six notes. (The concept of symmetry is discussed further in Chapter 20.) The notes B5 and D3 penetrate from one pitch pattern into the second and thus an eight note closing harmony is constructed. Each of the notes are distinct and each pitch level occurs only once within the sound mass.

First Vertical Pitch Pattern. Second Vertical Pitch Pattern.

Sound Mass II, Sound Area I provides a similar example where the opening rhythmically developed vertical pitch pattern (4 notes) develops into a large six note vertical pitch pattern on the tutti ensemble. The two "missing" notes are the G# and B on the trombone which link both ideas, and penetrate into the second vertical pitch pattern to create an eight note harmony.

There are a number of other examples of all twelve notes occurring within a single sound area although there is sometimes a limited amount of repetition of certain notes. In Sound Mass 3, Sound Area 2 all twelve notes are presented. Despite the extensive rhythmic development within this sound area (Bars 47.1 to 53.5) there are remarkably few repititions of notes. The twelfth note Bb, entering on the horn in the final bar. (See also SM12:5)

Similar examples (although not necessarily containing all twelve notes) can be found throughout the work. It seems that in *Déserts* Varèse has consciously avoided the repetition of notes which have already occurred within the same sound area, or notes that are dominant in a previous or following sound area.

**Motivic/Cellular Progressions Between Established Notes.**

Within some of the sound masses certain notes are more prominent than others. These notes can be perceived as
established for many reasons (See Chapter 8) but it is remarkable how often motivic and cellular progressions occur between these notes both at middle and background levels. (Justification for my selection of established notes and tables containing all of the cellular progressions are contained in Appendix 7.)

The following examples are included to illustrate these progressions. I have only chosen a few representative examples for inclusion in this chapter as the full extent of this phenomena should be clear from the graphs.

Example 9. Middleground Statements of Motive A.
Bars 115 - 117. (Motive A')
Bars 149 - 161. (Motive A)

(Timps) (Tuba) (Flute) (Picc) (Xylo) (Brass)
E 2 - - Eb 1 - - G#6
G 7 - - C 7 - - C#4

Similar examples can be found based on Motive B and Motive C, occurring at both middle and background levels and within each
section of the work. Despite the large changes of pitch level between many of these established notes, the progressions can still be considered cellular or motivic as they only reflect similar developments which occur in the foreground. (See Ch. 16)

Example 10. Middleground Statements of Motive B.
Bars 247 - 270

Example 11. Middleground Statements of Motive C.
Bars 168 - 178

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Conclusion.

From these examinations there seems to be considerable evidence that the introduction of notes in the sound masses is planned. Contrast between sound areas and sound masses is achieved by ensuring that prominent notes are not repeated in closely allied areas. Note ordering also helps to reinforce the form of Déserts (previously outlined) and indicates the way in which the internal structure of many of the sound areas and sound masses was created.
CHAPTER EIGHTEEN.

THE RHYTHMIC STRUCTURE OF DÉSERTS.

The rhythmic structure of Déserts can not be readily analysed as a separate entity. The development of rhythm is integral with the elements of pitch, texture and dynamics: one cannot occur without another. In general terms sound areas are defined in the vertical plane by pitch and timbre and in the horizontal plane by rhythm and dynamics. Rhythmic development occurs at a number of hierarchical levels, from small fragmentary sound ideas, to the structuring of the sound masses within the three major sections of the work.

If musical form arises from events in the foreground, as Varèse suggested, this seems to infer that the higher levels are freely developed. But there is evidence of rhythmic structuring of these higher levels, whether conscious or not, as shall be demonstrated later.

Rhythmic development occurs throughout the entire ensemble, as well as in the passages of organised sound. In the early works the percussion section often seemed to act as a separate "noise" generating section, which only occasionally combined with the instruments of precise pitch, in Déserts the section is fully integrated. Its role is constantly changing, both contrasting with, and supporting the various sound areas as
defined by the overall temporal progression of the music.

Thus, the rhythmic structure of *Déserts* consists of a complex mixture of a variety of temporal developments. These occur simultaneously, and at a number of differing hierarchical levels within the piece. I therefore intend to examine the various levels individually before attempting to look at the manner in which they are synthesised.

**Foreground Rhythmic Structures.**

Before embarking on an analysis of the rhythmic structure of *Déserts* it is important to remember that rhythmic development does not occur in a conventional manner. Rhythm and meter are separate. Rhythmic development takes place throughout the work and yet there are only a handful of places where meter is established, and these are all transient occurrences.

It is possible to examine the construction of rhythmic structures presented in the foreground as many of them are motivically based. Problems of copyright have prevented me from presenting a complete analysis of the rhythmic motives. To counteract this problem I have included an examination of all of Section Three and the Conclusion (See Appendix 9) as well as a number of tables detailing various statements of the rhythmic motives. These provide considerable evidence to support the
theory that many of the foreground rhythmic structures are motivically based (1). It was noted how the pitched motives were designed to challenge traditional concepts of harmonic construction. The two rhythmic motives are similarly challenging to the establishment of meter.

There are two recurring rhythmic motives in *Déserts*. The first consists of a simple three note group where the first two notes occur in quick succession, and this is often associated with statements of the pitched motive A. The second is a rhythmic quintuplet figure which is used to establish pitch levels and normally occurs with a dynamically emphasised note following shortly after the quintuplet figure. These motives I have termed Motives D and E respectively to avoid confusion with the three pitched motives.

**Example 1.** Rhythmic Motive D. Trombone 1. Bar 20

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Example 2. Rhythmic Motive E. Trumpet 2. Bars 49 - 50
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Both motives appear throughout the work in numerous forms. The development of the rhythmic motives is similar to that found with the pitched motives, but in this case development occurs in the horizontal rather than the vertical plane. The principal types of motivic development are augmentation and diminution. These developments affect the spacing between the notes. The spacing does not have to be mathematically precise so long as the fundamental characteristics by which the motive is defined are not destroyed. For example, the following three statements can all be considered variations of Motive D, but the fourth can not as the characteristic short and long intervals between the notes are absent.

Note that examples i, iii, and iv, are also statements of pitched Motive A. They also combine a falling and a rising motion, a characteristic associated with both pitched Motive A and rhythmic Motive D.

Example 3.

(i) Motive D. (Augmented)  (ii) Motive D. (Diminished)

(ii) Motive D. (Augmented)  
Piano. Bar 304

(iv)  
Piano. Bar 137.

The two other types of motivic development which occur in Deserts are retrograde statements, and decorated statements. The former is mainly found in association with Motive D, the latter with Motive E. Retrograde and decorated motives can occur in combination with augmented and diminished motives, thus the number of possible variations on the two rhythmic motives is almost unlimited.

Example 4. Retrograde Motives.

Motive D. (Augmented)  
Bb Clarinet. Bar 257

Motive E. (Augmented)  
Percussion 3. Bar 275

As many of the statements of motives D and E occur within the percussion section it is inevitable that a number of decorated statements would arise, as it is in the nature of the instruments to decorate rhythm with flams, drags, etc. Similar
developments (grace notes) can also be found in the rest of the ensemble. This form of decoration is predominantly associated with motive D.

Example 5. Decorated Motives. (Flams, Drags, etc.)

Motive D. Bar 134  Motive D. Bar 100  Motive D. Bar 88

Decoration of Motive E takes place by varying the dynamics and articulation. Practically all statements of this motive differ in these respects, even if the rhythmic reiteration is exact in each case.

Example 6. Decorated Motives. (Dynamics and Articulation)

Motive E. Bars 59-60  Motive E. Bar 129.  Motive E. Bar 299
Trombone 1.  Trombone 1.  Timpani.

There are also numerous examples of motives being passed between a number of voices within the ensemble. If this occurs it is normal for instruments to be of a similar timbre or texture. (ie Low Brass, Percussion, Woodwind, etc.)
Having identified the many and varied ways in which the two rhythmic motives can occur the next stage is to examine how motives are developed. Motives can either be extended through the addition of new material or can act as a basis around which further material is developed.

Motivic development through extension is common. Notes can be added before or after the characteristic statement of the motive. This extends the rhythmic sound area and usually occurs in combination with a sustained texture in the other voices. (Instability in one sound area contrasting with stability in another.) This form of development is commonly found in Section Two of Deserts.

The following developments of Motive E extend the idea through the addition of material either before, during, or after the quintuplet rhythm. It is important that the characteristics by which the motive is defined are not negated. There obviously
comes a point when one can debate whether a rhythmic sound idea is developed from a motive or is in fact a separate idea altogether. Most analysis is subjective but nevertheless it does help if one can provide reasons to support the identification or rejection of material.

For example, I consider the final example quoted below to be developed from Motive E. My reasons are as follows. Firstly, the rhythm is distinct and opens a new sound mass. Secondly, the five semitones at the start are distinguished from the opening semitone by pitched and textural change. Thirdly, the dynamic emphasis on the final note mirrors the characteristic emphasised final note of the original version of the motive. Fourthly, the preceding material featured statements of Motive E in similar timbres and similar situations (i.e. emerging from and instigating harmonic development). The last of these reasons is often the most significant, context can be all important as will be demonstrated in the developments of Motive D. (See Example 9iv.)

Example 8. Developments of Motive E.

i. Motive developed by additional material at the end.
   Trombone 2. Bar 132
   Timpani. Bars 206 - 209

- 429 -
ii. Motive developed by additional material at the start.

iii. Motive developed by additional material in the middle.
   Percussion 5. Bar 150 Percussion 2. Bar 190

iv. Motive developed by additional at beginning and the middle.

Similar development can be identified based on Motive D, some of which are listed in the following tables. These tables are not meant to be comprehensive, but do serve to illustrate the variety of motivic structures that can be developed from two simple ideas. They demonstrate how rhythmic motives permeate all aspects of the composition, occurring within all of the sound masses (including the passages of organised sound). Their importance arises as they are one of the principal means by which the temporal aspect of sound areas are developed.
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</table>
### Déserts: Variations of Motive D. (Augmented)

<table>
<thead>
<tr>
<th>No.</th>
<th>Motive</th>
<th>Instrument</th>
<th>Bars</th>
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</thead>
<tbody>
<tr>
<td>13</td>
<td></td>
<td>Piano.</td>
<td>Bar 242</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>Brass.</td>
<td>Bars 254-255</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>Percussion 3.</td>
<td>Bar 275</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td>Xylophone.</td>
<td>Bar 296</td>
</tr>
<tr>
<td>17</td>
<td></td>
<td>Piano.</td>
<td>Bar 304</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td>Brass.</td>
<td>Bar 319</td>
</tr>
<tr>
<td>Déserts: Variations of Motive D. (Diminished)</td>
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<td>---------------------------------------------</td>
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<tr>
<td><strong>1.</strong></td>
<td></td>
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</table>
| ![Motive D.](image1) | Trumpet 3.  
Bar 70 |
| **2.** |
| ![Motive D.](image2) | Percussion.  
Bars 91-93 |
| **3.** |
| ![Motive D.](image3) | Tubas.  
Bars 122-123 |
| **4.** |
| ![Motive D.](image4) | Piano.  
Bar 133 |
| **5.** |
| ![Motive D.](image5) | Percussion 3.  
Bars 158, 160. |
| **6.** |
| ![Motive D.](image6) | Piccolo.  
Bar 189 |
<p>| | | |</p>
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<td><strong>Deserts: Variations of Motive D. (Diminished)</strong></td>
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<tr>
<td>7.</td>
<td><img src="image1" alt="Musical notation" /></td>
<td>Eb Clarinet. Bar 196</td>
</tr>
<tr>
<td>8.</td>
<td><img src="image2" alt="Musical notation" /></td>
<td>Percussion 2. Bar 202</td>
</tr>
<tr>
<td>9.</td>
<td><img src="image3" alt="Musical notation" /></td>
<td>Piano. Bar 257</td>
</tr>
<tr>
<td>10.</td>
<td><img src="image4" alt="Musical notation" /></td>
<td>Percussion 3. Bar 266</td>
</tr>
<tr>
<td>11.</td>
<td><img src="image5" alt="Musical notation" /></td>
<td>Piano. Bar 270</td>
</tr>
<tr>
<td>12.</td>
<td><img src="image6" alt="Musical notation" /></td>
<td>Percussion 5. Bar 294</td>
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<table>
<thead>
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<td>Piano</td>
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<td>(Diminished)</td>
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<tr>
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<td>(Diminished)</td>
<td>Percussion 5</td>
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<td>(Augmented)</td>
<td>Woodwind</td>
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<td>5.</td>
<td>(Augmented)</td>
<td>Tubas</td>
<td>128</td>
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<tr>
<td>6.</td>
<td>(Augmented)</td>
<td>Percussion 3</td>
<td>155</td>
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</tr>
<tr>
<td><strong>1.</strong></td>
<td>Trumpet 2.</td>
<td>Bar 49</td>
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<tr>
<td></td>
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<tr>
<td><strong>2.</strong></td>
<td>Trombone 2.</td>
<td>Bar 59</td>
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<tr>
<td><strong>3.</strong></td>
<td>Trombone 1.</td>
<td>Bar 127/129</td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
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<tr>
<td><strong>4.</strong></td>
<td>Tuba 1.</td>
<td>Bar 130</td>
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<tr>
<td></td>
<td>Xylophone.</td>
<td>Bar 228</td>
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<tr>
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<tr>
<td><strong>5.</strong></td>
<td>Timpani.</td>
<td>Bars 299/300.</td>
<td></td>
</tr>
</tbody>
</table>
continued....

**Déserts: Variations of Motive E.**

7. (Original/Augmented)

```
\[ \text{\textmu} \]
```

Tutti.
Bar 138

8. (Original/Augmented)

```
\[ \text{\textnu} \]
```

Bass Drum.
Bars 173-174

9. (Original/Augmented)

```
\[ \text{\textlambda} \]
```

Timpani.
Bars 206-208

10. (Original/Augmented)

```
\[ \text{\textmu} \]
```

Percussion 1/
Percussion 3.
Bar 188

11. (Original/Retrograde)

```
\[ \text{\textnu} \]
```

Percussion 2.
Bar 142

12. (Retrograde/Augmented)

```
\[ \text{\textla} \]
```

Percussion 3.
Bar 275
Percussion 2.
Inverted in 134.
### Deserts: Developments of Motive E.

<table>
<thead>
<tr>
<th>No.</th>
<th>Notation</th>
<th>Description</th>
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</table>
| 13. | ![Notation](image1) | Percussion 2.  
Bar 190  
Percussion 5.  
Bar 191 |
| 14. | ![Notation](image2) | Percussion 5.  
Bar 198 |
| 15. | ![Notation](image3) | Trombone 2.  
Bar 132 |
| 16. | ![Notation](image4) | Percussion 5.  
Bar 133 |
| 17. | ![Notation](image5) | Horn 1. 197  
Clarinet. 205  
Vibraphone.  
Bars 280 - 282  
Horn. 288 |
| 18. | ![Notation](image6) | Horn 1.  
Bar 65 - 67  
Percussion 2.  
Inverted in 134. |
Rhythmic Motives and the Generation of Form.

The previous examples demonstrate how sound ideas can be extended through motivic development. But rhythmic motives are also capable of generating sound areas, and in the case of Sound Mass 9, Motive D is the driving force behind the entire temporal development of the sound mass. (This illustrates Varèse's point of form being the result of developments in the foreground.) Rhythmic motives may appear to be surface configurations which decorate the overall progression of material but in Déserts they are capable of generating structure and form.

This manifests itself in a number of ways. When clearly identifiable rhythmic, melodic or harmonic motives re-occur in a number of different sound masses it provides a sense of unity and coherence, and therefore infers structure. Motive E is particularly active in this role as it often appears in its original form.

In contrast, the statements of Motive D are far more varied. It returns only once in its original form, and this is just before the close of Section Three where it combines with an original statement of Motive E, and is presented twice on the timpani (Bars 299 and 300). It is interesting that, following a section in which material has been fragmented and juxtaposed throughout, order is restored by an extended rhythmic development in which both motives return in their original
forms. (Similar instances can be identified in many of the earlier works.) This sound area, and the following harmonic construction, can be seen as the true close of the work. All modes of development are restated in their "purest" and most obvious form, rhythmic motives, pitched motives, dynamic and textural contrast are all evident here in extremes. Thus, motivic development is an integral part of the development of the overall form of Deserts.

The other way in which rhythmic motives can generate structure and form is by acting as the basis for extensive temporal developments of what are essentially static vertical pitch patterns. To illustrate this I shall examine Sound Mass 9, which provides a clear example of motivic development centred on rhythmic Motive D and pitched Motive A.

Throughout Sound Mass 9 Motives A and D are ever present. Both instigate further developments, both are interrupted or penetrated by other sound areas (Bars 100 and 105) and both are dominant at the close. The sound mass basically consists of two extended and stable sound areas which drive forward with increasing momentum towards the harmonic close of the section. Motive D is first presented at the start of the sound mass on the woodwind. It next occurs in a decorated form in the percussion and is repeated, and dynamically emphasised, over the next five bars.

Pitched Motive A then enters. The timbre is relatively constant and the development features an arpeggiated rhythmic statement of the motive and a sustained upper pitch level of A5. This sound area is sustained for the following nineteen bars. Although the sound area appears to be rhythmically active, it is essentially a static vertical pitch pattern with which the developments of rhythmic Motive D interact. When Motive A is finally superseded (by the upper register Bb on flutes and piano in bar 110) it is interesting to note how the rhythmic activity based on Motive D increases, and this drives the sound mass towards the cadential harmonic construction between bars 115 to 117.

The sound area for percussion (SM9:2) is the only constant factor throughout the sound mass. It is interrupted on a number of occasions, by the appearance of the contrasting sound areas, but each time returns and continues with a similar path of development. It is only finally silenced by the appearance of
the closing harmonic cadence. Each time it returns the statements are more highly developed, both dynamically and rhythmically as can be seen from the following examples.

Example 10.

i. Percussion 2. Bar 100

\begin{music}
\begin{staff}
\begin{musicnote} \time 3 \duration 1 \sharp \end{musicnote}
\end{musicnote}
\end{staff}
\end{music}

ii. Percussion 2. Bar 102

\begin{music}
\begin{staff}
\begin{musicnote} \time 3 \duration 1 \sharp \end{musicnote}
\end{musicnote}
\end{staff}
\end{music}

iii. Percussion 2. Bar 104

\begin{music}
\begin{staff}
\begin{musicnote} \time 3 \duration 1 \sharp \end{musicnote}
\end{musicnote}
\end{staff}
\end{music}

iv. Percussion 2. Bar 107

\begin{music}
\begin{staff}
\begin{musicnote} \time 3 \duration 1 \sharp \end{musicnote}
\end{musicnote}
\end{staff}
\end{music}

v. Percussion 1. Bar 113

\begin{music}
\begin{staff}
\begin{musicnote} \duration 3 \end{musicnote}
\end{musicnote}
\end{staff}
\end{music}

vi. Percussion 2. Bar 114

\begin{music}
\begin{staff}
\begin{musicnote} \duration 3 \end{musicnote}
\end{musicnote}
\end{staff}
\end{music}

Motive D can be seen to be the basis around which Sound Area 2 is developed. All of the other sound areas interact with it, and the intensity of the developments increase driving the sound mass onwards to the close. Motive D also occurs within most of the pitched sound areas, and in addition it is the opening and closing rhythm to be heard in bars 85 and 116/117 respectively.
The two rhythmic motives are therefore important elements which, when combined with other structural elements such as pitch, timbre and dynamics, help to define both the internal structure and the overall form of Deserts.

