

writers of Concrete Poetry such as Augusto and Haroldo de Campos, or Max Bense in Germany have been producing. This restructuring of semantic meaning on the space of the page or in the time of the musical piece is only one manifestation of the enormous twentieth-century structuralist movement which seeks to get behind the conventional one-way progressions to symmetrical closed systems of structure, and perhaps 'to the structure of the mind itself'. The movement is as old as the century: Mallarmé (*un coup de dés*, 1897) '*Subdivisions Prismaïque de L'idée*', Pound (*The Cantos*), Joyce, Cummings, Apollinaire, Beckett (Ping etc.), Mondrian (Boogie Woogie series), Max Bill, Albers, Webern's Sator Arepo square, and its application in his music, Boulez's transformations of Mallarmé, and so on.

## Piano Piece XI

The overall structure of *Gesang der Junglinge* is remarkably like that of *Electronic Study 2*; both final sections combine and develop the ideas stated in the preceding sections. Although the violent contrasts are neatly absorbed into this higher form, it is above all they that give the work its alertness, its youthful, early-morning-visionary quality – a sort of Wordsworthian freshness: '... when meadow, grove, and stream, / The earth, and every common sight, / To me did seem / Apparell'd in celestial light ...'

This work ends what seems to me Stockhausen's richest creative period and one of the most artistic and influential groups of musical works of its time.

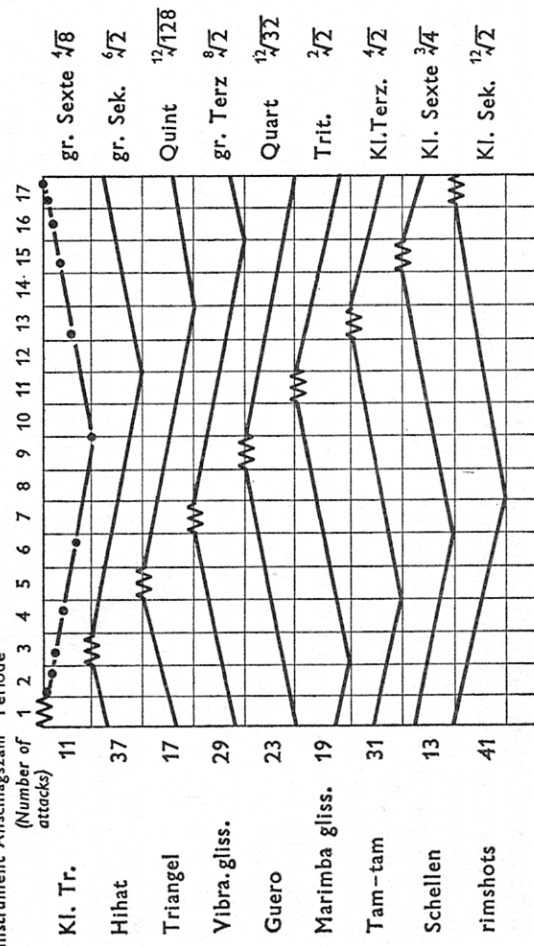
## The Early 'Moment Form' Works

There now occurs a short gap in the flow of compositions, and a corresponding change of direction. The personality changes in some in-  
 explicable way, and the musical thought changes with it. Works become longer, slower, more interested in colour experimentation, 'beauty' for its own sake; less formalistic, less rational. There are no more theoretical, scientific articles in *Die Reihe*; Stockhausen's utterances become increasingly 'artistic' in tone. In short, 'Moment Form' has arrived.

*Kontakte* was begun, but interrupted by a work not yet conceived in the new ethos, though it does not belong with the 1954-7 group either; if anything, it has closest affinities with the 1951 works for reasons that will become apparent shortly.

Nr. 9 *Zyklus* (1959) or 'Cycle' for a percussionist was written as a set piece for the Kranichstein competition for percussionists. A sequence of sixteen pages is set up in a circle

Ex. 39 Instrument Anschlagzahl (Number of attacks) Periode Progression



surrounding the player, and he is instructed to pick any starting point and play either way round the complete circle. Thus, it is a sort of open form like *Piano Piece XI*, at least there is no composed beginning and end, but it differs as a circle differs from dots on a page. Even after many hearings one cannot help feeling that it is a simple piece; obviously dimensions are severely limited in a medium of this sort, and the periodic glissandi on the vibraphone and marimba are the crude intrusions of a too-simple tonal world. However, study shows that, typically, it is extremely carefully thought out, and the systematic complexity is considerable.

For an insight into Stockhausen's mind I will try to give some indication of how it was written, using his diagrams.

Stockhausen provided a chart (Ex. 39) to show how nine instruments (left column) play a certain number of attacks (a prime number sequence, next column) over the seventeen periods (one on each of the sixteen pages, except for one page which contains both period 17 and period 1) in a linear ritardando (falling line) or accelerando (rising line) with a certain quasi-intervallic progression (right-hand columns). It can be clearly seen that they reach their climaxes successively.

