

TAPE MUSIC WITH ABSOLUTE ANIMATED FILM :
PREHISTORY AND DEVELOPMENT

IN TWO VOLUMES : VOLUME ONE

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A thesis submitted in partial satisfaction
of the requirements for the degree of
Doctor of Philosophy in Music

University of York

Music Department

December 1982

Volume 2

16mm Film, 35mm
Slides

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ACKNOWLEDGEMENTS

This research has been assisted by several institutions and individuals. Their generosity in giving of their time, providing both verbal and printed information, and making it possible for my films to be realized, has been greatly appreciated.

British Film Institute: information and screening facilities.

Arts Council of Great Britain: loan of absolute films; financial support towards the making of my film Opus I.

Svenska Filminstitutet: photocopy of Max Butting's score to Ruttmann's Opus I.

Yorkshire Arts Association: funding of my film Opus II.

Audio-Visual Centre, University of York: provision of rostrum-facilities; technical advice; funding of my film Time and Again.

London Filmmakers Cooperative: optical printing facilities; technical advice.

* * *

To Richard Orton, Director of the Electronic Music Studio, University of York, and Supervisor of Studies, my gratitude for advice, encouragement, and forbearance.

* * *

To David Curtis (Assistant Film Officer, Arts Council); Deke Dusinberre (critic of avant-garde film); David Griffiths (music librarian, Morrell Library, Univ. of York); the late Arthur Kleiner (music director, Museum of Modern Art, New York); Louise O'Konor (authority on Viking Eggeling); Malcolm Le Grice (film-maker and author); the late Hans Richter (pioneer absolute-film maker); Andrew Tudor (senior lecturer in Sociology, Univ. of York); and to Richard Verdi (lecturer in the History of Art, Univ. of York); I offer my appreciation for their ready willingness to contribute their own expertise.

ABSTRACT

Although speculation and experiment in the correlation of abstract visuals and sounds have a long if relatively undistinguished history, it is only in the present century that, through the medium of cine-film, it has become possible to articulate complex, precisely-synchronized temporal interrelations between music and dynamic coloured forms.

From an introductory discussion of the development of quasi-musical thinking amongst abstract painters in the early decades of this century, attention is drawn to some theories of music within non-narrative film sequences in dominant cinema. This is followed by a survey of those few absolute animated films realized in the nineteen-twenties. In particular, the films of Viking Eggeling, Hans Richter, and Walther Ruttmann are set in the context of that questing for a 'universal language' which imbued the Constructivist and Bauhaus spirit. The aesthetic posture of these avant-garde film-artists is studied, with later experimentation by Oskar Fischinger, Harry Smith, and the Whitney brothers considered in so far as it relates to similar concerns over the interconnection of absolute animated visuals with sound.

It is proposed that, whilst psychologically there can be traced very few direct parallels between the media, this - far from being a limitation - is a strength, since it encourages the establishment of new individual criteria of audio-visual interrelationship for each

composition. Speculations on possible connections between moving absolute image and sound in film lead to an outline of the present author's early film experiments through which he moved from a rigorously purist to a more intuitive approach, as embodied in the film Opus I.

In this film there is an attempt to articulate time in terms of an interwoven bi-media polyphony. Electronically synthesized sound is found the most appropriate aural complement to absolute visuals, and their conjunction is felt to be further exploitable within a wide range of artistic styles, Opus I offering only one illustration amongst the manifold possible responses to the challenge of this still youthful art.

* * *

INTRODUCTION

Sound is the soul of form, which can only come alive through sound and works from the inside outwards. The form is the outer expression of the inner content.

Wassily Kandinsky
"Über die Formfrage"

That the subject of this thesis may appear esoteric is a sad reflection on the vagaries of twentieth-century art. For, as will become apparent, it is historical accident and economic stringencies which time and again have aborted this art-form, an art-form which one might reasonably have supposed would have matured into one of the prime modes of expression for artists and musicians in the latter half of this century.

The new art of cinema, whose early years were spent travelling the fairs and dingy booths of the 1890's, lost no time in commending itself as a nickel-peepshow for the masses, disgorging narrative extravaganzas in the form of fantasy, travelogue, melodrama and comedy capers. Cinema's narrative appeal persisted through the years of live sound-accompaniment - despite rare and ambitious attempts to diminish the role of narrative in favour of explorations in subjective time manipulation by montage - and with the coming of sound-film, cinema was, as it still is, popularly regarded as just the most lavish and compulsive story-telling medium available.