**Temporal Development at Higher Structural Levels.**

In the music of Varèse rhythm is not employed in a conventional manner. Rhythmic development can occur at a number of different levels within a composition and is not just concerned with surface configurations. When discussing Trinitium Varèse commented that rhythm was to be treated as,

"an element of stability and not as meter." (2)

There are only a few instances where the music seems to establish a meter and in each case this appears to be contradicted not only by the surrounding rhythmic material but also by the time signature in which the development occurs.

The second sound area in Sound Mass 12 demonstrates this. The clarinets and tuned percussion present a repeated cellular development which emphasises a regular crotchet rhythm. The intermittent way in which it starts means that the opening statement seems to be in 3/4 not 4/4. Whatever the case, once the rhythm seems to be established the development stops. The piccolos enter with rhythmically opposed material, and by
bringing the final statement forward by a triplet the illusion of meter is shattered.


Similar instances can be found throughout Déserts. Other examples are: the sound area on percussion which introduces the organised sound in Section Three which seems to establish a 2/4 meter yet the central pivot is a bar of 3/8; the timpani and percussion phrase at bar 208 which infers 4/4 yet is written in 3/4; the percussion in bar 187 which seem to establish 6/8 yet is written within a 5/4 time signature. Therefore, consideration of the changes in meter do not help to indicate how the overall rhythmic structure might be developed as might be the case in traditional tonal music.

Examination of the higher level rhythmic structure of Déserts at first seemed problematical. One could argue that "resultant" form excludes the planning of the larger scale rhythmic structure. Yet there are so many other factors that contradict this idea, not least of which is the interaction of
four orchestral passages and three passages of organised sound. Clearly some planning must have taken place. Furthermore, I consider it impossible for a composer, particularly one with Varèse's musical education, not to have a "feeling" for the overall temporal development of a work. He must surely have known where the highs and lows were going to develop, where material was going to be static and where frenetic, but how does one examine this analytically?

The key to the higher level "rhythmic" structure was suggested by the statement of Stravinsky who observed,

"Varèse ... was also among the first to plot the intensities of a composition, the highs and lows in pitch, speed, density, rhythmic movement." (3)

The highs and lows of pitch will be examined in the following chapter. Speed can be examined through the movement of sound masses and sound areas. Rhythmic and textural density can be examined, and the majority of rhythmic movement has already been dealt with through the various motivic analyses.

**Rhythmic Density.**

The rhythmic density of the work was examined by calculating the average number of attacks per second within each sound mass. This reveals an interesting structure in which each of the three major sections are clearly distinguishable.

Each section follows a completely different path of
Rhythmic density has been calculated by totalling the number of attacks contained within each sound mass and dividing by the duration. (See Appendix 4)

The line drawn above the block graph represents the overall progression of the rhythmic density contained in each of the sections of Déserts.
development. The work opens with low rhythmic intensity and this is progressively increased towards the close of the first section. Note how the effect of Sound Mass 9 is made all the more startling by the sudden drop in intensity in Sound Mass 8 which links the organised sound back to the instrumental music. This closing sound mass of Section One is the most rhythmically dense sound mass in the entire work.

In Section Two the rhythmic density remains remarkably static throughout, this is all the more remarkable when one considers how drastically the durations of the various sound areas vary within this section. At the beginning of Section Three the rhythmic density suddenly drops, before being restored. It consequently maintains a relatively constant level until the close of the section. The final sound mass is distinguished by another sudden drop, separating it from the previous material and concluding the work with the rhythmic density being at its lowest level in the entire work.

The graph only provides an over-view of the rhythmic density of Déserts. The density within the sound masses is constantly changing and this is synonymous with the interaction of sound areas already detailed in Chapter 14. These changes of rhythmic density can be clearly seen in the graphs contained within Chapter 19 where, for example, Sound Mass 7 can be seen to have an arched structure, Sound Mass 10 increases in density throughout, Sound Mass 18 in extremely thinly textures, and so
on. (These changes will be discussed in more detail in Chapter 19.) Perhaps the most interesting aspect of the previous graph is how the sections are shown to contain different overall rhythmic progressions. Also, how completely it agrees with the overall structure outlined by other analytical techniques.

The Duration of Sound Masses.

The rate of change between the sound masses has been examined with regards to the durations indicated on the score and the fourth interpolation of the passages of organised sound. (See Appendices 4 and 8.) Once again the graphs support the structure established by other techniques. The opening and closing sound masses are distinguished by marked changes in duration and so is the change between the first and second sections. The exception to the overall progressions within the sections is Sound Mass 16. It has already been argued that this is a special case, it could be viewed as two sound masses with a commonality of material, and so the extended duration does not invalidate the reading of the overall structure.

The graph reveals that, following an extensive opening sound mass, the duration of sound masses in Section One gradually increases. In Section Two the durations progressively decrease, and in Section Three, after an initial period of stability, they increase quite rapidly towards the close.
THE DURATION OF SOUND MASSES.

The duration of the sound masses have been calculated from the metronome markings on the score, and the fourth interpolation of the passages of organised sound presented on the Robert Craft recording of Déserts with the Colombia Symphony Orchestra.

The line above the block graph represents the overall progression within each of the sections of Déserts.

(See also Appendices 4 and 8)
Overall Form and Temporal Development.

The final graph examines the durations in the background form of Déserts. It reveals an arched form, with the bulk of development occurring in Section Two. Whilst it is unlikely that Varese pre-planned the durations within this arched form, it is this overall structuring of the temporal aspect of Déserts that I consider evolved from the background of his musical education. It also supports the concept that the underlying themes of the three sections are tension, rhythm and intensity, which has been discussed previously.

Conclusions.

It has been demonstrated that the temporal development of Déserts arises from a complex combination of many different elements. Rhythm and dynamics are synonymous in shaping the forward progression of sound areas. Larger scale rhythmic development occurs through the interaction of sound areas and sound masses. These are shaped by changes in intensity and volume, which are in turn affected by timbre, texture and the relative stability of the sound mass.
THE DURATIONS OF THE SECTIONS

WITHIN DÉSERTS.

The duration of the sections have been calculated from the metronome markings on the score, and the fourth interpolation of the passages of organised sound presented on the Robert Craft recording of Déserts with the Columbia Symphony Orchestra.

The line above the block graph represents the overall temporal progression of the work.
CHAPTER NINETEEN.

DÉSERTS: SUPPLEMENTARY ANALYSES.

In order to complete a comprehensive examination of Déserts a number of the structural elements still require analysis. It seemed logical to include as many of these as possible on a single graph for ease of comparison and to demonstrate the symbiotic way in which the elements create the overall structure of the work.

Pitch, Texture and Rhythmic Density.

The following graphs support the previous analyses and show how the elements of pitch, texture and rhythmic intensity combine to specify the various sound masses and sound areas.

I do not propose to provide a commentary on the graphs as they are basically self explanatory. It is interesting to note how each of the sound masses is distinguished by a marked change in all three elements, whereas individual sound areas may only contrast one or two of the elements. For example, in Sound Mass 17 each of the sound areas contrasts all three elements, but in Sound Mass 10 the change between the first three sound areas is only evident on the pitched graph, the texture remains constant,
and the rhythmic intensity gradually increases over all three areas.

The graphs also reveal which the primary elements are behind the development of certain sound masses. For example, Sound Mass 10 seems to develop contrasting pitch areas, Sound Mass 11 centres on changes of timbre, and Sound Mass 12 contrasts rhythmic intensity. Once again this is an overly simplified description but the underlying principle is clear.

Although the graphs were not specifically designed to examine the higher structural levels they do provide an over-view of the different developments within the sound masses and sections. For example, the progressive breaking down of the material into smaller and smaller constructional units can be clearly seen throughout the first four sound masses. Extended pitch levels disappear and pitch and texture are increasingly employed as the principle forms of development. It is interesting to note how the rhythmic intensity remains relatively constant throughout the first four sound masses, and then slowly increases towards the close of the section. Thus, even the background form can be supported by the graphs.

Pitch.

Pitch has always been recognised as a crucial way in which the sound masses and sound areas are defined. However, within
Deserts there is a considerable amount of material which does not contain precise pitch within the percussion section and the passages of organised sound. The process by which pitch was identified in the passages of organised sound has already been described (See Chapter 12), but although pitch in the percussion section has previously been discussed it has not been explained with regards to the various graphs.

Pitch and register are extremely important factors in defining the manner in which the various percussive forces are deployed (1). From my experience as a percussionist I divided the various instruments into five broad pitch areas ranging from the high pitched sounds of cymbals and claves to the low pitched sounds of the bass drums and tam tams. The nature of percussion makes it difficult to categorise pitch even approximately. Where does one place the sound of a tam tam which contains a low fundamental note and numerous upper harmonics? Surely the pitch changes depending on how hard it is struck. What pitch is a snare drum, or a cowbell? These seem to depend more on the personal preferences of the performer than the desires of the composer. All imprecise sounds can be subject to various interpretations and thus I have tried to balance my own experience with the actual sounds of the instruments which can be heard on the Robert Craft recording of Deserts.

The result was as follows:
Pitch Areas in the Percussion Section.

Pitch Area 1. (High)  
High Suspended Cymbal, Claves, High Maraca and Slapstick.

Pitch Area 2.  
Snare Drum, High Timbale, Cowbell, Guiro, Low Maraca, High Wood Drum, High Lathe, and High Chinese Block.

Pitch Area 3. (Medium)  
Side Drum, Tambourine, High Gong, Low Timbale, Low Lathe, Medium Wood Drum and Medium Chinese Block.

Pitch Area 4.  
Field Drum, Low Chinese Block, Low Wood Drum, Medium Bass Drum and Medium Gong.

Pitch Area 5. (Low)  
Low Bass Drum and Low Gong.

Rhythmic Density.

The rhythmic density was calculated by plotting the number of attacks contained within each bar. The percussive sound areas proved the most problematical to calculate. Grace notes, flams and drags were normally excluded, and rolls and trills were counted as a single attack. However, each development had to be viewed in context. Thus, whilst demi-semi quavers may have been counted individually in some bars, in others they may have been grouped together. The decision depended on the tempo, the texture, and the timbre on which the rhythm occurred.

In the passages of organised sound the density was ascertained by totalling the number of attacks, or noticeable changes of timbre or texture, which occurred within each period.
Deserts: Analysis of Pitch, Texture and Rhythmic Density.
of two seconds. (2). Considerable care was taken to ensure that this aspect was as accurate as possible, but once again decisions had to be taken regarding the context in which the sound occurred and the way in which it was developed. So many of the developments within these passages contain sustained sounds which change their timbre, or dynamic level, in an amorphous manner without clearly starting a new attack. Hence the need to include the marked changes in texture, dynamics or timbre within the reading of rhythmic density in these passages.

Dynamics and Articulation.

The various changes of dynamics and articulation have not been analysed individually, but nevertheless these two elements are both important in the definition of sound masses and sound areas. There is normally a change in either or both of these factors between most sound ideas, sound areas and sound masses, as can be seen in the following examples.

I do not consider it is possible to accurately analyse these elements separately for a number of reasons. Firstly, the dynamics indicated on the score are indefinable. They change depending on the type of instruments playing, the register in which the sound appears, and the number of instruments employed (texture). Secondly, if one simply takes decibell or VU meter readings these are subjective with regards to the interpretation of the performers and the skill of the recording engineer. Articulation similarly varies between the markings on the score, the instruments in which they occur, and the skill and interpretation of the performers.

The analytical problems posed by these elements provides an insight into the reasons why Varese considered the ideal state of musical performance to one that was free from interpretation by a third party. He explained this concept whilst discussing his ideas for the creation of new means of sounds production in
his lecture to the University of California in 1939.

"Personally, for my conceptions, I need an entirely new medium of expression: a sound producing machine (not a sound reproducing one)... Whatever I write, whatever my message, it will reach the listener unadulterated by interpretation." (3)

Most of the elements in Varèse's music are precisely controlled. There is little scope for changing the pitch, timbre or texture of his music, but the tempo, dynamics and articulation will always be subject to interpretation. The following tables are simply meant to show the various ways in which dynamics and articulation are developed within Déserts. They are not treated as separate elements to be added after the vertical or horizontal pitch area has been established, but are an integral part of the "sound" of each development. Thus, it is to be expected that a huge variety of dynamics and types of attack will be found in Déserts.

<table>
<thead>
<tr>
<th>Déserts. Variations in Dynamics and Articulation.</th>
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</table>
| **Horn 2.**  
**Bar 145** |
| ![Horn 2 Bar 145 Diagram] |
| **Piano.**  
**Bar 148.** |
| ![Piano Bar 148 Diagram] |
**Deserts. Variations in Dynamics and Articulation.**

**Timpani.**  
Bars 38 - 40

**Trumpet 2.**  
Bar 49

**Trombone 1.**  
Bars 43 - 45

**Trumpets.**  
Bar 72

**Flute and Piccolo.**  
Bars 110 - 112.

**Horn 1.**  
Bar 120

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**Déserts. Variations in Dynamics and Articulation.**

<table>
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<tr>
<th>Instrument</th>
<th>Bars</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
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<td>Bar 127</td>
<td></td>
</tr>
<tr>
<td>Trombone 2.</td>
<td>Bar 132</td>
<td></td>
</tr>
<tr>
<td>Horn 2.</td>
<td>Bars 141 - 142</td>
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<td>Percussion 2.</td>
<td>Bars 175 - 177</td>
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<td>Clarinets.</td>
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<td>Eb Clarinet.</td>
<td>Bars 196 - 197</td>
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<td>Instrument</td>
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<td>Trumpet 1</td>
<td>210-211</td>
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<td>Piccolo</td>
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<td>Piano</td>
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<td>Percussion 2</td>
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<td>Percussion 2</td>
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<td>Timpani</td>
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The Content of the Passages of Organised Sound.

Although the passages of organised sound have already been described in considerable detail, both with regards to structure (Ch. 14) and content (in the previous graphs), there are a few points of particular interest that are worth noting. The three taped interpolations contain a variety of pre-recorded sounds (industrial, machine, engine noise, etc.), studio generated sounds and recordings of conventional instruments. A number of similarities can be drawn between the "sounds" in these passages and the instrumental material in the rest of the work.

It has already been noted how the different media interact, and the transitionary sound areas are carefully moulded to blend or contrast as desired.

The most obvious example of material transferring from one medium to the other is the woodblock figure which occurs throughout Sound Mass 16:7. This is the same idea that was previously stated on the wood drums in bars 160 and 161.

Example 3. Woodblock Figure. Bars 160 - 161/ SM16:7

The wooden and metal hammering that occurs throughout SM16 is
also reminiscent of the rhythmic development on the xylophone throughout SM11:3, albeit at an altered pitch level.

Example 4. Xylophone "hammering".

Many of the other percussive developments are similar, although not so immediately transferable. Nevertheless, many of the sound areas are obviously meant to refer to material in the instrumental passages and elsewhere in Varese's output. For example, SM16:1 refers to the tuned percussion sound idea in bar 175, SM22:2 is reminiscent of passages in Ionisation and the descending organ sound area (SM21:2) presents the same motive that persists throughout the organ part in Ecuatorial.

Although these similarities are significant they only reflect the process that is evident throughout his music, where certain sound ideas reoccur in a number of locations, and even in a number of works. Thus, some similarities are to be expected, and this merely emphasises that instrumental and organised sound is treated and developed in a similar manner.

Conclusions.

Although the previous analyses have concentrated on the way
in which the pitched and rhythmic structure of *Deserts* is created, I have tried to show the integral relationship between the elements through the commentaries and examples chosen. The supplementary graphs reinforce this view revealing how a number of the elements within Varese's musical language are synthesised. *Deserts* is not governed by traditional concepts where pitch and harmonic relationships realise the form. Varese composed with "sound" and each sound is constructed from a complex mixture of all of the basic elements.

"A work of art must make the rules; rules do not make a work of art.... On the threshold of beauty, art and science must collaborate... I tell people I am not a musician; I work with rhythms, frequencies and intensities." (4)
CHAPTER TWENTY.

SYMMETRY: A MEANS OF CREATING STRUCTURE AND FORM IN DÉSERTS.

It has already been established that Déserts is developed from the interaction of a number of cells and motives, and thus concepts of symmetry have already been discussed with regards to motivic forms. Motivic development will inevitably result in the creation of symmetrical structures, however, Varèse's use of symmetry in Déserts is highly developed. Its influence is wide-ranging and goes far beyond simple motivic development in the foreground, permeating all aspects of the composition.

When symmetry is discussed with reference to atonal music it usually refers to the way in which harmonic structures are created. The effect is to move the focus away from the bottom of a chord and into the centre.

"Unless a strong contrary line is taken in atonal music the bass will remain at the bottom of what sounds like dissonant music. But in symmetrical mirroring structures it is forced, focal attention is forced, into the axial middle, because all relationships converge there: the sounds point to it." (1) J. Harvey.

There are many examples of this type of harmonic structure in Déserts, but in addition concepts of symmetry permeate rhythmic and melodic structures. Thus, symmetry can occur in both the horizontal and vertical planes (inverted and retrograde), and on a few occasions in both planes together.
I do not intend to enter into a detailed commentary on the incidence of symmetrical structures in Déserts. (Many of these have already been identified through the motivic and set theory analyses.) I will therefore examine the various ways in which concepts of symmetry are used to create both harmonic and melodic material rather than presenting comprehensive lists of the incidence of such structures.

**Harmonic Symmetry.**

The idea that vertical pitch patterns can be constructed in a symmetrical manner is introduced by the opening sound area of the work. Sound Mass I presents the basic elements, and the principal forms of development from which Déserts is constructed. Therefore, it seemed logical to examine the work to see if this symmetrical structure arose simply from the peculiar texture of the opening sound mass, or, whether symmetry is really a significant method of musical development employed in the work. The latter proved to be the case.

The majority of key harmonic structures within Déserts are symmetrical, developing outwards from a central point until the full vertical pitch pattern has been stated. In most cases the order in which the notes enter may not be symmetrical but the vertically defined space most certainly is. The closing harmonic cadence of Section One illustrates this point.
This illustrates Harvey's point in that the harmonic structure is developed in contrary motion from the centre. There are many other examples of this type of structuring to be found in Deserts, perhaps the clearest being in bar 157 (SM 11:3).

However, Varèse was not inhibited by symmetry and did not see the necessity to always evolve outwards from the centre. Many harmonic structures use both rising and falling motions (similar to motivic development). Whatever the order in which the vertical pitch pattern is defined the following examples remain exactly symmetrical.
In a few cases the vertical pitch pattern is even presented in a more conventional manner, from the bottom upwards, despite being inversionally equivalent.

**Example 3.**
Bars 21 and 22.

There are also a number of instances where partial symmetry is achieved. In these cases a single note within the vertical pitch pattern is altered. This usually arises because of the tonal implications that would be created in the harmonic structure were it to be exactly symmetrical. In the following example the central B of the lower three note progression has been flattened. If this note had not been altered the manner in which the harmony is created, through the progressive addition of notes, would have meant that a dominant seventh chord on B would have arisen.
Melodic Symmetry.

As so much of the structure of *Déserts* is developed from motives, which can occur harmonically, melodically and rhythmically, it is inevitable that there will be many symmetrical motivic statements. The majority of these developments are inversionally symmetrical, but there are also a few examples of the use of retrograde, and even a few inverted retrograde forms. For example, all four possible versions of Motive A¹ (Original No 20, Inversion No 26, Retrograde No 23 and Retrograde Inversion No 28) appear in *Déserts*, but they are spread throughout the work. In this case the symmetry of the motivic statements is consequential of other forms of development. Thus, melodic and motivic symmetry only becomes a significant factor when the statements of the material occur in
close succession, as in the following example based on Motive B.