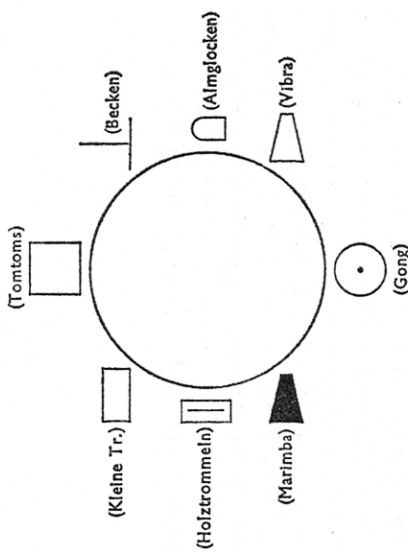
The next diagram shows the quite separate sequences of principal instruments in the order in which they enter and fall out (each instrument lasts for five periods) (Ex. 40).

And Example 41 (p. 83) shows the number and type of instruments used in each period. There is a symmetrical increase in tone colours from

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periods 17 + 1 to period 5, and from period 9 to period 13.

Ex. 40

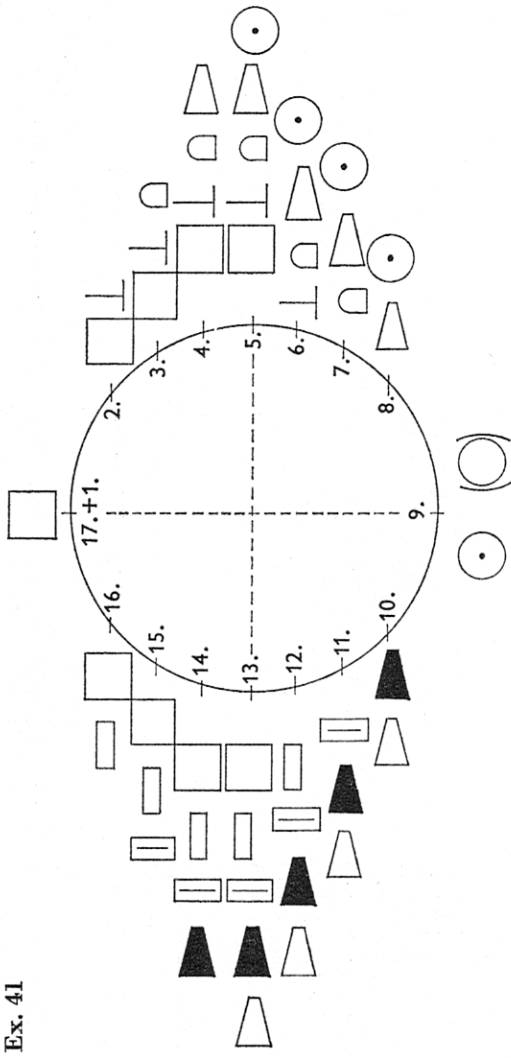


In the periods where many instruments are available and where Stockhausen wants greater indeterminacy, there are various systems of choice, of gestures which may be selected and inserted into the performance. Even the choice of the non-principal instruments is a flexible matter as long as they fulfil broadly the same functions in the plan of dry and resonant sounds.

Each period or page is the same length - thirty measured units whose tempo the performer must himself set. As we progress through the seventeen periods a scale of nine structure-types are used, which move from strictness to freedom. The first type has simple, clear rhythms and well ordered dynamic successions. The ninth has 'statistical' speeds and densities represented by approximate dots scattered on the time-stave. The progression over the whole performance therefore involves a move from strictness to freedom, or vice

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Ex. 41



versa if the performer goes the other way around the circle, with an obvious break in theory, but not, as Stockhausen says, in sound between the extremely statistical period 17 and the extremely determined period 1. The following chart shows how the structure-types within the periods, like the instrument types, increase from periods 1 and 9 to periods 5 and 13. The third column shows the number of time units allotted to each structure-type within the period (Ex. 42).

Similarly, the types of sound element (from roll to single stroke) are scaled (1-5), the number of these elements is scaled (a scale with the steep increase of the Fibonacci series - 1, 2, 3, 5, 8), the maximum dynamics of the gestures are scaled (1-5), the dynamic characters (crescendo, all maximum, etc.) are scaled (1-5), and all these scales are serialised and permuted cyclically, their characteristics changing together at the sounds of the *ff* rimshots of which there are 41 (see Example 39).

A further system, a pitch cycle from a large interval (nearly two octaves) to a small one (semitone) determines the widths of the tuned percussion glissandi.