It is not surprising that visual artists were at first loth to have anything to do with the medium. In the first years of the century the art-film house was unknown, and the audience for Lumière and Porter was no prospective audience for a cinematic presentation of modern art. But considering the contemporary interest in virtual movement it is surprising that by the mid-twenties so few artists had even considered the possibility of painting 'in time', if not that even fewer had actually completed short abstract films. The technical demands of animation were foreign territory to canvas painters, and the almost total inaccessibility of the new medium to the individual worker made the prospect of 'animating' his drawings distant indeed.

Throughout the thirties, forties, and into the fifties there were again few experimenters, cameras and stock both being expensive and the property of large-scale commercial enterprise. Only with the revolution into substandard gauges, - the introduction of 16 millimetre and 8 millimetre equipment for amateur use - did the medium of abstract animated film slowly begin to grow as a by-product of the flourishing home-movie market.

Today the independent film-maker is no longer barred easy access to semi-professional equipment capable of realizing technically acceptable animated images. (Even the absence of an animation rostrum-camera need be no real hindrance.) But so infrequent and tentative have past experiments in absolute animation been, that the present-day worker lacks a body of material - such as the musician finds in, for example, the works of Stravinsky, Schoenberg and Bartok - from which to draw strength and against which to relate his own artistic experience. There is a dearth of work of any standard in the medium such that a historical vacuum is created which must remain ever unfilled, leaving the present worker adrift, rootless. He must resort to sympathetic disciplines - absolute music and art on the one hand, and narrative commercial film, 'independent film', and more particularly (non-animated) abstract film on the other. The dangers of borrowing indiscriminately from the commercial film are great, since this field of filmmaking is usually explicitly directed towards the suspension of one's critical faculty. Indeed, as will be seen, there is relatively little to be learnt from commercial films regarding the interrelationship of absolute sound and absolute visuals, since there the requirements of narrative coherence and continuity are crucial, and of course irrelevant to absolute film.

From absolute music though, there is everything to be learnt, and it is the prime tenet of this thesis that, if the medium is to flourish, it must draw to itself creative artists who are technically equipped to weave music and visuals in a contrapuntal interplay. A successful treatment of absolute visuals in time is wholly dependent upon the 'musicality' of the creator; in other words, only a mind trained in temporal structuring can adequately handle their interplay. It can further be understood that ideally the same mind will organize both the visual and the aural components in the film experience, for failing this the unity and multilayered coherence of expression will suffer.

The demands, both imaginative and intellectual, which are made on the 'composer' of such works are very considerable, ideally involving an easy familiarity with the specialised techniques of animation, and an equal confidence in exploiting the resources of a sound-studio. The independent worker must secure access to both rostrum and studio over extended periods; such practical requirements are difficult to meet. In addition, the undertaking is expensive in both time and money; tape-composition and animation are both laborious techniques, the latter notoriously so when involving cels. These are the major obstacles, other than the great imaginative challenge, which have deterred all but the most fortunate or determined artists of the past from realizing their films.

Although in recent years several important studies have appeared documenting the animated abstract film experiments of 1910-30, and with interest in similar work since 1930 increasing, it is invariably from the point of view of the art-historian that the medium is considered. Musicologists have paid the absolute film almost no

attention, a surprising oversight in view of music's shared concern in the temporal organization of 'non-objective matter'.

Conceptualising visuals in time instead of sounds is largely foreign to the musician and is indeed an uncommon and undeveloped artistic ability, being the province of screen-writers, film-editors, and choreographers. Here, the narrative content is usually strong enough to dominate visual expression and continuity to a marked degree. In the case of absolute imagery there is no such support, and the creative mind flounders for lack of structure. The absence of a continuing tradition in the medium makes itself painfully apparent. This thesis essays in the film Opus I an interrelationship of absolute sounds and absolute visuals in such a way that a 'meaning' should be as intuitively apparent as on the audition of a piece of absolute music. A major goal is to propose criteria by which the media may meaningfully interrelate. Whilst much will remain intuitive, it is proposed that there are grounds for believing that certain visual and aural activities can be combined to calculable effect. No theory of correspondences is propounded, only tentative procedural suggestions which may help to clear the ground for later experiment in the same area.

My film Opus I attempts to define by illustration a range of such 'meaningful' interrelationships, thus propounding the elements of an audio-visual syntax.

* * *

The present study opens with a consideration of the 'temporal canvas' and of synaesthetic preoccupations, proceeds to some relevant theories of the function of music in films, and then examines the earliest examples of animated absolute film, both silent - but musically analogous - studies, and sound experiments in visualized music. In less detail, some absolute films dating from 1930 to the present are surveyed, paying attention to the contribution of synthesized sound.