Example 5. Brass and Woodwind. Bars 212-213

This type of development can also occur within the cells. The two phrases on the trombones and trumpets respectively which occur within the harmonic structure that concludes Sound Mass 11 are reminiscent of the opening. Both employ inverted cells of the perfect fifth (Cl') which are unfolded melodically from the centre. If one compares them with the opening sound mass of Déserts they can be considered as both retrograde and employing inverted cells. Both statements present the inverted cell of the perfect fourth, and both develop out from the centre, whereas in the opening sound area the perfect fifth moved in towards the centre.

Example 6. Trombones and Trumpets. Bar 166
This type of development is not the exclusive domain of the instruments of precise pitch. Many of the percussive sound ideas depend on inversion and retrograde statements for their internal development. The brief percussive sound area (SM13:3) that starts at bar 200 is developed from two overlapping rhythmic figure that are inversionally equivalent. Also, the clave rhythm which accompanies the sustained Bb on the clarinet in bar 191 is symmetrical around its central note.

Example 7.

Percussion 2 and 5. Bar 200

Percussion 1. Bar 191

There are also more complex examples which combine two melodic ideas, inverting both whilst maintaining the intervallic relationships between the two. The following sound idea occurs during the fragmentary sound area that precedes the first passage of organised sound (SM4:3)

Example 8. Horns. Bars 79 and 82.
It is also possible to distinguish a number of examples where melodic symmetry is slightly altered. The alterations usually occur to eliminate tonal characteristics of melodic lines, or as a result of the material with which they connect. In the two brass ideas described below, the lower note on the trombone is altered to F. The reason is because this note becomes the first harmonic note to be established in the closing sound mass of Section Three, and is sustained for the next eight bars.

Example 9. 1st Trumpet and Trombones. Bar 239-240

Harmonic, Melodic and Rhythmic Symmetry.

The previous examples outline symmetrical vertical pitch patterns and melodic sound ideas, but the rhythmic aspect is often freely developed. In many cases the music is developed by combining harmonic and melodic ideas so that the combined vertical pitch pattern, or a part of it, is symmetrical. However, rhythmic symmetry, in particular with regards to the rhythmic motives, is also common in the work. (This should be evident from the tables contained within Chapter 18.) Within
the "crystalline" concept of musical form it is inevitable that there will be some instances where melodic, harmonic and rhythmic symmetry coincide. The examples below show how rhythmic and pitched motives combine to create symmetrical structures. In the first example the right hand of the piano presents a descending statement of Motive A' and a rhythmic statement of Motive D. The response in the left hand is precisely symmetrical about the horizontal plane. In the second example the descending semitone cell on the trombones is answered by a rising semitone cell on the horn, and the rhythm is also duplicated. In both of these cases the rhythmic structure is considered integral to the structure of the sound idea.

Example 10.

i. Piano. Bar 42

ii. Brass. Bar 139
In its most highly developed state symmetry can occur in both planes simultaneously, incorporating rhythmic, melodic and harmonic aspects. The following sound area (SM3:5) which acts as a pivot between two brass sound areas demonstrates this perfectly with two overlapping statements of Motive C on flutes and then clarinets combining with two statements of rhythmic motive D, one retrograde and one original.

Example 11. Woodwind. Bar 63

Similar developments are also found in the percussion section as can be seen in the following passage (SM10:5) where the original and the retrograde inversion of these two bars coincide to create a complicated rhythmic texture. Note how the placement of the rests is designed to emphasise the interaction of these two voices as they never actually coincide during the two bar development.

Conclusions.

Through the previous examples it has been shown that the concept of symmetry in both the horizontal and vertical planes, is central to the construction of large portions of the music of Déserts. Symmetry is another means by which structure and form can be created, and can on occasion be of equal importance to textural, rhythmic or motivic development. However, its role is constantly changing throughout the composition, at one point it is to the fore, at another there is no evidence of symmetry occurring at all. Thus, symmetry should be considered as yet another factor which contributes to the complex mixture of elements from which Varèse's musical language is constructed.
CHAPTER TWENTY ONE.

DÉSERTS: CONCLUSIONS.

In Déserts many of the concepts and ideas that had shaped the early compositions of Varèse are brought together in an extended, yet concentrated and intense outpouring of his mature musical language. It is evident that Déserts marks a major step forward in Varèse's compositional style, a point that has been noticed by previous authors.

"Almost inescapable is the conclusion that Déserts reflects a considerable refinement of process." J. Bernhard. (1)

A number of changes can be identified in the way in which the composition is constructed and the manner in which the various elements are developed. Although the introduction of electronics was a significant factor in releasing Varèse from the compositional silence of the "abyss", changes are evident in all of the music, whether instrumental or electronic. In Déserts Varèse managed to create a work that was both close to the ideals he had envisaged in the twenties and thirties, and forward looking. Whilst its musical origins may lie in the past, its content and effect was progressive, opening up new
spheres of musical development for Varèse and for the whole world of contemporary music.

However, in Déserts Varèse reflects the trials and tribulations of his life, his personality, and the issues that were of particular concern at the time. Thus, it is important to remember that there were a variety of significant factors that led not only to the creation of Déserts, but also to the changes that are evident in Varèse's musical language. Thus, whilst it may be possible to quantify change with regards to his use of motives, pitch or timbre, it is almost impossible to quantify the changes in his psyche that brought this about.

Varèse composed with "sound". The form of Déserts does not arise in a conventional manner. There are many different factors which shape the structure and the genius of Varèse is evident in the manner in which he managed to synthesise all of the diverse factors into a single musical statement. The physical content of the music arises from the movement of sound masses. The internal structure of the sound masses is effected by motivic and cellular ideas, the contrast in the way in which the basic elements are deployed, the relationship between the passages of organised sound and the instrumental music, and changes in the rhythmic and pitched stability of each individual development.

Therefore, it would seem that the "crystalline" process of
composition to which he constantly referred is in fact an over-simplification. A number of basic cells and motives can be discerned, both pitched and rhythmic, and these permeate through all hierarchical levels of the composition. However, the development of the sound masses is also dependent on changes in one or more of the basic elements. Thus, the cells and motives may be the basic compositional units, but it is the interaction (whether blending or contrasting) of the elements of pitch, timbre, texture, dynamics and articulation that defines the sound areas, sound masses and the major sections of the work.

The overall form of Deserts is relatively simple. It comprises three major sections, each containing a number of sound masses, bordered by an introductory and concluding sound mass. Each of the three sections encompasses a passage of organised sound, and the passages of instrumental and taped music are both interactive and parallel statements of the same compositional ideas, albeit employing a different medium.

As in the previous works, the form is revealed through a combination of analytical factors and by the composer himself (through the various markings on the score). Each section contains its own particular pattern of development, even though the musical material from which it is shaped may be similar. Thus, the form of Deserts arises from the interaction of the sound masses and sound areas, and these changes outline a
structure which is fluid and constantly adapting to changes in the motivic structure and the basic elements. The relationship between the elements is integrated, or even symbiotic. Therefore, it is hardly surprising that the different analyses of the various elements all tend to agree, and reinforce the reading of the structure detailed in Chapter 14.
CHAPTER TWENTY TWO.

THE MUSICAL LANGUAGE OF EDGARD VARESE.

The musical language of Varèse has been shown to be highly complex. His music is more than simple notes on paper: it reflects the trials and tribulations of his life; his personality; a variety of external influences; his philosophy. The fundamental musical philosophies which underpin his work do not really change throughout his life. He did not seek "sanctuary" in the various schools or artistic movements with which he came in contact, but remained a committed "rebel" whose music challenged all traditional values and precepts. It is because of the unanimity of aims and ideals that are evident in his music that Varèse's compositional language has sometimes been viewed as static. This is compounded by the comparatively small number of surviving works.

"With Varèse we are dealing with a "limited" composer - one who wrote very few works and whose compositions were all conceived from an essentially unified point of view." (1)

Whilst I agree that the works are "unified", I do not consider that it necessarily follows that Varèse's musical language is static, as J.W.Bernhard seems to be proposing.
"Varèse's output ..... is the product of a compositional approach that underwent little if any real development.... it does suggest a consistency of conception that makes questions of chronology largely irrelevant." (2)

Many other theoreticians have recognised that Varèse's music evolved throughout his life: from the thematicism of Amériques to the "athematicism" of Déserts (3); from the "new worlds" to the "deserts" (4); from music that was "so rich, so dionysiac so immense"(5) to sounds that "do violence to the listener's body"(6).

It is probable that these differences of opinion relate directly to the manner in which the music is analysed. The former opinion will emerge if one restricts analysis to "just the notes"(7), the latter if one takes a broader perspective. As Varèse's musical language arises from the combination of a number of factors, many of which were changing throughout his life, I do not see how the former view can be justified.

I consider there to be clear evidence that the musical language of Varèse undergoes a number of changes from the early Amériques through to the incomplete Nocturnal. This is manifest in the obvious change from the frequent use of extended melodic lines found in Amériques and Offrandes, through a more restricted usage in Hyperprism and Integrales, to the almost total exclusion of melodic development (but not linear development) in Déserts. Although this change is significant in
In terms of the evolution of Varèse's musical language, it should not be seen as representing any major change in his approach to composition as melody, or the lack of it, is only of prime importance within a traditional compositional process. It has been demonstrated that Varèse's approach to composition was anything but traditional. Hence, the change in his melodic writing only represents change in one of the numerous elements with which he composed.

Thus, Varèse's musical language evolved through the changing roles of the different elements which construct his music, and not through any major change in his compositional aims and ideals. With the exception of the introduction of electronics, Varèse did not attempt to incorporate new compositional ideas but simply changed the way in which the elements were synthesised to create the different "sound" evident in the works composed after the "abyss".

Through the analyses it has been shown how the music depends upon the synthesis of many different elements, or "phenomena", which create the form of the works, and it is this synthesis which makes his music so inimitable. By changing and contrasting the basic structural elements of pitch, timbre, harmony, melody, rhythm, dynamics, articulation and texture Varèse created a limitless variety of sound masses and sound areas. The interaction of these sound areas and sound masses generate the
overall form of each work, but the form was not rigidly planned in advance. Rather, the form is a direct result of the various developments evident in the foreground structures of his music. This explains his comment,

"The form of the work is the consequence of this interaction. Possible musical forms are as limitless as the exterior forms of crystals.... Form and content are one." (8)

Thus, whilst Varèse obviously had a clear conception of the overall structure of each of the works, the form would actually be adapted by the process of composition. Yet Varèse was noted for his "constant preoccupation with form" (9). This apparent contradiction was explained by the composer in a conversation with David Ewen.

"Form is the dominating factor in any work of art, and my chief preoccupation in composing is the form, the structure of the work I have conceived. The form of the work results from the density of the content. Even the most beautiful phrase goes into the discard if it is not structural; if it is only an imaginative vagabond. ... The individual timbres are useful ingredients of the tonal compound, colouring and isolating the various planes and volumes and thus far from being incidental, they become part of the form. I do not use sound impressionistically. In my music it is an intrinsic part of the structure." (10)

Many authors have recognised the interplay between the various compositional elements in the mature music of Varèse, and thus it is surprising that few previous analyses have attempted to view the music from this wider perspective. Through comparative analysis it is evident that in the early works (Hyperprism and Intégrales in particular) the sound masses are
often dominated by a single element. Rhythm and dynamics define the horizontal development of the sound masses, and timbre and pitch the vertical dimension. There is seldom any major change in any of the elements within a sound mass, and the duration of the sound masses is often extensive.

In *Déserts* the elements are more closely synthesised and integrated. Development is seldom the concern of a single element, and the duration of sound masses and sound areas are relatively brief. The role of the percussion section has changed. In the early works much of the temporal development stemmed from the interaction between the instrumental and percussive forces. The two groups were almost predominantly employed in opposition to one another. In *Déserts* the percussion is a fully integrated part of the ensemble fulfilling a variety of roles, both oppositional and supportive. It appears that in *Déserts* Varèse has "condensed" and "clarified" his musical language so that the intensity of ideas increases, and thus the emotional response it invokes is all the more powerful.

In *Nocturnal* the synthesis of the elements shows signs of disintegration. The textures, sonorities, and melodic and harmonic ideas become increasingly contracted, but some of the principles of structure and form so evident in his earlier works are missing. Therefore, it is not surprising that the work remained unfinished at his death.
I have purposely omitted *Amériques* from the above discussion as I consider that, of all the works examined, *Amériques* is the only one to stand out as being constructed in a different way. Although the structural elements found in the later works do contribute to the form there is a lack of synthesis between them. The various forms of development seem to be consequential rather than inherent in the sound masses. Furthermore, sound masses and sound areas are difficult to identify in some areas of the work, as the values ascribed to the elements change without it seemingly affecting the structure.

The destruction of Varese's music written before 1920 makes *Amériques* appear at the beginning of his musical language. The title is certainly meant to reflect the stimulus afforded by his move to a new continent, but from comments made regarding the destroyed compositions, and from a simple observation of the score, it appears that the work actually stands at a point of transition in the music of Varese. The impressionistic influences, the extended melodic lines, the thematic unity, are all pointers to an earlier style of composition. The development of the role of timbre, the emphasis placed on rhythm, and the fundamental role of the percussion section are all indicators of the new musical language that he was developing. Whilst I recognise this is not a new opinion, it still seems to be widely ignored, yet surely the differences
between *Amériques* and, for example, *Arcana* or *Déserts* are clear to see.

"Until now *Amériques* has always been thought of as a new beginning. I would like to suggest that we should also be thinking of *Amériques* as a conclusion to a first style period, the final achievement of Varèse's aims in his early lost pieces, and the most perfect realisation of his "architectonic" concept of composition." D.H. Cox (11)

In a similar manner, I consider *Déserts* to be the epitomy of Varèse's mature musical language: the bringing together of all the diverse influences and developments in a composition that is the most perfect realisation of his integrated musical language based on the organisation of sound.
Appendix 1.

WORKS CHOSEN FOR EXAMINATION IN

PART TWO: METHODOLOGY.
APPENDIX ONE. CHosen WorkS.

This appendix includes material initially prepared for inclusion within the main body of the text. This was later rejected as not being of sufficient importance to the main thrust of the argument. However, it is included at this juncture as it reveals many of the thoughts and ideas that helped shape this study at an early stage, and to combat possible criticism regarding my selection of works that were the focus of the examination within Part Two of this thesis.

The choice of works on which to base the broad discussion of Varèse's musical language was not undertaken lightly. It was decided that examination of the following asterisked works would provide a balanced view in the context of his surviving compositions.

* Amériques. 1918 - 1921 Large Orchestra.
Offrandes. 1921 Small Orchestra.
* Hyperprism. 1922 - 1923 9 wind and 7 percussion.
Octandre. 1923 7 wind and string bass.
* Intégrales. 1924 - 1925 11 wind and 4 percussion.
Arcana. 1925 - 1927 Large Orchestra
* Ionisation. 1929 - 1931 13 percussion.
Ecuatorial. 1932 - 1934 Small orch, keyboards, chorus and soprano.
* Density 21.5. 1936 Solo flute.
Etude pour Espace.1947 Chorus, 2 pianos and percussion. (Withdrawn)
* Déserts. 1950 - 1954 14 wind, piano, 5 percussion, prepared tape.
* Nocturnal. 1961 Soprano, chorus, small orch.
( Edited and completed from sketches by Chou Wen-Chung. 1973 )
This choice of works was based upon the necessity to examine a wide chronological period, from the first complete surviving work *Amériques*, started in 1918, to the unfinished *Nocturnal* started in 1961. Similarly, I have encompassed a wide variety of orchestrations to ensure that all aspects of his musical language were considered. Although the works chosen are evenly spaced this selection was not undertaken arbitrarily. All the works of Varèse are important in a composer whose surviving works are so limited, yet the chosen works I see as particularly significant in his output.

*Amériques* was Varèse's first work on arriving in the "new world" and the work became a symbol of his break with all past European traditions, and consequently the basis for all his future experiments and developments.

"In 1920(?) Varèse began work on his first great work, one he was to recognize as being truly an expression of his universe: *Amériques.*" F. Ouellette. from Edgard Varese. A Musical Biography. Pg 55.

Furthermore it was a score of which Varèse was justifiably proud. A score,

"so rich, so dionysiac, so immense." (Ibid.)

as to embody all he had been striving towards prior to this point in time. As Varèse was already thirty seven when *Amériques* was completed the work not only marks the start of something new, but serves to conclude and draw together all his previous "lost" works and ideas in one succinct musical statement.
In **Hyperprism** we reach another key work for Varèse, as it was the first composition to bring him right into the public eye. The work caused a riot at its first performance, yet despite the furore Curwen, the London publisher who was present, decided to publish all of Varèse's scores. **Hyperprism** contrasts totally with **Amériques**, being written for chamber ensemble of wind and percussion and being only a few minutes in duration.

"It would be futile to seek for any influence from the past in **Hyperprism**. In this work Varèse is like no one but Varèse." A. Carpentier. Quoted by F. Ouellette. op cit. Pg 77

The reason that Carpentier was drawn into making this statement is that in **Hyperprism** Varèse cuts out all the material not considered essential to the musical structure, and thus we are presented with the bare bones of his musical language in a concise and uncluttered musical statement.

"He has never given us a more tightly knit, a more clear cut conception than this is as a whole." (Ibid.)

If this is correct then **Hyperprism** should prove most interesting to examine, giving a clear insight into Varèse's musical language at the time.

In **Intégrales** Varèse reveals the next step forward in his musical development by exploring new methods of performance and sound projection, and by further developing new timbres on conventional instruments.

"**Intégrales** was conceived for spacial projection. I constructed the work to employ certain acoustical means which did not yet exist." F. Ouellette. op cit. Pg 83
The work was also important in helping him to rethink his methods of composition at the time as is revealed through his comments on the interaction of sound masses.

Hence, in *Integrales* we are presented with a fully developed statement of his style of composition in the mid 1920s. Music that is based on the "movement of masses", developed from the crystalline concept of composition whereby infinite external variety is achieved from a few simple ideas.

*Ionisation* was chosen as a means of challenging my basic precepts in undertaking this study. If my methods were not flexible enough to encompass this work, and make useful comparisons in the overall context of this thesis, then I would be guilty of falling into methodological trap that I identified at the start. (See Preface). In *Ionisation* Varèse epitomises his constant striving for new sounds and effects. The work is basically devoid of any instruments of precise pitch, but still relies for its development on the contrast of timbre and pitch levels. Despite being scored for percussion alone it remains coherent and unmistakably Varésian in style. Ironically this composition, I believe, also indicates one of the reasons for his consequent cessation of writing in 1936. Through *Ionisation* he had exhausted practically all conventional methods of creating new sounds and timbres, and it was to require something new to stimulate him to write again.

Varèse had recognised the need for the development of
electronic and synthesised sounds at an early stage, and it was only when the means to create these evolved that he was to return to serious composition, with Deserts in 1954, and subsequently the entirely electronic work written for the Brussels Exposition in 1958, Poème Électronique. Thus the importance of Ionisation lies in the textural, pitch and timbral exploration that occurs, and for this reason it remains a key work in his output and crucial to the analytical validity of this study.

Density 21.5 was Varèse's last completed work, composed in 1936, before the period of his life referred to by Oudlette as the "abyss". It remains as the purest statement of his musical ideas, being composed for solo flute, and acts as the summation of the development that took place during his "first" period of composition. In the context of this thesis it represents a challenge in that this is one of the few works to have undergone previous analysis, and thus comparisons should prove enlightening.