The rigour of *Zyklus* nicely illustrates a point about that distinction between form and content. These forms of Stockhausen described above are clearly audible, but we do not normally think in the way necessary to have them in the foreground of our consciousness. In a Mozart symphony, say, we register the size of the groups of attacks and their regularity or otherwise and the dynamic scales only secondarily to the identity of the musical idea, the sum of them all; and compare it primarily with other *totals* rather than with other *components*. In *Zyklus* the components obstinately refuse to add up to a really cogent identity that we might call a musical idea - the limitation to really very few sound colours

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Ex. 42

The whole cycle is divided into two half-cycles. Over the seventeen periods the nine structure-types are distributed thus:

Periods	Structure-types	Durations of each Structure-type	Relative Portions of Structure-types
1	1	30	(1:2)
2	2 1	10 + 20	(1:3:2)
3	3 2 1	5 + 15 + 10	(2:4:3:1)
4	4 2 3 1	6 + 12 + 9 + 3	(4:3:1:5:2)
5	5 3 1 4 2	8 + 6 + 2 + 10 + 4	(4:3:1:2)
6	3 4 2 5	12 + 9 + 3 + 6	(3:1:2)
7	4 5 3	15 + 5 + 10	(1:2)
8	5 4	10 + 20	(3:2)
9	5	30	(2:1:3)
10	6 5	18 + 12	(3:1:2:4)
11	7 6 5	10 + 5 + 15	(3:1:5:2:4)
12	8 6 5 7	9 + 3 + 6 + 12	(1:2:4:3)
13	9 5 8 6 7	6 + 2 + 10 + 4 + 8	(1:2:3)
14	9 7 8 6	3 + 6 + 12 + 9	
15	8 9 7	5 + 10 + 15	
16	9 8	12 + 18	
17	9	30	

and even fewer pitch arguments are certainly important factors in this – so that we don't have the impression of a *form* organising significant or finely-felt individual ideas, we are left with form alone (as we noted previously to be the case with *Kreuzspiel*). And this lack of tensioned interplay between form and 'content' makes, for me, a dull work.

If *Zyklus* is something of a throwback to the old formalism, Nr. 10 *Carré*, for four spatially-separated orchestras and choirs (1959–60) is

certainly a step forward into 'Moment Form'. Moment Form's vital early stages, in which elementary 'material for use' is carefully prepared (viewed as an *area* to be criss-crossed rather than as a *line*), were triggered by the slow time-changes experienced on flights in America. A large orchestra of eighty players is divided into four roughly similar orchestras. Furthermore a mixed choir of twelve to sixteen voices is added to each orchestra. For the first performance in Hamburg I chose an almost square hall and had four stages built for the groups.

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The four conductors (with their backs to the wall) were: Andrzej Markowski, Michael Gielen, Karlheinz Stockhausen, Mauricio Kagel.

Voices and instruments are integrated into one sound world. The text is composed according to strictly musical principles: a scale of phonetic sound-differentiations ranges between voiceless consonants and vowels; the text is therefore untranslatable; it is notated in phonetic script.\* And in the programme note for the première: 'This piece tells no story. One can certainly stop listening for a moment if one no longer wishes to or can listen; for each moment is self-sufficient and at the same time is related to all other moments.'

'I wish from my heart that this music could give a little inner stillness, breadth and concentration; the consciousness that we could have plenty of time if we take it to ourselves – that it is better to come in to oneself than to stay outside (literally 'go crazy'); for the things that happen need someone to happen to, someone must receive them.'

Already the reader will be aware of the new tone of voice, the almost mystical obsession with 'feeling' or the 'now'.

In his article 'Momentform' (1960) Stockhausen voices his impatience with the teleology of musical moments which are always a result of past musical events and an upbeat

\* K. Stockhausen, *Texte* (vol. 2), Verlag M. Dumont Schauberg, Köln, 1964, p. 103.

† Stockhausen, *Texte* (vol. 2), op. cit., p. 102.

to future musical events. Why should the poor listener always have to connect the beginning of the piece to the end in one unbroken line? Are not other things more important? Why not have: 'forms of which an instant must not be a little bit of a temporal line, nor a moment a particle of a measured duration, but in which the concentration on the Now – on every Now – makes as it were vertical sections which penetrate across a horizontal portrayal of time to a state of timelessness, which I call Eternity: an Eternity which does not begin at the end of time, but which is attainable in each moment.' † (One remembers Rilke's views on music – 'you time, vertical on the direction of vanishing hearts!'.) §

Surprisingly, perhaps, Stockhausen's disdain for exactly measured large scale form dates right back to the *Gruppen* period, though *Gruppen* itself is the ultimate in calculated duration. *Gesang der Jünglinge* was only ended because of the pressure of deadline, so was *Kontakte*; in both cases he had planned and even partially realised further 'moments'. Stockhausen regards them as ended but not concluded in the Beethoven sense, open rather than closed.