The work Deserts has to be included in any study of Varèse's music as, firstly, it marked the end of a prolonged period of silence, and secondly, it allowed Varèse to use electronic sounds for the first time. The contrast between the taped interpolations and the passages for wind and percussion is important to the overall structure, but at a more immediate level the manner in which the sections merge, and the way
orchestral instruments imitate electronic sounds is quite remarkable. Arguably, in Déserts Varèse was able to realise his musical ideas to the full for the first time since his work on Hyperprism and Intégrales some thirty years previously.

Finally this study will consider Nocturnal. This is required as it was Varèse's swansong. Nocturnal was performed in an incomplete form in 1961, but the completion of the work was to occupy most of the last years of his life. His work was repeatedly interrupted by illness, and was never finished to the composer's satisfaction. The structure and compositional methods revealed in the edited and completed version by Chou Wen-Chung are still those of Varèse and, as such, Nocturnal is important to this study. Nevertheless, the point at which Chou took over the work is quite clear.

I perceive all of the works chosen important milestones in the career of a man whose music is so unique in sound and concept as to demand examination. Varèse enjoyed challenging conventional ideals; the only possible means by which music could progress was forward. Thus he worked on creating unity out of diversity, in contrasting opposing ideas to exclude traditional concepts without destroying the musical language with which he was working. These diverse elements and the manner in they react to one another will provide an insight into the way his compositional language evolved throughout his life. All the various elements do not seek to fragment the structure,
on the contrary they become the primary unifying elements in music that seeks its identity through the destruction of tradition.

"Edgard Varèse is perhaps the most enigmatic figure in an age notable for its healthy generation of seemingly isolated individualists. Of a ruthlessly independent spirit, he has a fiercely modern sensibility that has always remained aloof from any kind of system, from any set of rules, whether tonal, atonal or serial. In sound alone his music is unlike that of any other composer having its own unique and quite unmistakable "tone" and character. For by refusing to accept any given doctrines, Varèse has been forced to create his own highly individual language from the stuff of his personal, and extremely rigorous imaginative experience." R. Henderson. Musical Times. 1965.

Examination of these important works should therefore reveal what it is that creates this "unmistakable tone" and unveil this remarkable music.
Appendix 2.

HYPERPRISM.

NOTE ORDERING ANALYSIS.

Symbols used on the graphs.

FG  Foreground Level.
MG  Middleground Level.
BG  Background Level.

1. Numbers for notes in the foreground.
2. Numbers for notes in the middleground.
3. Numbers for notes in the background.
The hierarchical note ordering analysis reveals how the sound masses are developed. This occurs through the addition of new notes or pitch levels, the progressive expansion of pitch areas, the creation of new vertical pitch patterns or combinations of all of these factors.

In the foreground there are numerous statements of all twelve notes, and when these statements are incomplete the "missing" notes are often of significance in the surrounding passages. In the middleground there are two complete statements at an established level, separated by the major structural nine note vertical pitch pattern that occurs in bar 5.4 and 5.5. A background form can be discerned between the dominant notes of the various passages, and through all levels the progression is dominated by the interval of a semitone.

I do not propose to enter into detailed discussion on the graphs (I leave the reader to draw his/her own conclusions). However, I would emphasise that this concept of the ordering of notes is only a small part of a much more complex picture and requires comparison with other types of analysis for its full value to be realised.

Hyperprism contains three sustained nine note vertical pitch patterns which outline the major sections of the work. The
The extended opening sound mass uses only nine different notes, and it is interesting that the next sound mass to be established and sustained for any significant length of time is the march idea at figure 4, where the three "missing" notes all occur at an established level. As the work moves towards the cadential vertical pitch pattern at 5.4 the density of the foreground developments increases, the three passages containing eleven, twelve and twelve notes respectively, contrasting with the incomplete statements that occurred at the opening.

The third section is constructed in a similar manner, with the opening passages using ten notes, the next eleven (or twelve depending on your interpretation of the Db21) and the closing cadence using all twelve notes. The twelfth note of this passage is the F on the trumpet which is also the last note to join the sustained nine note cadential vertical pitch pattern.

Whilst I consider that there is not likely to be much argument over my choice of sections, or the delineation of foreground
passages (as most are clear from Varese's markings, changes of tempo, texture, dynamics, etc.) I do recognise that my choice of middleground and background notes needs to be justified.

As all background notes are first established in the middleground the list below incorporates notes from both levels. My selection of middleground and background notes was made for the following reasons.

Sections 1 and 2. Middleground and Background Notes.

Bar 0.3  C#  Established through repetition, sustain, dynamic and textural development.

Bar 0.5  D  Established through repetition, sustain, and is a sort of pedal point over which the C# pitch area is established.

Bar 1.6  C  Established because of change of timbre, register, and because it acts as an upper sustained note from which the nine note vertical pitch pattern is constructed. (This cadence is quite unusual being constructed from the "top down" rather than the "bottom up" as is normally found in Varese's music at this time.)

Bar 2.1  F  The bottom note of the sustained nine note vertical pitch pattern and, along with bars 7.5 to 8.1, the lowest pitch level in the work.

Bar 2.5  F#  Highest note of the flute passage, sustained and dynamically emphasised.

Bar 3.1  E  Concluding note of the flute passage, established by sustain, dynamic development, change in register, entrance of percussion, change of tempo.
Sections 1 and 2. Middleground and Background Notes. cont.

Bar 3.5 Bb  Dynamically and texturally emphasised over three bars and held through the pause. It concludes the passage and makes way for the complete change in all elements of the music that follows with the consequent "march" idea.

Bar 4.1 Gb  Dominant melodic note of the "march".

Bar 4.1 G  Bottom note of the harmonic pitch pattern which occurs throughout the "march".

Bar 4.1 Ab  Whether this note can be perceived as established or not is debatable. I am not totally convinced, but include it for the following reasons. Firstly the introduction of the low brass in the "march" in rhythmic unison with the percussion makes all of the notes of this vertical pitch pattern appear to be established. Secondly the note (enharmonically changed) occurs on the same voice at the start of the next cadential passage, no other instrument does this. Thirdly, in the passage after the cadence one of the dynamically emphasised notes on the trumpets is also G#. Thus, its may be considered established as it occurs in an important role in three consecutive passages.

Bar 5.1 (E)  Key note that instigates the construction of the cadential vertical pitch pattern and concludes the "march" development.

Bar 5.3 A  Bottom note of "cadence".

Bar 5.3 Eb  Top note of "cadence".

Bar 5.4 B  Last note to join the cadential vertical pitch pattern, and is the only note to be extended into bar 5.6 acting as a pivot into the next section.
<table>
<thead>
<tr>
<th>Bar</th>
<th>Note</th>
<th>Note Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.6</td>
<td>Bb</td>
<td>Principal pitch level around which the various rhythmic and motivic developments occur.</td>
</tr>
<tr>
<td>6.1</td>
<td>A</td>
<td>Sustained pitch level passing between 2nd and 3rd horn, rhythmically and dynamically emphasised.</td>
</tr>
<tr>
<td>6.1</td>
<td>C#</td>
<td>Root of the vertical pitch pattern right until bar 7.5</td>
</tr>
<tr>
<td>7.5</td>
<td>F#</td>
<td>Upper note of brief pitch area in brass, sustained note, emphasised by glissando and contrasting with frenetic activity in percussion.</td>
</tr>
<tr>
<td>8.1</td>
<td>F</td>
<td>Principal note of extensive trombone solo.</td>
</tr>
<tr>
<td>8.3</td>
<td>E</td>
<td>Sustained pitch level, upper register, dynamically emphasised, acts as brief pause in middle of extensive rhythmic and pitched development.</td>
</tr>
<tr>
<td>9.1</td>
<td>Eb</td>
<td>Concluding note of solo line, marks change of textural, rhythmic development, pitch level, etc.</td>
</tr>
<tr>
<td>9.5</td>
<td>Ab</td>
<td>Sustained, rhythmic developed, high in register, contrasts with percussive development.</td>
</tr>
<tr>
<td>9.5</td>
<td>G</td>
<td>As above but upper note of the two sustained notes. From the central cadential vertical pitch pattern the emphasis has been placed on rhythmic development of a number of pitch areas, which contrasts with the percussion section. There has been little sustained harmonic development, and thus these two notes emerge from this to conclude the frenetic linear activity and prepare for the construction of the closing vertical pitch pattern.</td>
</tr>
</tbody>
</table>
Bar 10.1 D Opening note of the final passage. Rhythmically and dynamically emphasised as well as occurring unison in three voices. (Unison notes are not common in music of this period.)

Bar 10.2 C Last note of small linear development on the horns and the first sustained note of the closing vertical pitch pattern.

Bar 10.2 B Bottom note of closing vertical pitch pattern.

HYPERPRISM. Hierarchical Note Ordering.

**Middleground. Sections One and Two.**

<table>
<thead>
<tr>
<th>0.3</th>
<th>0.5</th>
<th>1.6</th>
<th>2.1</th>
<th>2.5</th>
<th>3.1</th>
<th>3.5</th>
<th>4.1</th>
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<tbody>
<tr>
<td>C#</td>
<td>D</td>
<td>C</td>
<td>F</td>
<td>(F#)</td>
<td>E</td>
<td>Bb</td>
<td>Gb</td>
<td>G</td>
<td>(Ab)</td>
<td>(E)</td>
<td>A</td>
<td>Eb</td>
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</table>

Middleground. Section Three.

<table>
<thead>
<tr>
<th>5.6</th>
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<th>6.1</th>
<th>7.5</th>
<th>8.1</th>
<th>8.3</th>
<th>9.1</th>
<th>9.5</th>
<th>9.5</th>
<th>10.1</th>
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<tbody>
<tr>
<td>Bb</td>
<td>A</td>
<td>C#</td>
<td>F#</td>
<td>F</td>
<td>E</td>
<td>Eb</td>
<td>Ab</td>
<td>G</td>
<td>D</td>
<td>C</td>
<td>B</td>
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</tbody>
</table>
Background.

Note how background and middleground structures employ all twelve notes at established levels. Also, the predominance of progressions of a semitone which occur in all levels of the composition.
Appendix 3.

PREVIOUS ANALYTICAL STUDIES OF

THE MUSIC OF VARÈSE.
APPENDIX THREE. PREVIOUS ANALYSES OF VARESE'S MUSIC.

In formulating a methodology with which to examine Varèse's music considerable research was undertaken into previous writings on Varèse. This appendix summarises some of the concerns that arose through this research.

The music of Varèse has aroused considerable interest throughout the world, particularly since his death in 1965. Naturally this interest is reflected in the rapidly expanding number of articles written on the man and his music. (Since starting my work the number of articles, papers and theses on Varèse has more than doubled.)

Thus, the following reviews are not meant to be comprehensive (nor representing all I have read) but rather a way of directing the reader towards sources of potential interest and away from problematical areas.

It can be argued that as all forms of criticism are subjective this appendix might reveal more about my own philosophies and ideas than it does about the works under consideration. This may well be the case, although I have tried to review these works in an unbiased manner, nevertheless it should still help to contextualise the rest of this thesis.


Introduction.

Most previous examinations of the music of Varèse fall into three broad categories. Firstly, statements made, often in passing, within more general articles on the life of Varèse, secondly analyses included within more general theoretical works on Varèse, and thirdly works that are purely analytical and adopt a specific theoretical standpoint.

Each of these categories can have its pitfalls. In the first there is a tendency for well versed and respected authors to use generalisations that oversimplify the issue, or give a false impression. In the second, the problem is how detailed should an analysis be in the context of a more general paper? How much can you assume the reader knows of analytical techniques? Naturally, if you over-simplify you can incur the wrath of theoreticians, and if you over-elaborate the paper will become incomprehensible to the majority of readers. In the third category, as most analyses are subjective, there is often disagreement between authors employing different techniques.

In all three categories confusion can be created by the terms that are used. Some use traditional terminology, some use Varese's terminology, some develop new terminology and others use a mixture of all three. (I fall into the latter category.)

For example, P.Ramsier and R.T.Beck both use the term "sonata" when discussing Intégrales and Ionisation respectively.
What do they mean? It is easy to see the logic behind their statements as both identify themes that return in various guises and undergo different patterns of development as found in sonata form. However, if you try to extend the idea any further it falls down.

It should also be remembered that terms and literary styles have changed considerably over the years. When Wilfred Mellers wrote *Music in a New Found Land* in the early sixties Varèse's music was still gaining recognition. Additionally, the majority of means by which to analyse contemporary music were very much in their infancy or had not even been conceived.

Thus, statements sometimes are contradictory. It could be enlightening or misleading depending on the interpretation of the reader. For example, Wilfred Mellers states,

"Since Varèse's music is anti-harmonic we can examine its essence in *Ionisation* which is purely percussive, and *Density 21.5* which is purely linear." (Page 159)

An immediate reaction might be that this statement is correct. Superficially it seems to summarise some of the trends seen in Varèse's music clearly and concisely. However, on closer examination there are a number of problems. Varèse's music can only be seen to be "anti-harmonic" within a traditional interpretation where harmonic expectation generates forward movement. Much of the music of Varèse's still depends upon the interaction of vertical pitch patterns (or harmonies) so can it
really be termed "anti-harmonic"? The second point that arises is whether Density 21.5 is really "purely linear". Although it is written for a solo flute, to deny the work "harmonic" structure would be unwise. Surely many of the passages are simply rhythmic elaborations of vertical pitch patterns. Finally, the term "purely percussive" can be misleading. I believe he is referring to concepts of attack and articulation. However, to consider these factors without dynamics and timbre, or the way in which all of these elements affect the rhythm, is again an over-simplification of the issue.

To have conducted such a witch hunt on this statement by Mellers' is rather unfair, but I use it to illustrate how easily misunderstandings can arise if one starts to delve into apparently innocuous statements. Many of the general articles on Varèse show a tendency to over-simplify or use terms that require considerable clarification due to the traditional concepts they invoke. Thus, one must be wary of analytical ideas presented in general articles unless adequately supported and explained.

For this reason I do not propose to deal with any more of these general descriptions but will continue this critique by examining works that fall into the second category outlined above.
Analyses Contained within more General Theoretical Works.

Many authors have included quite detailed examinations of Varèse's music within more general works designed to give an overview of the man, his life and his compositions. Amongst the most extensive and well researched theses that fall into this category is the work of Anne Florence Parks.

Freedom Form and Process on Varèse. A.F. Parks

This extensive work begins with chapters on Varèse's life, links with the past and influences on his music which are most revealing and well researched. The author continues to explore a number of elements in the music individually isolating dynamics, spatial music, rhythm, percussion, and form and process. Parks identifies numerous salient points which serve to explain the mystique surrounding his music.

To avoid possible problems of terminology the author gives a number of definitions that Varèse accepted. For example, from his lectures we know his favourite definition of "music" was taken from Esthetic Musicals by C.A.Durutte, written in 1876, which described music as,

"The corporealization of intelligence in sounds." (Oudlette)

Similarly Parks reveals Varèse's thoughts on rhythm as,

"referring to all temporal aspects of the music as distinguished from pitch, planes, timbres etc." (Pg. 313)
and his attitude to the vertical sonorities of his music as,

"Harmony and timbre should be thought of as closely related and analogous. They are elements of stability rather than motion." (Pg. 260)

It is clear the author has an insight into many of the problems that faced Varèse. Although her thesis is not essentially theoretical it does include a considerable amount of analysis to illustrate the points. It is ironic that, having identified the problem of definitions, she occasionally falls into the trap herself. For example, her statement,

"Density 21.5 requires a special approach since the factor of timbre change is not present." (Pg 249)

One can see the point she is making, as the work is for solo flute, but surely there are differences of timbre between the various registers that are contrasted throughout the work.

Thus, I find many of the conclusions accurate and perceptive but feel there is a failure to recognise the interaction of the elements or how they combine to create Varèse's music.

The Realisation of Varèse's Conceptions. C. Riley.

Three main areas are identified through which the author considers whether Varèse realised his musical conceptions or not: "formal process" (with regards to the crystallisation analogy); "motion and space"; "orchestration as a structural device".

The first chapter notes various structural devices, motives,
rhythmic ideas, textural change, pitch and so on. These elements are traced through *Arcana* with selective examples and occasional references to other works. She concludes that the realisation of Varèse's formal ideas depend on the concepts of space and motion for musical growth, the "movement of sound-masses" being the logical way to develop a "crystalline" structure.

The second chapter examines the concept of "moving sound masses" as described by Varèse. The full realisation of "musical space as open, rather than bounded" (Pg. 47) is seen in the electronic sections of *Déserts*, and particularly in *Poème Électronique*. I feel this aspect could have been expanded as the same principles also apply to his orchestral and chamber music. A detailed examination of the music follows, supporting the existence and conscious planning of sound masses in the music. Naturally I agree with this, but have some reservations over her definition of "sound mass"? She says,

"For a sound mass to exist, it must possess certain features peculiar to itself, and retain those features for a noticeable length of time." (Pg. 59)

and this agrees with my interpretation. Yet towards the end of the chapter the author apparently contradicts herself saying,

"Towards the end of *Intégrales* the different sound-masses, although clearly present in the texture, have become so fragmentary, and the interaction between them so slight, that an explanation of them is almost worthless." (Pg. 62)

Here I think she is confusing the term sound mass with the
elements from which it is constructed.

The final chapter considers the structural use of orchestration. The title is somewhat confusing as she actually discusses Varèse's structural use of timbre. To talk about orchestration infers that he thought of the notes first and then chose the instrument to perform those notes. Of course these two factors are inseparable in his music.

To conclude, I found this work useful as it starts to confront the problem of how the essential elements are combined within Varèse's music.

**Art and Science in Varèse. P. Griffiths.**

Griffiths examines the statement made by Varèse that,

"In reality music partakes of both art and science." (Pg. 1)

He notes that Varèse composed with "rhythms, frequencies and intensities" and from this basis goes on to examine how the music is built from a number of simple elements. He also examines the means by which Varèse explored new areas of sound through complex rhythms, untempered intervals, extremes of pitches and new instrumentation.

In an examination of Hyperprism he concludes that the work contrasts the three possible tetrachords, and sees these as the "sound masses that attract and repel" to which Varèse referred.
This seems to be a strange interpretation and, interestingly by the time of writing the entry on Varèse for the New Grove Dictionary of Music and Musicians his opinions had changed. The three note vertical cell (motive) now being identified as central to the structure. This is a far more accurate view but is naturally rather simplistic due to the constraints of the article in which it appears.

Ives and Varèse. R.Middleton and I.Bonnington.

This unit prepared for the Open University, and its appendix by R.P.Morgan provides a good general introduction to the life, style and compositions of Varèse. The music is examined through Varèse's attitudes towards the various elements from which it is constructed. An analysis of Octandre follows, based on an examination of the sound masses and the way in which they are constructed. This analysis identifies the way many disparate elements are combined to create sound masses and how form results from their interaction. I found some aspects of the analysis a little confusing (some of the diagrams and the terminology employed) but nevertheless I feel that the analysis is generally accurate and perceptive. Thus, this work was important in the formation of my own methodologies as it encompassed most aspects of the music I had perceived as important to the structure.
Note.

Whereas this unit was important in helping formulate ideas regarding analysis of Varèse's music I also wished to examine the idea that Varèse's music changed and developed throughout his life. Almost without exception all writings on Varèse seemed to ignore this aspect and thus I would refer the reader to the thesis of D.H. Cox _The Music of Edgard Varèse_ and the paper prepared for the First American Music Conference held at Keele University in 1975 entitled _Stylistic Evolution in the Music of Varèse_.

_Theoretical/Analytical Studies of Varèse's Music._

Within this section a number of analytical works are considered. Most of these focus on the examination of a single aspect of Varèse's music. A number of these studies were important in my development of an overall methodology but the way most of them focus on a single element, to the exclusion of others, made me wary of their ability to fully reveal the construction of his musical language.

_Motivic Analyses of Octandre and Intégrales. P. Ramsier._

Detailed analyses of both works are undertaken revealing similar methods of motivic construction. Having identified the
"principal" melodic and rhythmic motives he then continues to examine the structure by detailing augmentations, inversions, contractions, embellishments, etc. of the motives and so doing accounts for sixty per cent of the music. From the analyses it is clear that motives, and the cells from which they are formed, are evident in the construction of all aspects of the music.

I do, however, have a few reservations about the work. Firstly, having accounted for approximately sixty per cent of the music he does not suggest how the remainder might be generated. Secondly, the identification of rhythmic motives is very important in these analyses and yet the percussion section in Intégrales is ignored. I think there is evidence that a good deal of motivic development occurs within the percussion section. Thirdly, there is little examination of motives within any vertical structures. Ramsier primarily examines linear development, yet Varèse's statement regarding "transmutation" suggests that the transfer of material (and motives) occurs between the horizontal and vertical aspects of his music.

Nevertheless, Ramsier's work is informative and shows clearly how important motivic development is to the formation of sound masses. He also suggests ways in which the technique could be improved through the incorporation of the elements of timbre and dynamics.

In this article Stempel concerns himself with trying to link Varèse to those composers of the European mainstream he considers influential. The support for his ideas revolve around an examination of Un grand sommeil noir on a text by Verlaine. This fragment dates from 1906 and remains the only early piece not to have been destroyed. He shows the similarities to be found between this work and Debussy's music, and through this examines possible influences on Varèse and links with the past.

Stempel reaches many conclusions which, although accurate, I feel should be more cautiously presented. I am not sure that the question of how representative of Varèse's early music this fragment might be, is really tackled. Nevertheless, it provides an interesting and useful insight into an aspect of Varèse's music that is seldom considered although I would stress the need for caution. As J.W.Bernhard says,

"Judgement on Varèse, ultimately is not likely to depend on this work any more than Stravinsky's worth as a composer can be gauged by the merits of his Symphony in E flat Opus 1." (See below. Pg. 41)


Bernhard examines pitch and register in a graphical way, investigating the spatial effects of the music ("penetration,
repulsion and projection"). The way the vertical aspect of the music is constructed is analysed in a variety of ways, and the symmetry of many of the vertical pitch patterns revealed. On occasion I find the examples he quotes rather forced but in general the work provides a clear insight into this aspect of Varèse's music.

Again, I do have some reservations regarding the work. Bernhard recognised that his study was not comprehensive as it only really considers the vertical dimension of the music. However, there seems to be little consideration of how these vertical structures and sounds combine to generate the horizontal form. He also ignores the percussion section which seems unwise. Surely the percussion section has pitch and register albeit imprecise. (See below.)

**The New Worlds of Edgard Varèse. Edited by S. Van Solkema.**

This book contains three important papers by Elliot Carter, Chou Wenn-Chung and Robert Morgan. Each concentrates on a different aspect of the music of Varèse and each reveals a considerable insight into the Varèsean musical language.

**Ionisation: The Function of Timbre in its Formal and Temporal Organisation. Chou Wen-Chung.**

"In Ionisation Varèse reveals to an extraordinary degree not only his concepts and techniques but also the profundity
and imagination with which he crystallizes his ideas: in this case, hewn from raw sonic material that offers no definite pitch or known means for development and organisation. To analyse Ionisation, then, is to pave the way for understanding all of Varèse's music." (Pg. 27)

This analysis is important in recognizing how sound masses are created and how they combine to outline the form. I am not sure I agree with his supposition that Ionisation holds the key to all of Varèse's music, strong arguments could be put forward for a number of other works, but nevertheless I see this investigation of the way contrasting timbres are employed as significant in understanding Varèse's music.

Once again I have some reservations. By concentrating so much on timbral development I think other important aspects are ignored. For example, I consider the two motives on the side drum and bongos at Figure 1 as extremely important in shaping much of the rhythmic development of the work. These motives, and their developments, occur throughout the work yet Chou ignores them, calling the former,

"a succession of typical snare drum stick techniques." (Pg31)

Thus I feel that, important as timbre is in the development of Ionisation, there are other significant factors that need to be considered if a more "complete" picture of the work is to be revealed and to focus on timbre alone does not provide a complete picture of how Ionisation might have evolved.
On Edgard Varèse. E.Carter.

Elliot Carter makes many well reasoned statements on the structure of Varèse's music and notes the crucial role of rhythm.

"He made rhythm the primary material of his musical language and used it, rather than thematic linearity, as the thread which holds his compositions together." (Pg.2)

He sees the rhythmic development of Varèse's music starting to take shape in the early Amériques and Offrandes, being developed through Hyperprism and coming to fruition in Déserts.

"It is very important to realise that Varèse was not adopting this structuring as a means of furthering the almost hysterical expressivity sought by the Viennese composers, but rather as a way of producing a new rhythmic structure with a high degree of forward drive not resulting from regular beat patterns." (Pg.3)

Although primarily concentrating on rhythm Carter also recognises the role of other motive forces in Varèse's music.

"What has interested recent composers, also, is that Varèse's music does not depend on thematic motives for its continuity, but rather the relationship between vertical, harmonic structures, instrumental sonorities, spacings, and, of course, the play of rhythmic motives." (Pg.3)

Therefore, Carter recognises the same features in Varèse that drew me towards a more comprehensive examination of his music, the fact that any single element alone is insufficient to examine the concept of structure within any work. Furthermore he clearly recognises that the rhythmic development of Varèse's music evolves throughout his life.

Although purporting to deal with rhythm, much of the article concentrates on the expansion of pitch areas, the progressive introduction of new notes to the texture, through the element of rhythm. This again coincides with my view that it is impossible to separate individual elements of the music analytically.

"It is in the rhythmic domain that one recognises most forcefully the consequences of Varèse's conception of pitch." (Pg.11)

The author also recognises the integrated role of the percussion section, the way it responds to and instigates pitched development.

"What is most characteristic, certainly, is the sense of constant variation and renewal that stems from the continuous metamorphosis of the highly colourful surface of the percussion, providing an essential foil for the relatively fixed timbral and registral quality of the pitch component." (Pg.25)

Therefore, I consider the concepts presented in this article reveal much of the structure of Varèse's music and clearly indicate how elements of the music are intrinsically linked and are dependent upon one another for the generation of form.

Towards an Open Ended Method of Analysis of Contemporary Music. Y. Yehuda.

The bold title of this work starts from a somewhat idealistic point of view. Yehuda dictates a "modus operandi" for analysis
based on the assumption that legitimate musical products are derived from an ideal abstract model. Personally, I am unconvinced that "contemporary music" per se is striving towards an abstract model.

In examining Octandre Yehuda starts with a pitch analysis graph and then proceeds to examine rhythm with regards to modes of attack. By dividing the bars with the number of attacks contained therein he produces attack tables, and from these he plots a curve of the relative density of attack. Although I am sure that Varese did plan the rhythmic intensity of his music I find it hard to accept that he did so in the meticulous manner suggested by Yehuda.

The author then continues by choosing selective examples of chords to note key points of internal structure or register. He details many interesting points but seems to ignore the obvious links to the linear development of the work. The follows this with a brief examination of rhythmic devices, pitch and dynamics but these are rather too selective to draw any significant conclusions.

Despite my criticism of this work Yehuda has tried to tackle the problems of the selectivity of many forms of conventional analysis. I am not convinced that he has managed to provide a comprehensive analysis but nevertheless, his basic ideology is one that I agree with,
"the open ended analytical approach, based on the premises of an expanded definition of the musical object that includes the widest possible spectrum of manifestation of recent creativity, can consider in its scope the examination of musical systems in which the parameters noted play secondary roles. The pluralistic state of creativity in music does seem to warrant preserving the theory of musical analysis in a state of fluidity and regeneration, flexible to come to terms with our constantly changing and expanding musical environment." (Pgs.125-126)

Analyses of Density 21.5

As Density 21.5 was, and still is, one of Varèse's most popular works it has attracted considerable analytical attention. In addition, its scoring for solo flute has made it an obvious target for analytical study. There are many different analyses of this work, a few of which will be considered below.

One of the most extensively read of analyses of Varèse's music is J.J. Nattiez's Density 21.5: A Study in Semiological Analysis, in particular since its recent translation into English. Once the reader has tackled the problems posed in understanding his semiological approach (most of which seem to disappear in the translation) it reveals, in a very detailed manner, a structure consisting of three major sections. Each major section divides into ten smaller sections and then into eighty three different segments.

Gumbel's analysis, Versuch an Density 21.5, is somewhat
confusing in its terminology and the form outlined. He identifies a number of sections ("variation", "exposition", etc.) and when conventional terms prove inadequate he inserts new ones such as "transformation" and "evolution". The form consists of two broad sections, both of which develop the two foreground ideas he identifies at the beginning. The various developments of these two ideas create the internal structure of each section which he sees as A A B.

R. Middleton's analysis contained in the Open University Unit on Ives and Varèse further illustrates the incongruity between the different analyses. He identifies nine sections varying in length from four to twenty three bars. There doesn't appear to be any suggestion as to how these sections might combine with regards to the overall form of the work.

J. Siddons in The Nature of Melody in Varèse's Density 21.5 defines three major sections, (which do not agree with Nattiez) and fourteen smaller sections.

There are other interpretations and analyses each outlining differing approaches and interpretations of the structure. For example, P. Griffith's comments under the entry on Atonality in The New Grove's Dictionary of Music and Musicians, A Path Through Density by J. Kresky and A Flow of
Energy: Density 21.5 by M. Gluck. I do not wish to discuss the appropriateness of the methodologies employed nor the accuracy of the various interpretations, but use this work as an example of the problems facing one when contemplating analysis of the music of Varèse.

How can so many people come to so many different opinions over the structure of a sixty-one bar piece for solo flute that lasts only a few minutes?

It could be argued that either the value judgements of the various authors are incorrect or that the methods employed were not properly applicable to the matter in hand. Yet each analysis coherently supports the ideas of its author and gives an insight into the music. I am sure that each author was convinced of the merits of the methodology adopted and fully prepared to back up the value judgements taken.

Conclusions.

From my research I have reached a number of conclusions concerning the construction of Varèse's music and which methods of analysis are best suited to his music. I trust this has been justified in the main body of this thesis.

As it was beyond the scope of this appendix to undertake a comprehensive criticism of articles written on Varèse's music, the writings chosen form a cross section of opinions and methods
to illustrate some of the problems that need to be confronted before one examines the music of Varèse.

Analytical works on Varèse display a wealth of interesting techniques. A variety of means have been employed in an attempt to unravel the complexities of the music. Many of these, I consider, fall short of supplying a comprehensive method of analysis. Most analyses choose a single element of the music and pursue its development throughout a composition. This requires the author to make a value judgement at the outset as to which element is perceived as being most important in the structuring of Varèse's music. If one does not agree with this fundamental judgement then it is hard to consider the work sympathetically.

The majority of techniques seem to be concerned with the establishment of pitch areas and simple melodic and harmonic motives. Very little work has included anything like a succinct or enlightening analysis of the rhythmic structure of his music which, in many cases, is of equal importance to the elements of melody, pitch and harmony. Indeed, in spite of the huge percussion sections employed in most of Varèse's works, and the obvious importance of rhythmic development, it is surprising that many analyses ignore this aspect altogether. Similarly many analyses seem to consider only the surface configurations and their developments, and ignore how the overall structure and form is created.
Therefore, to examine the music of Varese requires a fluidity of technique if one is to be able to approach a comprehensive understanding of the music. The reader must not expect the neat packaging of classical analysis, but rather methods that are capable of evolving in parallel with the music.
Appendix 4.

DÉSERTS.

The Duration of Sound Masses.
APPENDIX FOUR.

The Durations of Sound Masses.

The following tables are based on the timings derived from the metronome markings on the score, and the re-worked passages of organised sound (4th version of 1962) as found on the Colombia recording with Robert Craft and the Colombia Symphony Orchestra. (NB. See also Appendix 8.)

<table>
<thead>
<tr>
<th>Sound Masses</th>
<th>Location</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sound Mass 1.</td>
<td>Bars 1.1 to 29.4</td>
<td>1'16&quot;</td>
</tr>
<tr>
<td><strong>Section One.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sound Mass 2.</td>
<td>Bars 30.1 to 45.4</td>
<td>0'43&quot;</td>
</tr>
<tr>
<td>Sound Mass 3.</td>
<td>Bars 45.4 to 65.3</td>
<td>0'47&quot;</td>
</tr>
<tr>
<td>Sound Mass 4.</td>
<td>Bars 65.4 to 82.5</td>
<td>0'42&quot;</td>
</tr>
<tr>
<td>Sound Mass 5.</td>
<td>OS1. 0'00&quot; to 0'52&quot;</td>
<td>0'52&quot;</td>
</tr>
<tr>
<td>Sound Mass 6.</td>
<td>OS1. 0'53&quot; to 1'20&quot;</td>
<td>0'28&quot;</td>
</tr>
<tr>
<td>Sound Mass 7.</td>
<td>OS1. 1'21&quot; to 2'07&quot;</td>
<td>0'47&quot;</td>
</tr>
<tr>
<td>Sound Mass 8.</td>
<td>OS1. 2'08&quot; to 84.3</td>
<td>0'24&quot;</td>
</tr>
<tr>
<td>Sound Mass 9.</td>
<td>Bars 85.1 to 117.5</td>
<td>1'11&quot;</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>5'54&quot;</strong></td>
</tr>
</tbody>
</table>
### Section Two.

<table>
<thead>
<tr>
<th>Sound Mass</th>
<th>Bars</th>
<th>Total</th>
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<tbody>
<tr>
<td>10.</td>
<td>118.1 to 145.7</td>
<td>1'48&quot;</td>
</tr>
<tr>
<td>11.</td>
<td>146.1 to 167.4*</td>
<td>1'35&quot;</td>
</tr>
<tr>
<td>12.</td>
<td>167.4 to 193.7</td>
<td>1'28&quot;</td>
</tr>
<tr>
<td>13.</td>
<td>194.1 to 205.3</td>
<td>0'56&quot;</td>
</tr>
<tr>
<td>14.</td>
<td>205.4 to 224.2</td>
<td>0'46&quot;</td>
</tr>
<tr>
<td>15.</td>
<td>OS2. 0'00&quot; to 0'45&quot;</td>
<td>0'46&quot;</td>
</tr>
<tr>
<td>16.</td>
<td>OS2. 0'46&quot; to 3'17&quot;</td>
<td>2'31&quot;</td>
</tr>
<tr>
<td>17.</td>
<td>Bars 225.1 to 247.1*</td>
<td>0'55&quot;</td>
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</tbody>
</table>

**Total:** 10'45"

(NB. The overlap between Sections Two and Three approx 10")

### Section Three.

<table>
<thead>
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<tbody>
<tr>
<td>18.</td>
<td>244.3 to 263.4</td>
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</tr>
<tr>
<td>19.</td>
<td>OS3. 0'00&quot; to 0'33&quot;</td>
<td>0'33&quot;</td>
</tr>
<tr>
<td>20.</td>
<td>OS3. 0'34&quot; to 1'16&quot;</td>
<td>0'43&quot;</td>
</tr>
<tr>
<td>21.</td>
<td>OS3. 1'17&quot; to 1'56&quot;</td>
<td>0'40&quot;</td>
</tr>
<tr>
<td>22.</td>
<td>OS3. 1'57&quot; to 2'29&quot;</td>
<td>0'33&quot;</td>
</tr>
<tr>
<td>23.</td>
<td>OS3. 2'29&quot; to 3'09&quot;</td>
<td>0'41&quot;</td>
</tr>
<tr>
<td>24.</td>
<td>Bars 264.1 to 288.1</td>
<td>1'17&quot;</td>
</tr>
<tr>
<td>25.</td>
<td>Bars 288.2 to 309.4</td>
<td>1'03&quot;</td>
</tr>
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</table>

**Total:** 6'21"

### Conclusion.

<table>
<thead>
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<th>Total</th>
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<tbody>
<tr>
<td>26.</td>
<td>310.1 to 325.7</td>
<td>0'47&quot;</td>
</tr>
</tbody>
</table>
Appendix 5.

DÉSERTS.

SET THEORY ANALYSIS.
The first section of *Déserts* was examined using the Forte technique of identifying K and Kh inclusion relations. If this examination is based on the various motives it can be seen that the proliferation of these relationships does not actually make this type of inclusion relation particularly useful.

<table>
<thead>
<tr>
<th>DÉSERTS. SECTION ONE. Sound Mass 1. Pitch Class Sets.</th>
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<tbody>
<tr>
<td>3-1(12)</td>
</tr>
<tr>
<td>3-3</td>
</tr>
<tr>
<td>3-4</td>
</tr>
<tr>
<td>3-5</td>
</tr>
<tr>
<td>4-8 4-10(12) 5-14 5-23 6-7(6) 6-32(12) 6-Z41</td>
</tr>
</tbody>
</table>

<table>
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</tr>
<tr>
<td>3-5</td>
</tr>
<tr>
<td>5-6 5-14 5-16 6-Z3 6-Z6(12) 6-7(6) 6-Z28 7-22 8-4 8-9 /6-Z38</td>
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<td>3-4</td>
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<td>3-5</td>
</tr>
<tr>
<td>4-5 4-6(12) 4-18 5-4 5-9 6-Z39 7-11 8-2</td>
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- 598 -
### DESERTS. SECTION ONE. Sound Mass 4. Pitch Class Sets.

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<tbody>
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</tr>
<tr>
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<td>Kh</td>
<td>-</td>
<td>-</td>
<td>Kh</td>
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<td>-</td>
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<th>6-20(4)</th>
<th>6-Z44</th>
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<th>Kh</th>
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<tbody>
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<td>K</td>
<td>K</td>
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<td>K</td>
<td>K</td>
<td>Kh</td>
<td>K</td>
<td>Kh</td>
<td>K</td>
<td>Kh</td>
</tr>
<tr>
<td>3-5</td>
<td>Kh</td>
<td>Kh</td>
<td>K</td>
<td>K</td>
<td>Kh</td>
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<table>
<thead>
<tr>
<th>4-8(12)</th>
<th>4-Z15</th>
<th>4-25(6)</th>
<th>5-1(12)</th>
<th>5-7</th>
<th>6-Z38</th>
<th>6-Z41</th>
<th>7-14</th>
<th>8-4</th>
</tr>
</thead>
</table>
Appendix 6.

DÉSERTS.

ANALYSIS OF PITCHED MOTIVES.

Symbols used on the graphs.

- **M** = Motive A. (3-5 pitch class set)
- **M′** = Motive A'. (Adapted version of Motive A) (3-4 pitch class set)
- **M** = Motive B. (3-1 pitch class set)
- **MC** = Motive C. (3-3 pitch class set)
- **C1** = Cell 1. (Original: Perfect Fifth)
- **C1′** = Cell 1. (Inversion: Perfect Fourth)
- **C2** = Cell 2. (Original: Semitone)
- **C2′** = Cell 2. (Inversion: Major Seventh)
- **+** = Augmentation of Cells through octave transposition.
Motivic Progression.

Cell 1 ....................... (Fifth)

SOUND MASS 1

- 601 -
Motivic Progression. (Fifth)  
(Semitone)

SOUND MASS 1
Motivic Progression.