*Carré*, with its four orchestras and choirs, invites comparison with the previous spatial works, *Gruppen* for three orchestras and

† 'Momentform' in *Texte zur elektronische und instrumentalen Musik* (vol. I), Verlag M. Dumont Schauberg, Köln, 1964, p. 199.

§ 'Music! Breathing of statues, perhaps', from 'Stanzas for Winter', transl. J. B. Leishman in Rainer Maria Rilke, *Later Poems*; The Hogarth Press, London, 1938.

*Gesang der Jünglinge* for five loudspeakers. Compared with *Gruppen* the spatial organisation is more sophisticated, or rather, clearer. But in every other way it is a simpler work. Things happen more slowly, at greater length, and only rarely is there a metre; for the most part, time signals are beaten irregularly and approximately according to spatial notation. This has two results: the sound is more inherently beautiful than in *Gruppen* and everything that is notated 'speaks', for it is easier music to play with good tone and there are less problems of getting voices to come through; and secondly, it has much less in it, fewer levels of meaning, less that needs to be remembered to understand the piece as a whole, than in *Gruppen*.

Cornelius Cardew, in two fascinating articles in *The Musical Times*,\* has given an account of his role as realiser of the blueprint. All Stockhausen provided initially was the familiar type of plan with pitches, symbols for the rhythmic character, dynamic level, timbral composition etc. of each of 101 moments, a plan which had undoubtedly been plotted as a graph of gradually changing elements, but measured by 'moments' rather than beats or seconds as in more systematic pieces. An element might grow logarithmically over, say, four 'moments'. It was Cardew's job to score out these symbols. He frankly admits that the end result, after all the discussions and cuts, is mostly Stockhausen's (though not without friendly questioning of the point of such a collaboration). But even so, one can see here a significant move towards the improvisation of

\* *The Musical Times*, vol. 102, 1961, pp. 619-22, 698-700.

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*Aus den Sieben Tagen* (see below p. 113), and away from the precision of *Gruppen*, *Zeitmasse* and *Gesang der Jünglinge*.

Another similarity with *Gruppen*, however, lies in the inclusion of interludes or insertions, or, as Stockhausen came to call them, 'windows' into a further vista. These were only added at a very late stage of Carré's composition, and, as with *Gruppen*, form the most exciting music. There are nine in Carré, many of them short and exploiting spatial rotation of sound (Stockhausen was at that time experimenting with a loudspeaker on a rotating table-stand for spatial rotation in the tape of *Kontakte*). For instance, moment 63X throws woodwind chords around, with piano (Orchestra I), vibraphone (Orchestra II), cymbalum (Orchestra III) and harp (Orchestra IV) staccato chords providing another layer. Naturally as the rotation becomes more rapid, the synchronisation must be very precise and exact metrical structures *have* to be used. The effect is astonishing. A music starved almost to death of one of its most important layers of meaning suddenly springs to life and alertness. 69X is another substantial insertion. A soprano D (a ninth above middle C) is rotated one way, and strings and woodwind rotate the other way, five times as fast. 75X sustains the slow, long sounds of the main structure whilst pitting against it simultaneously this other level of metrical music in a way which, again, dramatically raises the music out of its one-dimensionality. 82X is the climax of the added interludes in which frantic directional motion rotates sensorially like wheels of fire, halted with increasing efficiency by suspended motionless chords. This is very reminiscent of the climactic interlude of

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*Gruppen*, groups 118-119. Perhaps your preference for either *Gruppen* or Carré indicates what type of musician you are. My experience was to like Carré at first (for its beautiful and ecstatic surface), but subsequently *Gruppen* overtook it (for yielding real beauty of a more complex and mysterious sort - despite its occasional miscalculations). But it is a matter of opinion.

The next piece, Nr. 11 *Refrain* for three players (1959) inhabits a quite limited and distinct sound world, though it has affinities with Carré, with which it coincides in time, in that it is chordal and in slow unmetrical rhythms. It is for high piano (doubling three wood blocks), celeste (doubling three crotales) and vibraphone (doubling three cow bells and three glockenspiel plates). To this light and resonating sound world are added (as in Carré) tongue clicks (five approximate pitches) and short, sharp phonetic syllables - a plosive plus a vowel - which the players have to pitch near the sounds they are simultaneously playing. The effect is like something out of Japanese theatre. Rhythmically the piece is very still, using only approximate durations, and nine times using a notation that requires the player concerned to hold up the performance altogether until his chord has died away.

All this is disturbed by the refrain. The appearance of the score with its semi-circular staves and supplied plastic refrain strip is famous by now; Stockhausen has once again found the exact visual and notational equivalent for the process he has heard in his inner ear. It is possible, however, that as with much avant-garde 'graphical' music the visual con-

ception came first and led to the music only subsequently, but this can only be a guess. The plastic refrain strip, revolving on a central axis in the middle of the music, imposes music on a variable slit of places, compensating for where it arrives in the upper three stave systems by where it arrives in the lower three. It ruffles the smooth surface with a gentle gust of trills, glissandi, clusters, low piano notes and melodic fragments.

There are various other arrangements and compositional rules, but this, like *Piano Piece V*, is decidedly a 'statistical' piece. The pitches are very slow to change for much of the time, but there are certain places where 'change' reaches a statistical high point and a statistical low point. One remembers Stockhausen's comment on Webern: 'a process usually very important for the time-moulding in Webern's music is the fixing of each note in a constant octave-register, and alternation of registers at the most varying speeds; this is one of the most notable means of moulding experiential time...'.\* There are statistical high points for quick change of register, as well as tongue-clicks, phonetic syllables, 'as-fast-as-possible' groups, slow chords etc. The way, for instance, chords will 'fan out' into single notes and vice versa is not arithmetically worked out, but statistical following an overall series of change.

The coda, as in many earlier pieces, *Piano Piece X* for instance, mixes up the elements (including the refrain's) in a sort of 'anti-statistical' way - i.e. there is no statistical predominance of any one element, they are

\* 'Structure and Experiential Time', *Die Reihe*, vol. 2, p. 72.

finally merged into a complex new unit which one perceives as, if I may descend from the sublime a moment, 'fruit cake' rather than flour, sugar, eggs, butter, almonds, cherries, currants and candied peel.

Whilst Stockhausen was working on *Carré* he was also making experiments in the electronic studio with a rotating loudspeaker which was surrounded by four microphones. As the loudspeaker moved from one microphone to another, so the sound would increase and decrease in each of the microphones in turn, and if recorded on four tracks and played back in a hall with four loudspeakers, one in each corner, the sound could be made to rotate around the hall. These experiments materialised into Nr. 12 *Kontakte* (1960) which can be played as just a tape, or with piano and percussion added. (There is even another version with yet more added to the original tape - *Originale*, a music theatre piece which adds actions and other sounds to the tape, piano and percussion! Superimposing things on existing works is a feature of Stockhausen's late style. It says much about the 'openness' of these works that this is possible; it would certainly be impossible, or inartistic, to do such a thing with any of the pre-1957 works.) In the tape of *Kontakte*, Stockhausen uses various totally new forms of spatial movement - rotation at varied speeds and in both directions; 'Flutklang' (flood sound) sounds coming from one loudspeaker, then successively from others, which gives the impression of the sound flooding through the hall; alternation continuously between two loudspeakers; looping, where the sound rotates in the form of a loop, i.e. loudspeakers I, III, II, IV; and pointillistic patterns of all sorts.

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The other important point about the medium used, is that a piano is juxtaposed to electronic noises. Just as with the ostensibly awkward mixture of a boy's voice and electronic sound in *Gesang der Jünglinge*, so here, a continuous scale between the two different sounds is constructed in order to integrate them. This is where the percussionist comes in. He plays a variety of wood instruments (including marimbaphone), metal instruments (including crotales - high bell-like sounds of definite pitch), and skin instruments. The scale runs from piano → marimbaphone → percussion → tamtam of almost definite pitch, such as African wood drums and tom-toms → 'noise' percussion → tape. In the tape part the sounds were made, after a long period in which Stockhausen analysed the acoustical structures of percussion sounds, by impulse-generator, filter, reverberator and ring modulator. They can be reduced to certain general types. Here they are as drawn in the score with approximate descriptions of how they make 'contact' with instrumental sounds\* (Ex. 43).

Thus 'contact' can be made between instrumental and electronic sound, although extremely sensitive performers are required - the piano, especially, can easily be too loud or too soft depending on the level of the electronic sound.

The instrumentalists play almost entirely without metre, fitting their sounds into a cer-

\* I am indebted to Edward Cowie, post-graduate student of Southampton University, for putting at my disposal his analysis of the work.

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Ex. 43

Continuous rotating sounds within pitch ambit, no attack or decay audible

Short-imitative percussion sounds (bongos, marimba, cymbals, even piano): position on the score indicates approximate pitch

Vowel or consonant human voice fragments linked by filter sweeps

Long heavy noise-cymbal/tam-tam

Heavy white noise sounds where attack and decay are much varied

High or low trill elements

Enclosed but transforming sound elements - constant inner change

tain space on the page as they think best. Inevitably with a piece which is by no means slow or sparse, as *Carré* and *Refrain* are, the impression of improvisation or rhythmic dis-

Ex. 44

order can be a little disturbing beside the time-structure of the tape which seems both relaxed and precise. But in a performance as sensitive as, for instance, the one Aloys Kontarsky and Christoph Caskel recorded, one's attention becomes transfixed by the beauty of the colour idea, the interplay wherein one is even unsure of distinguishing the piano from the tape, and one moves along the scale from familiar sounds

to totally unfamiliar ones with no sensation of losing the meaning.