Motive A. ........................................
(3-5)

SOUND MASS 1
Motivic Progression.

Motive C ... Combination ............. Motive A'
(3-3) 
(3-4)

SOUND MASS 2

- 605 -
Motive A .................
(3-5)

Cell 2 ..............
(Semitone)

SOUND MASS 2

SOUND MASS 3

- 606 -
Motivic Progression.

Motives A + C ................. Motive C .................

(3-5 + 3-3) (3-3)

SOUND MASS 3
Motivic Progression:

- Motive C ....... Motive A and A' ....... Motive C

(3-3)  (3-5 and 3-4)  (3-3)

SOUND MASS 3

- 608 -
Motive C
Progression.  (3-3)  (Semitone)

SOUND MASS 3  SOUN D MASS 4

- 609 -
Motivic Progression. Cell 2 Combination (Semitone)

SOUND MASS 4

- 610 -
Motivic Motive B Cell 1 .................
Progression. (3-1) (Fifth)

SOUND MASS 8

SOUND MASS 9

- 611 -
Motivic Progression.  (3-1)  (3-5)

SOUND MASS 9

- 613 -
Motivic Motive A
Progression. (3-5)

SOUND MASS 9
Motivic Motive B ................. Combination .................
Progression. (3-1)

SOUND MASS 10

- 615 -
Motivic Progression. Cell 1 and Cell 2 ............... Motive A ............... (Fifth and Semitone) (3-5)

SOUND MASS 10

- 616 -
Motivic Motive A ......................... Cell 2 .........
Progression. (3-5) (Semitone)

SOUND MASS 10

- 617 -
Motivic Cell 2  
Progression. (Semitone)  
(3-5)  

- Motive A  
- Motive A  

SOUND MASS 10  

SOUND MASS 11  

- 618 -
Motivic Motives A and A'..............................
Progression. (3-5 and 3-4)

SOUND MASS 11

- 619 -
Motivic Motive B ... Motive A ... Motive C ... Cell 2 ....
Progression. (3-1) (3-5) (3-3) (Semitone)

SOUND MASS 11

- 620 -
Motivic Progression

Cell 2 .......... Motive A ...... Cell 1 ..........
(Semitone) (3-5) (Fifth)

SOUND MASS 11

SOUND MASS 12

- 621 -
Motivic Combination
Progression.

SOUND MASS 12
- 622 -
Motivic Cell 2 .......... Motive A ......................
Progression. (Semitone) (3-5)

SOUND MASS 12

- 623 -
Motivic Progression. (3-3) (3-1 and 3-3) (Semitone)
Motive C .................................  Motive A ..............
Progression. (3-3)  ...................... (3-5)

SOUND MASS 13
Motivic Progression

Motive A .............
(3-5)

Combination.......

SOUND MASS 14

- 627 -
Motivic Combination

SOUND MASS 14

- 628 -
Motive B ... (3-1)
Motive A ... (3-5)

SOUND MASS 17
Motivic Progression.

Cell 2 ..... Motive C. ........................................

(3-3)

SOUND MASS 18

- 632 -
Motive C (3-3)

SOUND MASS 1

- 633 -
Motivic Progression.

Motives A and C .......... (3-5 and 3-3)

SOUND MASS 24
- 634 -
Motivic Progression

Combination

SOUND MASS 24

- 635 -
Motivic Motives A and B
Progression. (3-5 and 3-1)
Motivic Combination Motive A' Cell 2 ..................
Progression. (3-4) (Semitone)

SOUND MASS 24

- 637 -

SOUND MASS 25
Motivic Progression.

Cell 2 ...................... Motive A ......................

(Semitone)            (3-5)

SOUND MASS 25

- 638 -
Motivic Progression.

Motive A .... Motive B ..............................

(3-5)     (3-1)

SOUND MASS 25                    SOUND MASS 26

- 639 -
Motivic Progression.  Motive C  
(3-3)

SOUND MASS 26  
- 640 -
Appendix 7.

DÉSERTS.

NOTE ORDERING ANALYSIS.

1. Foreground Note.
① Middleground Note.
① Background Note.

→ Refers forward to next established statement.
← Refers backwards to last established statement.
7. 8. 9. 10. 11. 12. 1. 2. 3. 4. 5. 6. 7.

E A Eb Bb F G# G Bb C# D B F F#

FG. ----------------------------------

MG. ----------------------------------

BG. ----------------------------------

- 647 -
6. 7. 8. 9. 10. 11. 12.

Perc.

FG.

G# F A F# C Db G

MG.

BG.

- 660 -
Fl.
Fl.
Clar B♭
Bass Cl
Horns
Trpt D
Trpt C
3 Tpts
Tubas
Reno
Timps
Per 2
Per 3
Per 4
Per 5

Fg. 6 7 8
M.G.
B.G.

- 682 -
Justification of the Choice of Middle and Background Notes.

The following lists provide the justification for my selection of established notes within the opening sound mass and Section One of Déserts. I do not propose to continue the listing of notes for the remainder of the work as similar criteria apply. Thus, the reasons for my selection of certain notes and the rejection of others should be apparent by cross referencing the score and the note ordering graphs.

Section One.

Bar 1. G + F Established through repetition, sustain, etc.
Bar 6. D + E Established through repetition, sustain, etc.
Bar 7. A Established through repetition, sustain, etc.
Bar 14. C Although the pitch level does first occur in bar 7, the textural change, and the dynamic emphasis of the horn makes its entry at this point more structurally significant.
Bar 14. Bb Root of SM1:2, and lowest pitch thus far.
Bar 21. G# Basis for first major vertical pitch pattern.
Bar 30. D# Upper sustained pitch level of the opening harmonic texture of SM2.
Bar 37. C# Root of SM2:2, and lowest pitch level thus far.
Bar 41. C Sustained upper pitch level that opens SM2:3.
Bar 47. F# Central sustained pitch level throughout SM3:2
Bar 54. E  Upper register pitch level which opens SM3:3, emphasised by repetition, octave transfers and changes of dynamic level.

Bar 54. A  Root of SM3:3, established through repetition and sustain.

Bar 61. D  Central pitch level around which SM3:5 is developed.

Bar 64. Bb  Concluding note of SM3, dynamically emphasised as the accompanying brass is marked pp.

Bar 66. G  Sustained and rhythmically developed pitch level on the horn.

Bar 70. F + B  Central pitch levels around which SM4:2 develops, dynamically emphasised and sustained.

Bar 75. G#  Repeated note throughout SM4:3, occurring in various octaves within the brass voices.

Bar 83. B  Root of transitionary sound area, SM8:2.


Bar 86. D  Lower pitch level which occurs at the opening of SM9, established through dynamics, timbre and sustain.


Bar 94. C#  Root of SM9:3.

Bar 95. A  Basis of SM9:4, sustained and dynamically and timbrally developed.


Bar 105. G  Root of SM9:6, emphasised by cessation of the percussion and the sudden drop in dynamics.

Bar 110. Bb  Upper register pitch level which supersedes the A5 and is dynamically and timbrally developed until the development of the closing vertical pitch pattern of the sound mass.
Bar 115. F#  Central pitch level of closing pitch pattern. Perceived as established due to the significance of the note in the build up to the sustained notes, occurring as F#3 then F#5 before settling on F#4 in the closing "cadence".

Bar 115. E  It initially appears to be the root of the vertical pitch pattern. It is perceived as established because of the descending figure on the timpani and its dynamic and timbral independence from the surrounding material.

Bar 116. Eb  Root of the closing vertical pitch pattern of Section One.

Bar 116. G#  Top of the closing vertical pitch pattern of Section One and the last note to join the texture.
Examination of Cells in the Hierarchical Note Ordering Analysis.


### Middleground Notes. Bars 1.1 to 29.4

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<th>6</th>
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<td>F</td>
<td>E</td>
<td>D</td>
<td>A</td>
<td>C</td>
<td>Bb</td>
<td>G#</td>
<td>(E)</td>
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<td></td>
<td>C1</td>
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Section One.

Sound Masses 2 - 4.

### Middleground Notes. Bars 30.1 to 82.4

<table>
<thead>
<tr>
<th>Bar.</th>
<th>30</th>
<th>37</th>
<th>41</th>
<th>42</th>
<th>47</th>
<th>54</th>
<th>54</th>
<th>61</th>
<th>65</th>
<th>70</th>
<th>70</th>
<th>71</th>
<th>71</th>
<th>75</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note.</td>
<td>D#</td>
<td>C#</td>
<td>C</td>
<td>(C#)</td>
<td>F#</td>
<td>E</td>
<td>A</td>
<td>D</td>
<td>Bb</td>
<td>G</td>
<td>F</td>
<td>B</td>
<td>(E)</td>
<td>(D#)</td>
</tr>
<tr>
<td>Cell.</td>
<td></td>
<td>C2</td>
<td>C2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C2</td>
<td></td>
<td>C2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>C1</td>
<td>C1</td>
<td>C1</td>
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<td>C1</td>
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<td>C1</td>
<td>C1</td>
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</tr>
</tbody>
</table>
Sound Masses 8 - 9.

**Middleground Notes. Bars 83.1 to 117.5**

<table>
<thead>
<tr>
<th>Bar.</th>
<th>85 86 92 92 94 95 101 101 105 105 110 115 115 116 117</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note.</td>
<td>G# D F B C# A (Eb) C (F) G Bb F# E Eb (G#)</td>
</tr>
<tr>
<td>Cell.</td>
<td>C1 C1 C2 C1</td>
</tr>
<tr>
<td></td>
<td>C1</td>
</tr>
</tbody>
</table>

**Background Notes. Section One.**

<table>
<thead>
<tr>
<th>Bar.</th>
<th>30 41 47 54 65 70 71 83 86 86 94 95 110 116 117</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note.</td>
<td>D# C F# E G F D# B D G# C# A Bb (Eb)(G#)</td>
</tr>
<tr>
<td>Cell.</td>
<td>C2</td>
</tr>
<tr>
<td></td>
<td>C2 C2</td>
</tr>
<tr>
<td></td>
<td>C1 C1 C1</td>
</tr>
</tbody>
</table>

Note also the cells that occur between the opening and closing established notes in the middleground.

**Introduction and Section One.**

<table>
<thead>
<tr>
<th>Bar.</th>
<th>Sound Mass 1</th>
<th>Sound Masses 2 - 4</th>
<th>Sound Masses 8 - 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note.</td>
<td>G</td>
<td>G#</td>
<td>D#</td>
</tr>
<tr>
<td></td>
<td>G#</td>
<td>G#</td>
<td>G#</td>
</tr>
<tr>
<td>Cell</td>
<td>C2</td>
<td>C1</td>
<td>C1</td>
</tr>
</tbody>
</table>
Section Two.

Sound Masses 10 - 11.

<table>
<thead>
<tr>
<th>Middleground Notes. Bars 118.1 to 167.4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bar.</strong></td>
</tr>
<tr>
<td><strong>Note.</strong></td>
</tr>
<tr>
<td><strong>Cell.</strong></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Sound Masses 12 - 13.

<table>
<thead>
<tr>
<th>Middleground Notes. Bars 167.4 to 205.3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bar.</strong></td>
</tr>
<tr>
<td><strong>Note.</strong></td>
</tr>
<tr>
<td><strong>Cell.</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Sound Masses 14 and 17.

### Middleground Notes. Bars 205.4 - 247.1

<table>
<thead>
<tr>
<th>Bar.</th>
<th>206 206 206 210 212 213 214 216 225 226 227 228 228 240 243</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note.</td>
<td>B F# G# (B) G Bb F (F) Eb D (Eb) A C# E C</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell.</td>
<td>C1 C2 C1 C1 C2 C2 C1 C2 C2 C2 C1</td>
</tr>
</tbody>
</table>

Note also the cells that occur between the opening and closing established notes in the middleground.

### Section Two.

<table>
<thead>
<tr>
<th>Bar.</th>
<th>Sound Masses 10-11</th>
<th>Sound Masses 12-13</th>
<th>Sound Masses 14+17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note.</td>
<td>Bb E C G B C</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>C1</td>
<td>C2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>C1</td>
</tr>
<tr>
<td>Cell.</td>
<td></td>
<td></td>
<td>C1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>C2</td>
</tr>
</tbody>
</table>

- 689 -
### Background Notes. Bars 118.1 to 247.1

<table>
<thead>
<tr>
<th>Bar</th>
<th>118 127 132 132 137 141 149 149 157 157 168</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note</td>
<td>Bb A D F Ab (Bb) Db G C (C#) (C)</td>
</tr>
<tr>
<td>Cell</td>
<td>semi semi semi</td>
</tr>
<tr>
<td></td>
<td>fifth fifth fifth</td>
</tr>
</tbody>
</table>

---

Continued....

<table>
<thead>
<tr>
<th>Bar</th>
<th>169 170 175 178 185 186 206 206 225 228 243</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note</td>
<td>Eb (G#) E (G#) (Bb) (D) F# B (D) (C#) (C)</td>
</tr>
<tr>
<td>Cell</td>
<td>semi semi semi</td>
</tr>
<tr>
<td></td>
<td>fifth fifth</td>
</tr>
</tbody>
</table>

---

Section Three.

The fragmentary nature of the material contained in Section Three means that only a single middleground statement of eleven notes can be distinguished. The "missing" note is the final established note to be presented in the concluding sound mass. The background statement is similarly incomplete, containing only 7 notes, but still develops a wealth of cellular activity.
Sound Masses 18, 24 and 25.

<table>
<thead>
<tr>
<th>Middleground Notes. Bars 244.3 to 309.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar.</td>
</tr>
<tr>
<td>Note.</td>
</tr>
<tr>
<td>Cell.</td>
</tr>
</tbody>
</table>

continued...........

<table>
<thead>
<tr>
<th>Middleground Notes. Bars 244.3 to 309.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar.</td>
</tr>
<tr>
<td>Note.</td>
</tr>
<tr>
<td>Cell.</td>
</tr>
</tbody>
</table>

- 691 -
Concluding Sound Mass. (SM26)

Middleground. Bars 310.1 - 325.7

<table>
<thead>
<tr>
<th>Bar.</th>
<th>311</th>
<th>312</th>
<th>317</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note.</td>
<td>C#</td>
<td>D</td>
<td>Eb</td>
</tr>
<tr>
<td>Cell</td>
<td>C2</td>
<td>C2</td>
<td>C2</td>
</tr>
</tbody>
</table>

Background Notes. Section Three and Conclusion.

<table>
<thead>
<tr>
<th>Bar.</th>
<th>244</th>
<th>246</th>
<th>281</th>
<th>285</th>
<th>292</th>
<th>294</th>
<th>296</th>
<th>304</th>
<th>312</th>
<th>317</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note.</td>
<td>F#</td>
<td>G</td>
<td>(F#)</td>
<td>(G)</td>
<td>D</td>
<td>Bb</td>
<td>(G)</td>
<td>A</td>
<td>Eb</td>
<td>E</td>
</tr>
<tr>
<td>Cell.</td>
<td>C2</td>
<td>C2</td>
<td>C2</td>
<td>C2</td>
<td>C2</td>
<td>C2</td>
<td>C2</td>
<td>C2</td>
<td>C1</td>
<td>C1</td>
</tr>
</tbody>
</table>

- 692 -
DESERTS. Overview of Hierarchical Note Ordering Analysis.

Note also the cells that occur between the opening and closing established notes in the background.

<table>
<thead>
<tr>
<th>Overview.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar.  Intro.  Section One.  Section Two.  Section Three.  Conc.</td>
</tr>
<tr>
<td>Note.  G  D  D#  B  Bb  B  F#  A  Eb  E</td>
</tr>
<tr>
<td>Cell  C1  C1  C1  C1  C2  C2  C2  C2</td>
</tr>
</tbody>
</table>

- 693 -
Appendix 8.

DIFFERENCES IN THE DURATION OF

DÉSERTS.
The Duration of Déserts.

The following table compares the timings of Déserts as found on the Robert Craft recording with the Colombia Symphony Orchestra (CBS Records) with the actual metronomic timings indicated on the score. Whilst it is recognised that different playback equipment can produce slightly differing results the utmost care was taken in ensuring the playback was at the correct speed.

The comparison was made to try and discover why the overall timings printed on the first page of the score are so different from the actual recording. This difference was worrying as some parts of my analysis of Déserts are based on the Craft recording. If his interpretation was found to be significantly different to the composer's wishes it could invalidate some of my analysis, and thus further investigation was required.

Also, if there was any evidence that the passages of organised sound were not reproduced at the correct speed this would drastically effect the prepared scores with regards to duration and pitch.

It is known that Varèse approved of the Craft recording which includes the fourth versions of the sections of organised sound
finished in 1962. These are the interpolations that Varese considered as definitive (Oullette 191-192), and even taking into account the possible changes of duration brought about by this re-working, the recorded work is considerably longer than 23'28" shown on the score. Hence, the following comparison was made to examine these differences, and to see if they affected my reading of the overall form of the work.

At the start of the score the durations are marked, with the orchestral passages being 13'20" long and the three passages of organised sound being 10'08" long. As the re-worked passages of organised sound are shorter (only 8'54") the overall length of the work, on this basis, should be even shorter (22'16"). The Craft recording is well in excess of 25' long, and thus the reason for the apparent discrepancy of approximately 3' required investigation. After painstaking and meticulous calculation the comparison reached two main conclusions.

1. The durations printed on the score are false.
2. It is remarkable how closely Craft adheres to Varese's metronome markings, as his interpretation never varies by more than a few seconds throughout the recording.

The are two main reasons for the inaccuracies in the timings. Firstly, the duration given for the passages of organised sound are too long. (It is probable that the 10'08" results from the
first interpolation and not the fourth used here.) Secondly, the timings for the instrumental passages seem too short and bear no resemblance to the actual timings represented by the metronome markings on the score. Whilst recognising that it is almost impossible to have an accurate interpretation of a score with respects to its tempi the fact that Varese spoke so strongly about the "clouding" effect of interpretation, and that he took so much trouble in indicating tempo changes on the score, makes the difference all the more surprising. The timings for the orchestral passages written on the score and those of the Craft recording vary by more than 3 minutes. (Almost a 25% increase.) Hence the need for the following investigation.

The following tables have proved useful in indicating some of the durations of the sound masses, and the movement of the various sections. They helped inform the discussion on the macro-rhythm of the work but it should be remembered that the divisions simply represent changes of tempo or points which were easily distinguishable on the recording, and not sound masses or sound areas.