The variety of timbres and textures is greater than in any previous work, and, again, one must live for the moment alone, for the vivid sense of an *aperçu* - it is not particularly enriching to recall what has gone before or what is yet to come by way of comparison. Though, as so often, an overall behind-the-scenes structural principle is made out of one number, in this case 6. There are six degrees of variation between 'just noticeable' and 'violent' in each of the six dimensions (spatial location, volume, texture, register, speed, instrument family), ordered into six subdivisions within each 'moment'. The six types of moment are related by the same range of six degrees of variation, and their specifications delimit the area within which the subdivisions' variations may range, presaging later 'plus-minus' methods.\*

The piano and tuned percussion use the set shown in Ex. 44.

There are no transpositions, but notes jump, and the interval between two notes is fre-

quently filled in, making a cluster; and towards the end of the piece more and more permutations are made. In other words, no over-rigid

\* I am indebted to Stanley Haynes for the latter insight.

thought is at work here. It is, broadly speaking, a case of the pitch being suggested by the tape, or else prompted by the imagination to diverge from the tape in some way. In general the instrumentalists help delineate the sections or 'moments'; they change character when the tape does. They also have their spatial role. They are placed at opposite sides of the platform area, and occasionally play a gong and tamtam placed midway between them. At one point the pianist plays his cow bells and then his hihat in a crescendo to *ff* (he has eight percussion instruments to play as well as the piano) and then leaves his seat to play the central tamtam *ff*. At the same time the percussionist plays his cow bells and then moves into the middle to make a crescendo on the gong (while the pianist is still playing the hihat), and at the point of the pianist's *ff* on the tamtam the percussionist makes an *ff* stroke on the gong. At the same time, also, the tape emits loud tamtam-like sounds. Through the world of metallic sounds, 'contact' has been made – and simultaneously demonstrated in space.

*Kontakte* was Stockhausen's first live and electronic piece, and must therefore be regarded as something of a turning point; for most of the works composed since have employed the two media in one form of combination or another.

*Originale* (1961) was written shortly after *Kontakte* on which it is based. Stockhausen describes it as 'musical theatre'. It consists of eighteen scenes in the form of instructions for the *dramatis personae* carefully placed in time-boxes. Each character's actions, in other words, must take a specified number of

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seconds or minutes. These scenes are grouped into seven 'structures' which may be performed successively as 'normal', or simultaneously (up to three at once), or both. For simultaneous performance Stockhausen envisages three small stages: to the right, at the front and to the left of the audience.

The similarities between drama, which moves in time through a total form, and music which does the same, have often been commented upon. It is only logical that Stockhausen, who conceived new types of music by imposing external structures on sound, should do the same with 'music theatre'. The form is no longer ostensibly governed by the flow of feeling, but more by structural patterns of the same sort he uses in music. Again, this is a trait of structuralist art. Robbe-Grillet's books, or his film *L'année dernière à Marienbad* are examples. The line – 'this story is already over – frozen' – occurs many times in the film just as the serial coverage of scales gives a frozen quality to the music; and the perforated layers of time-consciousness are similar to the simultaneities of *Originale*. The tone of *Originale* is very different, however. There is much that is surrealistically absurd, shades of Pinter (the commonplace) and Beckett. At one point the actors even speak forant rhythms; one actor has three words equally spaced in four minutes, another five words in that time, another eight, another thirteen (Fibonacci series) and another provides a 'noise' band with totally irregular rhythms. Perhaps Beckett seems nearest of all to it as the dramatist of our time most dominated by musical and serial form in his work, and the surrealism of Mauricio Kagel's theatre pieces may have been influenced by it.

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The piece is built on *Kontakte*, and with interruptions and recorded replays by the sound technician, it runs from beginning to end, with pianist and percussionist performing many specified actions (like making tea) as well as their parts. There is also an excerpt of seven minutes from a *Carré* recording, the slow-moving final sections from about moment 87 to the end, which would follow quite naturally as an expansion of the slow and profoundly beautiful section of *Kontakte* marked X in the score. *Originale* is Stockhausen's main venture into theatre so far, though by no means the only one into surrealistic theatricality, an element that can be traced especially in works involving human voices, such as *Momente*, Nr. 13.

*Momente* again exploits the 'feeling' rather than the 'thinking' aspects of music. The form is open and adjustable, the content richly composed. Stockhausen advises us to lose ourselves in each little paradise of sound as it occurs, not to worry about overall repetitional form.