(See Overleaf)
<table>
<thead>
<tr>
<th>Location.</th>
<th>Craft. CBS.</th>
<th>Score.</th>
<th>Difference.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Individual.Total.</td>
<td>Individual.Total.</td>
<td>(Craft over the score) (Sec) (Tot)</td>
</tr>
<tr>
<td><strong>Introduction.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1 - 29.4</td>
<td>1'08&quot; 1'08</td>
<td>1'16&quot; 1'16&quot;</td>
<td>(-8&quot;) -8&quot;</td>
</tr>
<tr>
<td><strong>Section 1.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30.1 - 40.5</td>
<td>0'22&quot; 1'30</td>
<td>0'28&quot; 1'44&quot;</td>
<td>(-6&quot;) -14&quot;</td>
</tr>
<tr>
<td>41.1 - 53.5</td>
<td>0'46&quot; 2'16&quot;</td>
<td>0'33&quot; 2'17&quot;</td>
<td>(+7&quot;) -1&quot;</td>
</tr>
<tr>
<td>54.1 - 82.4</td>
<td>1'19&quot; 3'35&quot;</td>
<td>1'11&quot; 3'28&quot;</td>
<td>(+15&quot;) +7&quot;</td>
</tr>
<tr>
<td><strong>Organised Sound.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>83.1 - 93.3</td>
<td>0'29&quot; 6'32&quot;</td>
<td>0'25&quot; 6'21&quot;</td>
<td>(+19&quot;) +11&quot;</td>
</tr>
<tr>
<td>93.4 - 117.5</td>
<td>0'45&quot; 7'17&quot;</td>
<td>0'49&quot; 7'10&quot;</td>
<td>(+15&quot;) +7&quot;</td>
</tr>
<tr>
<td><em><em>Section 2. (&quot;</em> 2&quot; added for pause)</em>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>118.1 - 132.7</td>
<td>0'44&quot; 8'01&quot;</td>
<td>0'51&quot; 8'01&quot;</td>
<td>(-7&quot;) Same</td>
</tr>
<tr>
<td>133.1 - 145.7</td>
<td>0'54&quot; 8'55&quot;</td>
<td>0'57&quot;* 8'58&quot;</td>
<td>(-10&quot;) -4&quot;</td>
</tr>
<tr>
<td>146.1 - 153.1</td>
<td>0'23&quot; 9'18&quot;</td>
<td>0'19&quot; 9'17&quot;</td>
<td>(-6&quot;) +1&quot;</td>
</tr>
<tr>
<td>154.1 - 164.5</td>
<td>0'57&quot; 10'15&quot;</td>
<td>1'07&quot; 10'24&quot;</td>
<td>(-16&quot;) -9&quot;</td>
</tr>
<tr>
<td>165.1 - 174.7</td>
<td>0'44&quot; 10'59&quot;</td>
<td>0'42&quot; 11'06&quot;</td>
<td>(-14&quot;) -7&quot;</td>
</tr>
<tr>
<td>175.1 - 193.7</td>
<td>0'59&quot; 11'58&quot;</td>
<td>0'54&quot;* 12'00&quot;</td>
<td>(-9&quot;) -2&quot;</td>
</tr>
<tr>
<td>194.1 - 198.5</td>
<td>0'28&quot; 12'26&quot;</td>
<td>0'23&quot; 12'23&quot;</td>
<td>(-4&quot;) +3&quot;</td>
</tr>
<tr>
<td>199.1 - 203.7</td>
<td>0'24&quot; 12'50&quot;</td>
<td>0'26&quot; 12'49&quot;</td>
<td>(-6&quot;) +1&quot;</td>
</tr>
<tr>
<td>204.1 - 215.5</td>
<td>0'47&quot; 13'37&quot;</td>
<td>0'39&quot; 13'28&quot;</td>
<td>(+2&quot;) +9&quot;</td>
</tr>
<tr>
<td>216.1 - 224.2</td>
<td>0'14&quot; 13'51&quot;</td>
<td>0'12&quot; 13'40&quot;</td>
<td>(+6&quot;) +11&quot;</td>
</tr>
</tbody>
</table>
Location. | Craft. CBS. | Score. | Difference.  
|-----------|------------|--------|------------------------
|           | Individual. Total. | Individual. Total. | (Craft over the score) (Sec) (Tot) |
| Organised Sound. | 3'17" 17'08" | 3'17" 16'57" | (+4") +11" |
| 225.1 - 237.3 | 0'29" 17'37" | 0'25" 17'22" | (+8") +15" |
| 238.1 - 241.4 | 0'16" 17'53" | 0'13" 17'35" | (+11") +18" |
| 242.1 - 244.2 | 0'07" 18'00" | 0'07" 17'42" | (+11") +18" |

Section 3. (* 2" for the pauses. ** Includes the beaten silence)

| | | | |
| 244.3 - 263.4 | 0'49" 18'49" | 0'51" 18'33" | (-2") +16" |
| Organised Sound. | 3'09" 21'58" | 3'09" 21'42" | (-2") +16" |
| 264.1 - 269.4 | 0'19" 22'17" | 0'19" 22'01" | (-2") +16" |
| 270.1 - 275.7 | 0'17" 22'34" | 0'16"* 22'17" | (-1") +17" |
| 276.1 - 278.7 | 0'12" 22'46" | 0'11" 22'28" | (00") +18" |
| 279.1 - 295.4 | 1'07" 23'53" | 1'02"* 23'30" | (+5") +23" |
| 296.1 - 303.4 | 0'24" 24'17" | 0'22" 23'52" | (+7") +25" |
| 304.1 - 309.4 | 0'11" 24'28" | 0'11"* 24'03" | (+7") +25" |
| Conclusion. | | | |
| 310.1 - 325.7 | 0'48" 25'16"** | 0'47" 24'50" | (+1") +26" |
Overview of Sections.

<table>
<thead>
<tr>
<th>Location</th>
<th>Craft. CBS.</th>
<th>Score.</th>
<th>Difference.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Individual.</td>
<td>Individual.</td>
<td>(Craft over</td>
</tr>
<tr>
<td></td>
<td>Total.</td>
<td>Total.</td>
<td>the score)</td>
</tr>
<tr>
<td>Introduction.</td>
<td>1'08&quot;</td>
<td>1'08&quot;</td>
<td>(-8&quot;)</td>
</tr>
<tr>
<td>Section One.</td>
<td>6'09&quot;</td>
<td>7'17&quot;</td>
<td>(+15&quot;)</td>
</tr>
<tr>
<td>Section Two.</td>
<td>10'43&quot;</td>
<td>18'00&quot;</td>
<td>(+11&quot;)</td>
</tr>
<tr>
<td>Section Three.</td>
<td>6'28&quot;</td>
<td>24'28&quot;</td>
<td>(+7&quot;)</td>
</tr>
<tr>
<td>Conclusion.</td>
<td>0'48&quot;</td>
<td>25'16&quot;</td>
<td>(+1&quot;)</td>
</tr>
</tbody>
</table>

The obvious discrepancies between the overall timings can be seen from the following diagram.

<table>
<thead>
<tr>
<th>DÉSERTS.</th>
<th>Timings written at start of score.</th>
<th>Timings of score. (metronome)</th>
<th>Timings of recording. (Craft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrumental Passages.</td>
<td>13'20&quot;</td>
<td>15'56&quot; (20%)</td>
<td>16'24&quot; (23%)</td>
</tr>
<tr>
<td>Organised Sound.</td>
<td>10'08&quot;</td>
<td>8'54&quot; (-12%)</td>
<td>8'54&quot; (-12%)</td>
</tr>
<tr>
<td>Total Duration.</td>
<td>23'28&quot;</td>
<td>24'50&quot; (6%)</td>
<td>25'16&quot; (8%)</td>
</tr>
</tbody>
</table>
Appendix 9.

DÉSERTS.

ANALYSIS OF RHYTHMIC MOTIVES.

(Bars 251 - 325)

Symbols used on the graphs.

- HD - Rhythmic Motive D.(Short/Long)
- - ME - Rhythmic Motive E.(Quintuple figure)
+ Augmentation.
- Diminution.
R Retrograde statement of motive.
* Adapted/Developed statement of motive.
Motivic Progression. Motive D (Augmented)
Motivic Progression. (Various)

Motive D 

SOUND MASS 18
Motivic Progression. (Augmented)

SOUND MASS 18
Motivic Progression. Motive Dansticned)

SOUND MASS 24
Motivic Progression. (Augmented)

SOUND MASS 24
Motivic Progression. (Various)

SOUND MASS 24
Motivic Progression. Motives D and E (Various)

SOUND MASS 24

- 708 -
Motivic Progression. Motives D and E ..............................

(Various)

SOUND MASS 24
Motivic Progression.

Motives E ......... Motive D  Motive E ...

SOUND MASS 24  SOUND MASS 25
Motivic Motives D
Progression. (Various)

SOUND MASS 25
Motivic Motives D and E ...............................
(Various)

SOUND MASS 25
Motivic Progression. (Various)

SOUND MASS 25
Motivic Motives D and E ……………………………

(Original)

SOUND MASS 25
Motivic Motives D and E (Augmented)

SOUND MASS 25
Motivic Progression.

Motive D .............
(Augmented)

SOUND MASS 25

SOUND MASS 26
Motivic Progression. (Augmented/Retrograde)
Motivic Progression.
Motive D (Augmented)

SOUND MASS 26
Appendix 10.

The Use of Pitched Motives in the Music of Varese.
Appendix 10A. Motives That Return Towards The Close.

Ameriques.

Hyperprism.

Integrales.

Density 21.5

Ionisation.
Appendix 10B. Motive Constructed From Semitone Cells.

Amériques.

Offrandes.

Octandre.

Hyperprism.
Intégrales.

Density 21.5

Ecuatorial.

Déserts.

Nocturnal.
Appendix 11.

DÉSERTS.

Misprints in the Score.
APPENDIX ELEVEN.

DESERTS: Misprints in the Ricordi/Colfranc Score.

To prove or disprove conclusively whether or not the score contains misprints would require access to the original score, and unfortunately this has not been possible to achieve. The first table (below) contains misprints which I consider to be obvious, and the corrected versions of these bars have been incorporated into the previous analyses. The second table lists a number of places where I consider there is the possibility that a misprint has occurred. These have not been included within the previous analyses as I consider there is not sufficient proof to support the alternate reading suggested.

See Overleaf....
### TABLE 1. **DÉSERTS:** Misprints in the Ricordi/Colfranc Score.

<p>| | | |</p>
<table>
<thead>
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<tbody>
<tr>
<td>1. Piano. Bars 38 - 39</td>
<td>The marking over the right hand should be 15va, not 8va, to double the flute and piccolo.</td>
<td></td>
</tr>
<tr>
<td>2. Trumpet 3. Bar 70.4</td>
<td>Tied note should be a crotchet. At present it is not clear what it is meant to be.</td>
<td></td>
</tr>
<tr>
<td>3. Trombones. Bar 77.1</td>
<td>The triplet bracket does not include all of the first beat.</td>
<td></td>
</tr>
<tr>
<td>4. Piano. Bars 110-114</td>
<td>The 8va should read 15va to double the flute and piccolo.</td>
<td></td>
</tr>
<tr>
<td>5. Piano. Bar 204.3</td>
<td>Left hand should read F3 not G3, duplicating the trombones.</td>
<td></td>
</tr>
<tr>
<td>6. Flute 1. Bar 215.2</td>
<td>Should be minim within the triplet brackets not a crotchet.</td>
<td></td>
</tr>
<tr>
<td>7. Piano. Bar 270.3</td>
<td>8va sign missing from right hand.</td>
<td></td>
</tr>
</tbody>
</table>

The majority of possible misprints seem to stem from the piano part. Throughout **Déserts** the role of the piano is essentially to emphasise material presented by the brass and woodwind. Thus, it normally doubles the notes exactly. When differences of octave or rhythm appear it seems possible that misprints have occurred but cannot be proved conclusively.
TABLE 2. **Déserts**: Possible Misprints.

<p>| | | |</p>
<table>
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</thead>
<tbody>
<tr>
<td>8. Piano.</td>
<td>Bar 149.</td>
<td>Possible confusion over octaves in the right hand. Some of it copies the woodwind, others double at the octave.</td>
</tr>
<tr>
<td>9. Piano.</td>
<td>Bar 193.</td>
<td>Should the rhythm be the same as the piccolos?</td>
</tr>
<tr>
<td>10. Piccolo 2.</td>
<td>Bar 125.</td>
<td>E7 or G7?</td>
</tr>
<tr>
<td>11. Piccolo 1.</td>
<td>Bar 243.</td>
<td>8va? To double piano. Possible omission due to placement of tempo indication. NB. On the Craft recording the Piccolo moves to upper C at this point.</td>
</tr>
</tbody>
</table>

Note. Although the score of *Déserts* is generally clear in its musical content there are a few points (not necessarily specific to this score) which can cause confusion. Most of these are common to all twentieth century musical scores. Through my experience as a performer these points have given rise to considerable confusion, and have wasted many hours of valuable rehearsal time.

1. The majority of these arise within the notation for percussion. The main area where confusion can arise is in the writing of rolls. These are notated throughout the score as \( \text{\textbullet} \) and yet are often included within the same bars, or adjacent to, hemi-demi-semiquaver activity. Thus, this
abbreviation will often sound like a roll but it depends on the tempo of the particular passage. (See Bars 152-154, 191, 197, 202-203, 264, 266, 267.) To further confuse the issue the trill sign has been used on some rolls (normally of extended duration) but not others.

2. The piano rhythm at 277 is confusing. The reason for writing it this way seems to be that Varese wants the two harmonies to overlap. As there is no pedal marked, the notes have to be written as minims if this effect is to be achieved. But how does one play it?

3. In the music of Varese percussion parts are often extremely rhythmically complex. Thus, it seems unwise to combine triplet quavers and triplet semi-quavers within the same bar, it can lead to confusion, especially when sight reading. (As a percussionist I can vouch for this.) Yet it often occurs in the way Varese's scores are notated. For example, see Déserts 294 and 134, or Ionisation 7.3, 7.4, 11.2, etc.)

4. My final "hobby horse" as a performer is in the notation of pauses. In bar 288 the pause obviously occurs on the first beat of the bar. Why are only the trumpets, trombones, and tubas written correctly? It is clear to the conductor where the pause should occur but for the rest of the performer the score is usually the source of their written parts, and no indication is given to them as to the location of this pause. Ironically in bar 193, another bar of 7/4 the placement of the pause is marked clearly throughout the ensemble.
Appendix 12.

Previous Analyses of DÉSERTS.
APPENDIX TWELVE. PREVIOUS ANALYSES OF DÉSERTS.

Previous analyses of Déserts are limited but nevertheless can still be seen to fall into the same three categories identified in Appendix 3. Firstly there are analytical comments contained within more general works on Varèse. For example,

"Déserts, for a group of wind and percussion instruments alternating with organised sound material on tape, in a big A B A C A B A form. "A" standing for the sections played by the instruments, "B" for tape music based raw sounds collected by Varèse in a foundary, a sawmill and several factories, and "C" for tape music based on percussion sounds. The work seems wholly integrated; the electronic interpolations simply broaden the range of Varese's "sound mass" techniques of the 1920's, and the music has a power of almost terrifying dimension." H.Wiley Hitchcock. Music in the United States p.239.

Whilst this provides a background to the passages of organised sound it is a somewhat simplistic view that could cause confusion. Surely there is a significant a difference between some of the instrumental passages within this seven section form yet all are marked "A". Also, I would argue that the differences between the first and third passages of organised sound are as marked as between the second and third or first and second. I agree with the B,C,B structure but only if the criteria for identification is the timbre of the sound, yet sound masses and sections have been shown to be separated by changes in all of the elements. (See also Freedom, Form and Process in the Music of Varèse by A.F.Parks which outlines a similar structure.)
Secondly there are analytical articles that focus on **Déserts** which, by their nature, cannot provide a detailed analysis but can outline important principles and ideas. The most influential article in terms of this thesis has been A. Whittall's article *Varèse and Organic A thematicism*. Whittall examines the klangfarbenmelodie treatment of the "pedals", or established notes, within the orchestral sections of **Déserts**. It is interesting that although I disagree with the basic structure he outlines (seven section form which ignores the passages of organised sound altogether), the concepts of timbre being a crucial means of development and the notion of structural movement between established notes are both fully supported by my analyses even though the means by which these conclusions have been reached may differ.

Thirdly, there are the detailed and dedicated analyses of **Déserts**. Whilst precise information regarding works on Varese is difficult to obtain (especially regarding recent theses and publications) I have not become aware of any analysis that attempts to fully examine the whole of **Déserts**. J.W. Bernhard has examined **Déserts** extensively both in his doctoral thesis and his recent book on the music of Varèse. Bernhard obviously has a detailed insight and knowledge of the music of Varèse and has developed an analytical technique around these perceptions. Whilst I find much of his analysis revealing, particularly regarding symmetrical structuring and the relationship between
the various notes, I am not convinced that it is a comprehensive technique, particularly as it is essentially arhythmic.

D.H.Cox's doctoral thesis *The Music of Edgard Varèse* contains a comprehensive analysis of *Deserts* within a broader framework which examines all of his music. Whilst this analysis only purports to cover the orchestral sections in any detail, the technique appears to be flexible and encompasses all of the elements I see as crucial to the structure. Thus, it is hardly surprising that so many of the internal sound areas and sound masses coincide with my findings. Cox also identifies pitched and rhythmic motives, and whilst these do not concur exactly with the structures I have outlined there are a considerable number of similarities.

REFERENCES AND NOTES.

Preface.


Chapter One. Introduction.


6. L. Varese, *Varèse. A Looking Glass Diary.* (Eulenberg Books, London, 1975), p. 235. "As things turned out, he did not return to Berlin until 1922 when he learned that during the Spartacist revolution the storage house had been destroyed by fire. He had kept out two score and a part of the last act of *Oedipus*, which he was revising. A day or two before war was declared he sent one of the scores - I think Varese said it was *Les Cycles du Nord* - to Bela Bartok, who never received it, and before leaving for America he sent the fragment of *Oedipus* to a Berlin friend, Dr Merton, then in Switzerland. As for *Bourgogne*, Varese brought it with him to New York and later himself destroyed it." See also note 7 in Chapter Two.


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Chapter Two. Edgard Varèse: The Man.


3. Ibid.


5. Ibid., p. 23. (Quoting Edgard Varese)

6. Ibid., p. 6.

7. *Un grand sommeil noir* is an early work of Varese's which only came to light a number of years after his death. L. Stempel used the work as a basis for his PhD dissertation in 1974, but one should be wary of drawing too many conclusions from this work with regards to
the development of Varèse's overall musical language. We have no knowledge of how representative this piece may be of his work at the time. It was written during his time at the Conservatoire in Paris, was it a student exercise? Thus, although the work is seen by many as highly influential I believe one should be extremely careful about drawing any significant conclusions from it.


11. Ibid., p. 217. (Quoting Edgard Varèse)

12. Ibid., p. 219.

13. Ibid., p. 35.


17. Ibid., p. 264. (Quoting Edgard Varèse)

18. Ibid., p. 238. (Quoting Edgard Varèse)

19. Ibid., p. 238. (Quoting Edgard Varèse)

20. Ibid., p. 239.


22. Ibid., p. 130.


24. Ibid., p. 249.

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References and Notes. Chapter Two. (continued)

25. Ibid., p. 249.
29. Ibid., p. 22. (Quoting Edgard Varèse)
30. Ibid., p. 22.
33. Ibid., p. 32. (Quoting Edgard Varèse)
34. Ibid., p. 33/34
35. Ibid., p. 45. (Quoting Edgard Varèse)
36. Ibid., p. 45. (Quoting Claude Debussy)
37. Ibid., p. 77.
40. Ibid., p. 271/272.
42. L. Varèse, Op. cit., p. 188. (Quoting Mrs Reis)
43. Ibid., p. 188.
44. Ibid., p. 152. (Quoting Edgard Varèse)
References and Notes. Chapter Two. (continued)

Note. These comments were taken from a lecture given at Princeton in 1962.
56. Ibid., p. 69.
59. Ibid., p. 31.
60. Ibid., p. 47.
62. Ibid., p. 125. (Quoting Edgard Varèse)
63. Ibid., p. 49.
64. Ibid., p. 160. (Quoting Edgard Varèse)
66. Ibid., p. 261. (Quoting Leopold Stokowski)
References and Notes. Chapter Two. (continued)

67. F. Oullette, Ibid., p. 45. (Quoting Claude Debussy)
69. Ibid.,
70. Ibid., p. 26.
73. Ibid., p. 9.
75. Ibid., p. 47.
78. Ibid., p. 86.
79. Ibid., p. 240. (Quoting Edgard Varèse)
80. Ibid. (Quoting Edgard Varèse)
82. Ibid., p. 125. (Quoting Edgard Varèse)

Note. The concept of "klangfarbenmelodie" was first outlined by Schoenberg in this book.