'He who kisses the Joy as it flies  
Lives in Eternity's sunrise.'

was the apt motto in Stockhausen's mind at the time. The 'form' consists simply of a form-plan which specifies what sort of thing may happen when, with several alternative choices possible. The main formal distinctions are made in terms of colour-textures, melodic textures and durational or rhythmic textures. The actual 'moments' are named accordingly and juggled in the form-plan by the performer, making many creative decisions, but also obeying several rules, putting in insertions from neighbouring moments to pre-echo or echo certain events, and following one set or

another of arrows through alternative sequences of events. The complexity of the score arises largely from Stockhausen's determination not to write out *Momente*, but to leave it open, flexible. But it must not be thought that this is improvisatory music. All the orderings and inserts must be fully arranged before the first rehearsal, but not necessarily by the composer.

The forces used to supply the exotic and at times ecstatic 'content' are solo coloratura soprano, four choirs of at least twelve singers each, two electronic organs, brass and percussion including the large 160cms tamtam (which Stockhausen uses in *Mikrophonie I*). This tamtam plays a large part in the *K*-moments of the work (*K* = *Klang* or timbre). The colours are *structural*, Stockhausen says. He is here continuing what was done in *Gesang der Jünglinge* and *Carré*, namely integrating vocal sounds and instrumental sounds, pitch and noise, sound and silence. For instance, the choirs not only sing but laugh, shriek, shout, speak, murmur, titter, whisper and exhale voicelessly. They also make noises with fingers, hands, feet, tongues and play little instruments which produce noises or notes. For text, Stockhausen throws together fragments from the 'Song of Solomon', the 'Kala Kasesa Ba'u' from *The Sexual Life of Savages* and Mary Bauermeister's letters to him. The soprano part ranges from singing intelligible texts to voiceless consonants. 'Scales' of this sort are covered as in previous works.

Very similar in construction, though almost the opposite in sound is Nr. 15 *Mikrophonie I* for the enormous tamtam mentioned above and six performers, divided 3 + 3. Both use

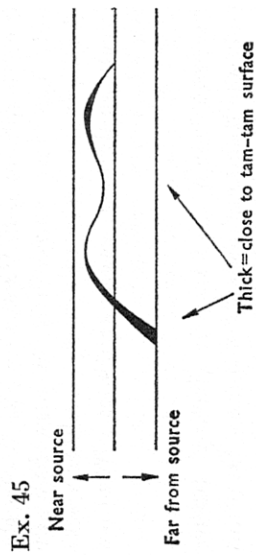
similar types of formplan with moments freely slotted in, but whereas *Momente* used innumerable instruments this piece uses only one. The formplan again is very simple, consisting of thirty-three boxes representing moments allotted to the two performer groups in alternation (one on either side of the tam-tam except where the three signs to show the moment's relationship to its successor: either  $\triangle$  (similar), or  $\neq$  (different), or  $\neq$  (opposite); also either  $+$  (supporting) or  $|$  (neutral) or  $-$  (destroying); also either  $\nearrow$  (increasing)  $\rightarrow$  (constant)  $\searrow$  (decreasing). These are the 'rules' to be followed by the performers in selecting their version. Again, the supplied 'moment' sheets are precisely notated, and each one has a name descriptive of its character. Again, also, there are insertions from other moments which pre-echo or echo events, and various cue arrows which may be chosen which will either bring the next moment in at some point in the middle of the one that's already going on, or at its end. (Even, occasionally, at its beginning.)

The methods of 'exciting' the tamtam are very diverse, and are not so much described in the score as is the nature of the sound to be aimed for. Hugh Davies, who was Stockhausen's personal assistant at the time of *Mikrophonie I*'s first performance, and who operated filters and potentiometers in it, notes in his diary that at one of the last rehearsals: 'Stockhausen's wife finds a few things being used as instruments that have been missing from her kitchen recently!'.\* The durations, volume and type of sounds are notated pre-

\* 'Working with Stockhausen', by Hugh Davies, *The Composer*, vol. 27, p. 11.

## Chapter Nine

cisely. These are performed by the first players in each group of three. The second players hold the microphone near the sound source, or move it away along the surface of the tamtam or else away back from the tamtam. In the first case the sound itself gets softer and the reverberations sound well, in the second case the reverberations get softer and the sound itself sounds well. This part, together with symbols for a cup to collect the sound more or less into the microphone, is carefully notated in time:



The third performer of each group operates a band pass filter and volume controls, for which he has precise band widths and dynamic levels specified.

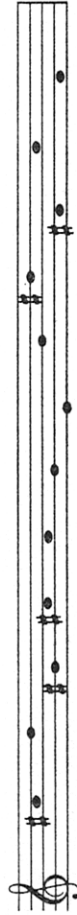
The piece is obviously a *tour de force*, something totally new achieved by painstaking trials and errors, once and for all. It can be very long, twenty minutes if the earliest cue arrows are taken, much more if they are not, and it is formally and timbrally very limited. But if one can submerge oneself into this giant mixing machine with all its complex reverberations (actions may reverberate and effect other actions for some time afterwards) it cannot be denied that a totally new experience of sound is offered, as well as an exhaustive knowledge of the complex nature of one simple object — a microcosm of 'moment-form' technique.

## The Early 'Moment Form' Works

I have left Nr. 14 *Plus Minus* (1963) until now, although it was composed between the beginning of *Momente* and *Mikrophonie I*, because those two works belonged together in type. *Plus Minus* marks an altogether new departure; I shall never forget the incredulity, bewilderment and hostility in the seminar that Stockhausen gave on it at Darmstadt shortly afterwards! Fundamentally, however, it is no different from the formplans of *Gruppen* and *Carré*, the sole novelty lay in publishing it as 'his' work when it has yet to be realised, one's notions of 'the work of art' had to be widened a little, that's all.

It consists of seven pages of 'forms' symbolically notated, which may be realised by up to seven players simultaneously (instruments not specified), and seven pages of notes. One must beware of calling these latter the 'content' which is inserted into the 'form', because by 'content' one means something much more precise and finished — the small scale 'feel' of a phrase or gesture with its dynamic hierarchy of upbeat and stress and registral and rhythmic attributes. The notes provided are simply more 'form' of a different sort, and the realiser must then, according to thirty-five rules, make a great many decisions of his own as to the 'content' he wishes to insert into these forms. They operate, incidentally, on the following set and its inversion:

Ex. 46



and offer an insight into the different types of set-expression, by *gruppetto* segmentation and

jumbling, by band widths of clusters (as in *Gruppen*) following the intervals of the set, by the isolation and development of each interval in turn, etc.

But the linear figurations just described are really secondary to the 'central sound' of each structure, which is also indicated on the notes pages, but as a succession of seven *chords*, each of a different density. One central sound and one linear decoration is specified for each event. To them are added sounds of indeterminate pitch. The seven different types of event resulting from different combinations of the above are the basic elements of the piece which are then given instructions on the degree to which they should wax or wane in quantity, in registral height and in volume.\* As with the formplans of other works, *Mikrophonie I* for instance, symbols for changes of behaviour are always directly related to what is audible in terms of information theory, to what the listener will perceive as new information or redundant information. In works published at the *Plus Minus* stage, the information theory is the work, and performers must be found who can implement the theory in sound.

\* The distribution of types over the seven pages is (as with other factors) governed by the Fibonacci series, as Stanley Haynes has pointed out to me; each type occurs either 1, 2, 3, 5, 8, 13 or 21 times on each page.

If I have touched on nearly every work up to 1964, it was to lay out the most crucial aspects of Stockhausen's mind as they moved from one type of form to another, one type of 'content' to another. It seems that nothing

### The Early 'Moment Form' Works

written since then changes direction quite so radically, and so the remaining works may be dealt with more informally.

## The Later 'Moment Form' Works New Achievements in Electronic Music

The only major work I have not touched on prior to 1964 is the revision of *Punkte* for orchestra. The early work, as its title implies, belongs to the highly formalised pointillistic period, and dates from 1952. It serves as a background on to which Stockhausen imposes, ten years later, an elaborate foreground, a text on which he composes a far-reaching variation; each 'point' or single note or notes becoming the centre or pedal point of an elaborate group which surrounds, engulfs, develops or contrasts with it. The result is impressive in the manner of *Gruppen*, there is precise control and much in the detailed texture to extend the experience on repeated hearings. It is a work best understood and analysed as a whole in terms of related group structures, but to do that would be to go well beyond the confines of this book.

Stockhausen has, since 1964, written a fairly constant flow of works. Nr. 16 *Mixtur* for orchestra, sine wave generators and ring modulators (written rather quickly in the summer of 1964) and Nr. 17 *Mikrophonie II* (1965) for choir, Hammond organ and four ring modulators are Stockhausen's first works to exploit the ring modulator. This is a device into which two or more simultaneous notes may be fed (through a microphone), which adds the frequencies together and sounds the

resultant note, and also subtracts the frequencies from each other and sounds that note. If one of the frequencies is below 16 c.p.s., as it often is in *Mixtur*, a *rhythmic* transformation of the sounds occurs. The ring modulator's use led to, again, a unique and distinct sound world. The "what" (material) is not separable from the "how" (the forming). I would never have composed as I did, had the "what" of this process not had very specific characteristics which lead to a specific "how". For example, when one uses ring modulation, one must compose particular kinds of structures – simple superimpositions, many tones of long duration, not-too-rapidly moving layers – since ring modulators create dense symmetrical spectra from simple material, and this can easily lead to an overweight of noise or a stereotyped colouring of the sounds.\*

Of course, paying respects to the exigencies of sound *per se* rises in a sweep from the bad (?) old days when structures were structures and medieval music could be played sung or whistled on anything to hand, *The Art of Fugue* almost likewise, and even Mozart

\* Record sleeve note by K. Stockhausen for *Mikrophonie I and II* (BS 72647).