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References and Notes. Chapter Two. (continued)

90. Ibid., p. 81.
91. Ibid., p. 89.
96. F. Oudlette, Op.cit., p. 70
97. Ibid., p. 71. "This is why when Aragon (a critic) writes that Varèse was the only musician of the dada period, he seems to be restricting the scope of Varèse's esthetics very considerably."
99. Ibid., p. 132.


2. F. Oudlette, Op.cit., p. 84. (Quoting Edgard Varese)
References and Notes. Chapter Three. (continued)


10. Ibid., p. 139. (Quoting Edgard Varèse)


13. Ibid., p. 83. (Quoting Edgard Varèse)


16. Ibid., p. 60. (Quoting Gilles Tremblay)

17. There seem to be a number of analytical works which try to reduce the complexity of Varèse's musical language to mathematical formulas and principles. Although I have also tried to find "formulas" that can be applied to his music, particularly in relation to the ordering of notes, there are no easy answers. Thus, I consider work such as that contained within Yannay Yehuda's thesis dealing with attack tables, etc., should be treated with an air of scepticism. (Perhaps all analysis should be treated this way.) Formulas can be useful whilst they inform the overall analysis but when someone announces "this is the key!" that is when I start to become sceptical.


21. My initial experience of the problems of a new analytical language was as a student when tackling Nattiez's analysis of *Density 21.5*. I become hopelessly confused by the terminology, all of which was alien to me, and thus had to constantly refer backwards and forwards to try and make the analysis even partially intelligible to me. I realise this problem was compounded at the time by my poor French but nevertheless it proved a salutary example. Thankfully, practically all these problems have dissolved since its recent translation and revision into English. But, Oh how I wish it had been available in that form whilst I was an undergraduate.


27. *Ibid.* (Quoting Jolivet)


31. Both A. Whittal in his paper *Varèse and Organic Athematicism* and P. Boulez make the same observation. Pierre Boulez is quoted by Ouellette as saying, (p. 76) "Hyperprism appears, with its refusal of all thematism and the plastique of its fluctuating tempi, as the most imperious of projections."
References and Notes. Chapter Three. (continued)

33. 
35. Ibid., p. 140. (Quoting Edgard Varèse)
36. Ibid., p. 140. (Quoting Edgard Varèse)
37. Ibid., p. 82. (Quoting Marc Wilkinson)
38. Ibid., p. 77. (Quoting Pierre Boulez)
39. W.P.Tryon, "New Instruments in the Orchestra are needed, says Mr Varèse", (Christian Science Monitor, July 5 1922), p. 18. (Quoting Edgard Varèse)

There seems to be some confusion over which instrument was actually specified for the use in Ecua torial. Varèse entered into lengthy correspondence with Professor Theremine regarding the development of new instruments and the Ondes Theremine were the instruments used at the first performance. The instruments were rather primitive and when the second performance took place some twenty five years later they were replaced by Ondes Martenots. This explains the inaccuracy of the scoring as listed by F. Ouëlette. (Pg 122)

Chapter Four. Analytical Methodology: An Over-view.

3. Although the initial applications of pitch class set analysis were somewhat restricted the recent years have seen an rapid development in the technique encompassing a wide range of styles and an ever expanding chronological period.

Chapter Five. Analysis of Sound Masses and Sound Areas.

2. Ibid.
3. Ibid., p. 184. (Quoting P. Boulez)
4. Ibid., p. 84. (Quoting E. Varèse)
5. Ibid., p. 184. (Quoting P. Boulez)
6. Ibid., p. 60. (Quoting E. Varèse)
7. Ibid.
Chapter Six. Pitch Class Set Analysis.


3. Ibid., p. 152.


6. For example, see George Perle's analysis of Schoenberg's Opus 11 No 1. contained in Serial Composition and Atonality. (UC Press, Berkeley, 1977.)


8. Ibid., p. 55.


Chapter Seven. Motivic Analysis.

1. I employ the term "variations" with certain reservations. I do not mean to allude to any classical connotations but use the term to mean various restatements of the original motive.

2. Nocturnal was performed in April of 1961 although precise records as to how "complete" this version was are not available. However it is certain that Varese was not satisfied with the work in this state and spent the remainder of his life revising the work amongst other projects.
Chapter Eight. Note Ordering Analysis.

3. Although the term "atonal" is commonly applied to music in which the relationships between the various notes do not fulfill traditional harmonic expectations the term does appear to be negative and suggests that "tonality" cannot exist within atonal music. I would refute this with regards to Varèse's music as large parts of the music seem to develop around established pitch levels, and the relationship between the various notes is normally meticulously planned. For a more detailed exposition of this argument refer to J. Dunsby and A. Whittall, Op. cit., Chapter 9.

Chapter Nine. Rhythmic Analysis.

2. Ibid. p. 15
3. A brief analysis by N. Slonimsky is printed within the cover of the Colfranc edition of the score of Ionisation.
5. Ibid.
Chapter Twelve. Deserts: Background.

2. Ibid.
5. R.P. Morgan, Appendix to the Open University Unit Ives and Varèse, p.104.
7. Ibid. p.182.
9. Ibid.
12. Dynamics and articulation are almost impossible to accurately analyse as they depend upon the player's ability and interpretation of the music. Also the various instruments have different acoustical characteristics, for example, a xylophone will normally have a sharp attack regardless of register whereas staccattimoso in the low register of the flute is extremely difficult to achieve, although perfectly feasible in a higher register.
13. It should not be forgotten that the identification of sound areas and sound masses within the passages of organised sound is greatly helped by the distinction made between material that occurs on the left and right channels of the mix.
Chapter Thirteen. Déserts: Contextualisation.

2. Ibid. p. 132.
10. Ibid. p. 133.
15. Ibid., p. 137/138.
16. Ibid., p. 151.
17. Ibid., p. 181.
18. Ibid., p. 185/186.
22. There appears to be some disagreement between various authors regarding the number of reworkings of the passages of organised sound. However, Ouellette is quite clear that there were four versions of the tapes prepared. The first was used at the first and early performances of the work, the second in a performance given in August 1960 (p.208), the third in a performance in April 1961 (p.209) and the fourth was completed in August 1961.(p.211)


25. Ibid. p.xix.

26. Ibid. p.xxii.


29. Trinium is also an important work with regards to ther development of Déserts. At the beginning of 1954 A.Skulsky reported that work on Trinium, a work in three sections to be played without a break, was well advanced. The work was commissioned by the Louisville Symphony Orchestra but never materialised. Although Ouellette considers Trinium became the electronic passages in Déserts, there is a considerable body of opinion supporting the notion that Trinium did in fact become the orchestral parts of Déserts. Whatever the case, Déserts appeared in 1954 and Trinium is not mentioned again. Documentation is extremely scant, and thus it is difficult to substantiate either of the views expressed above. Nevertheless it seems highly probable that Trinium, either in part or in total, developed into Déserts.

Chapter Fourteen. Déserts: Structure and Form.


2. Ibid., p. 192.

3. Ibid., p. 184.


6. Hyperprism, Octandre, Integrales, etc. are all structured in this manner.

References and Notes. Chapter Fourteen. (continued)

8. Ibid.
9. Ibid.
10. Ibid., p. 183.
12. Ibid., p. 183.

Chapter Fifteen. Déserts: Pitch Class Set Analysis.


Chapter Sixteen. The Motivic Structure of Déserts.

3. I am not convinced that the type of labels employed by P. Ramsier in his Motivic Analyses of Octandre and Intégrales would actually be of any particular use in Déserts and thus I have chosen to simply number the "variations".

Chapter Eighteen. The Rhythmic Structure of Déserts.

1. This concept has been outlined in Chapter 16. It is interesting to note that P.Ramsier considers motivic development to account for practically all of the development within Octandre and Intégrales, and it appears that the same holds true for Déserts.
3. Ibid. p. 59.
Chapter Nineteen. Supplementary Analyses.

1. The importance of pitch and register and timbre within the percussion section is perhaps best illustrated through Chou Wen Chung's *Ionisation: The Function of Timbre in its Formal and Temporal Organisation*.

2. To try and ensure a greater degree of accuracy the passages were transferred onto a reel to reel tape and slowed down to half speed. Whilst lowering the pitch it also allowed the many previously unclear changes and attacks to be identified. Thus, the final results were achieved by combining full speed and half speed density figures to achieve an overall picture. Nevertheless, much of the analysis remains totally subjective as the timbre, register, dynamics and context all had to be considered when choosing or rejecting a particular change in the analysis.


4. Ibid., p. 139.


A. Whittall,

Chapter Twenty One. Déserts: Conclusions.


Chapter Twenty Two. The Musical Language of Edgard Varèse.


2. Ibid.


5. Ibid., p. 55.

6. Ibid., p. 192.

7. See Preface.


9. Ibid., p. 76.


GLOSSARY.

Architectonic. Term deriving from Varèse's constructional analogies to refer to music created from the combination of blocks of sound.

Background. The hierarchical level at which large scale and established structures can be perceived in relation to the whole work. In the work of Schenker the term implies the level at which form is revealed. In Varèse we know the form evolves from developments in the foreground, and thus although the background structures are significant they should not be expected to conform to traditional structures.

Cadence. A large vertical pitch pattern that occurs at the end of a composition or section and conveys the impression of a momentary or permanent conclusion. (Harvard Dictionary of Music.)

Cell. The smallest discernable building block in the music. A simple device from which more complex sounds are developed. (eg.an interval of a semitone or a triple rhythmic attack.)

Crystal. Variation on the term cell. (see above) Varèse used a crystalline analogy when discussing his attitude towards form in his music. The terminology has consequently been used by a number of authors as a concise way in which to describe the amazing variety of sounds created from a few simple ideas.

"Conceiving musical form as a resultant, the result of a process, I saw a close analogy in the phenomenon of crystallisation...There is an idea, the basis of an internal structure, expanded or split into different shapes or groups of sound, constantly changing in shape, direction, and speed, attracted and repulsed by various forces. The form of the work is the consequence of this interaction. Possible musical forms are as limitless as the exterior forms of crystals..... Form and content are one." (Lecture to Princetown University. 1959. F.Oublette. Page 60)
Glossary. continued...

Foreground. The immediate level of a composition in which all notated phenomena are considered regardless of their structural significance.

Harmony. The movement of sequences of vertical pitch patterns that occur within, and between sound masses.

Hierarchical. A structure incorporating a number of inter-related layers. Thus hierarchical form moves from the foreground, through the middleground and into the background.

Motive. A short figure of characteristic design that recurs throughout a composition or a section as a unifying element. (Harvard Dictionary of Music. Page 545)

Melody. The horizontal element of musical texture. Musical sound has two fundamental qualities, pitch and duration, and both of these enter into the successions of pitch-plus-duration values known as melodies. (Harvard Dictionary of Music. Page 517)

Middleground. The intermediate hierarchical level of a composition. Usually constructed from the interaction between sound masses, or passages, in which structures are outlined that are more established and of greater duration than in the foreground.

Music. The corporealisation of the intelligence that is in sounds. (F. Ouellette. Pg 17)

Organised Sound. The use of this term has changed. Within this thesis it is used to refer to the sections of "electronic" music that occur between the orchestral passages in Déserts. However, to Varèse this term was equally applicable to all of his music. "As far back as the twenties I decided to call my music organised sound and myself not a musician, but a worker in rhythms, frequencies and intensities." Lecture to Yale University. 1961. Quoted by A. F. Parks. Freedom, Form and Process in Varèse. Page 206.
Glossary. continued...

**Passage.** A collective term for one or more sound masses which are linked with regards to the overall structure.

**Penetration.** The overlapping and interaction between two sound masses or sound areas, usually resulting from instability. (Varèse's term.)

**Pitch area.** The linear development of a number of different pitches within a confined range. As most pitch areas usually contain more than just elements of pitch the term more commonly used in this thesis is sound area.

**Pitch level.** A single pitch, that is often subject to considerable rhythmic and textural development, but remains constant throughout the phrase or passage.

**Projection.** The aural sensation created by a sound mass, or by its individual planes when performed. "I think of musical space as open rather than bounded, which is why I speak of projection in the sense that I want simply to project a sound, a musical thought, and then let it take its own course." (E.Varèse quoted by J.Siddons. Melody in Density 21.5. Pg.315)

**Register.** Changes in the nature of the sound produced in different areas within the total range of an instrument.

**Repulsion.** When two stable or established sound masses or sound areas are adjacent to one another the aural effect is one of repulsion. (Varèse's term)

**Rhythm.** "Rhythm is the element in music that gives life to the work and holds it together. It is the element of stability, the generator of form. In my own works, for instance, rhythm derives from the simultaneous interplay of unrelated elements that intervene at calculated, but not regular time lapses." (Varèse. Lecture at Princeton University. 1959. Quoted by G.M.Roberts. Procedures for the Analysis of Sound Masses. Pg 202)
Glossary. continued....

Section. A large part of a composition, normally constructed from a number of sound masses, and clearly delineated within the overall form of a work.

Sound Area. A block of sound located within a sound mass. It is through the interaction of sound areas that the total aural effect of a sound mass is generated. Sound areas can occur simultaneously or concurrently. The content is normally established at the start and then evolves slowly or remains static. If any element varies too greatly it results in the destruction of the sound area and the creation of a new sound area.

Sound Idea. A small unit of sound, often occurring within the percussion section, and capable of temporal development within a sound area. The term is necessary to include smaller constructional elements that do not readily fall under the terms cell or motive.

Sound Mass. A block of sound of such complexity that its individual components are subordinate to its total aural effect. (G.M. Roberts. Procedures for the Analysis of Sound Masses. Pg 1)

Texture. The relationship between the lines of the music. Conventional definitions infer that texture is dependent on melody and harmony. (See Harvard Dictionary of Music). But as melody implies rhythm and harmony implies spacing and register it would be confusing to adopt this broader definition in an examination of the music of Varese.

Timbre. The characteristic quality of a sound, independent of pitch and dynamics, from which its source or manner of production can be inferred. Timbre depends on the relative strengths of the different frequencies produced by an instrument, or group of instruments, and these are determined by resonance. Adapted from Hamlyn Dictionary.
Glossary. continued...

Tone. The distance between two notes equivalent to two semitones. I am aware that in conventional usage the term has many musical meanings. By keeping to this definition alone it should avoid confusion. Thus, when referring to the nature of the sound produced by an instrument I refer to timbre, and have avoided the Americanism where tone is equivalent to note. However, the reader should be aware that the latter interpretation will naturally occur within a number of the quotations as so many of them originate from America.

For similar reasons I have avoided using the term overtone when discussing harmonics. Whilst recognising that both terms are in common usage to combine them within this work where the reader has to assimilate so many new terms could only lead to confusion.

Transmute. To change from one nature, substance, or form into another. Hamlyn Dictionary. Term commonly used by Varèse to describe the interaction between sound masses. In this dissertation it is often used to define sound areas.

Vertical Pitch Pattern. The pattern outlined by the coincidence of a number of pitches. The vertical aspect of the music.
Abbreviations.

Bar Numbers.
1. In works which contain rehearsal figures bar numbers have been referred to in relation to the previous figure. Thus, 3.4 means the fourth bar after figure 3 and so on. This applies to Amériques, Hyper prism, Octandre, Intégrales and Ionisation.

2. In works which contain only bar numbers more accurate locations are able to be identified. In this case the former number refers to the bar number and the latter to the beat within that bar. Thus, 265.4 means the fourth beat of bar 265, and so on. This applies to Density 21.5, Déserts and Nocturnal.

Time.
The common abbreviations for indicating time in minutes and seconds have been employed where ' indicates minutes and " indicates seconds. Thus, 13'20" stands for thirteen minutes twenty seconds, and so on.

Pitch.
The American system of pitch notation has been employed where A4 is equivalent to A 440hz. Octaves above and below this point are indicated by adding or subtracting numbers so that A220hz is A3, A 880hz is A5 and so on.

Sound Masses and Sound Areas.
SA Sound Area.
SM Sound Mass.

To refer to specific sound areas abbreviations have been used which combine numerical locations referred to on the Sound Area graphs in Chapter Fourteen. Thus, SM25:4 refers to sound area 4 in sound mass 25, and so on.
Symbols.

CI Intervallic cell of a perfect fifth.
CI' Inverted cell of a perfect fifth = perfect fourth.
C2 Intervallic cell of a semitone.
C2' Inverted cell of a semitone = major seventh.
MA Pitched Motive A, identified by the pitch classes 0,1,6 regardless of transposition or placement.
MA' Adaptation of Pitched Motive A, identified by the pitch classes 0,1,5 regardless of transposition or placement.
MB Pitched Motive B, identified by the pitch classes 0,1,2 regardless of transposition or placement.
MC Pitched Motive C, identified by the pitch classes 0,1,4 regardless of transposition or placement.
MD Rhythmic Motive D, identified by characteristic short and long intervals between the attacks.
ME Rhythmic Motive E, identified by characteristic quintuplet figure and consequent separate attack.
+ Augmentation of intervallic cells through octave transposition.
- Diminution of rhythmic motives.
R Retrograde statements of rhythmic motives.
* Adapted/developed statements of the rhythmic motive.
BIBLIOGRAPHY.

Music by Varèse.

Quotations have been taken from the following scores.


Recording of Déserts used for Analysis.

Articles, Dissertations and Books.


Boulez. P., Boulez on Music Today (Faber and Faber, London, 1971)


Chou Wen Chung, Open Rather Than Bounded from Perspectives of New Music, Volume 5:1, (London, 1966)


Bibliography. (continued)


Cowell.H., American Composers on American Music (Stanford University Press, New York, 1933)


Cox.D.H., Stylistic Evolution in the Music of Varèse First American Music Conference (Keele University, 1975)


Ewen.D., Varèse in American Composers Today (H.W.Wilson, New York, 1934)


Bibliography. (continued)

Griffiths.P., Art and Science in Varèse from First American Music Conference (Keele University, 1975)


Henderson.R., Varèse, in Musical Times (London, Dec 1965)


Mellers.W., Music in a New Found Land (Barrie and Rockliff, London, 1964)

Middleton.R., Ives and Varèse (Open University Press, Milton Keynes. 1979)


Bibliography. (continued)


Perle G., Serial Composition and Atonality (Faber and Faber, London, 1962)


Reti R., The Thematic Process in Music (Faber and Faber, London, 1961)

Reti R., Tonality - Atonality - Pantonality (Barrie and Rockliff, London, 1958)

Richter H., Dada (Thames and Hudson, London, 1965)

Riley C., The Realisation of Varèse's Conceptions (Thesis for B.Mus., Bristol University, 1979)


Sachs C., Rhythm and Tempo (W.W.Norton, New York, 1958)


Schoenberg A., Style and Idea (Faber and Faber, London, 1979)

Schuller G., Conversation with Edgard Varèse from Perspectives of New Music Vol 3:2 (London, 1965)


Slonimsky N., Ionisation. An Analysis in the front of the score. (Colfranc Music Publishers, New York, 1934)

Slonimsky N., Music Since 1900 (W.W.Norton, New York, 1938)

Stempel L., Not Even Varèse Can be an Orphan (PhD. diss., New York University, 1974)

Stravinsky I., Poetics of Music (Harvard University Press, London, 1942)
Bibliography. (continued)

Tremblay G., Visage d'Edgard Varèse edited F. Ouellette, (Editions de l'Hexagone, Montreal, 1959)