There follows a more general examination of the interrelationships between image and sound within the confines of absolute film. Finally I document my own film-experiments preceding Opus I, passing on to a description of the film's gestation and technique, and concluding with an analysis of the audio-visual polyphony achieved.

By relating material drawn from sources on both film and music, a clearer view of the potential of tape music with animated absolute film can be gained; for it is still in terms of potential that the medium should be evaluated.

CHAPTER ONE

TIME: MOVEMENT IN ART;

SYNAESTHESIA FROM CASTEL TO KANDINSKY

In the pleasing nature of their harmony colours can be related like musical sounds and be mutually proportional.

Aristotle : De Anima ,

Time and Mysticism

Around the turn of the twentieth century visual artists became increasingly preoccupied with two areas of investigation - time and mysticism. The philosopher's ponderings on the reality of time became a shared concern of the avant-garde, common to Futurists, Cubists, and Constructivists. Their canvases sought to represent past, present and future in a contracted simultaneity; or they sought behind relative exterior phenomena for absolute values poised in a timeless dynamic equilibrium.

There was an underlying belief (no doubt recently fuelled by Wagner-mania), that in music could be found the key to life's mysteries. Through its ambiguous precision, music mediated between man's subjective realities and the objective phenomenal world. The canvas painter, his erstwhile confidence in the validity of graphic representation undermined by camera-art, might now seek spiritual rejuvenation in a pictorial mode resonating to music's (time-based) autonomy.

The intangible, mystical unreality of time bewildered and intrigued visual artists. Intoxicated by their own daring in trespassing on music's terrain ('All art constantly aspires towards the condition of music', Walter Pater (1839-1894), The Renaissance. The School of Giorgione), many eagerly embraced the new theosophical movement which offered release from the mundanity of an imperfectly perceived, imperfect world, and a glimpse of the incorruptible higher planes of existence granted the exalted few. Fascinated by, yet at the same time ultimately dissatisfied with, their grasp of this new

dimension, time, artists vied in wooing it away from music to the visual - none with more tenacity or courage than the makers of absolute films, where a preparedness to confront time 'head-on', to wrestle with an unfolding temporal flux, marks them out from the majority of canvas-painters still devoted to the instantaneous re-presentation of change through virtual movement.

Reality became internalised; the taxidermic art of representational canvas painting (still life...nature morte) was coerced into abdication in favour of its natural heir, narrative cinematography. Simulacrae of the external world could now be provided by the camera, thus relieving the artist of his mimetic subservience to the perceived. That which was exterior should be transformed, interpreted, abstracted, or ultimately outgrown as the artist's inner eye evolved its own para-reality of absolute thought-forms, or eidetic imagery.

A sensitivity to the workings of time and an inclination towards the transcendental stimulated the creativity of the vast majority of absolute film-makers, from Viking Eggeling through to the Whitney brothers and later. Perhaps paradoxically, this extra-temporal mysticism was so often sought in a medium which impresses upon the animator the utter artificiality of an apparent dynamic continuum (actually conflated from a concatenation of discrete 'stills').

The composer of music was not unmoved by current theorizing on time - the natural carrier of his art. The relatively articulate ambiguities of eighteenth and early nineteenth-century chromaticism had become over-faceted with the accretion of increasingly distant partials; pivotal chords had swept into a maelstrom of vertiginous

rotation, where the customary security of coherent tension-relaxation flow had become reduced to an undifferentiated chromatic surge. In the expressionist outpourings of composers and artists the spontaneous and feverishly inchoate gesturings of the hypnagogic state welled up; the flood-gates of time burst open, overwhelming the senses in an engulfing excess of sensation. The cadencing of earlier arts - the poise of linear design, the resolution of acoustic disharmony in consonance - was replaced by a prolonged deferral of closure, even to the point of its absence. Completion was no longer a prerequisite for art. To this degree had time eaten away at the discreteness of the artefact.

Before embarking upon a discussion of theoretical writing in music and film, some earlier propositions regarding the correlation of music and images may be reviewed, setting later work in context; for it would be inadequate to consider the synchronization of absolute image and music in film independent of its pre-history, which embraces colour-music speculations stretching back to antiquity, and documented experiments dating from the early eighteenth century. It will be seen that absolute film only provides a long-awaited means to an end - a technology capable of integrated sound and image production - and furthermore that its apparent relatedness to live-action narrative film-making is spurious and irrelevant, a historical coincidence.*

* For example, an immediate precursor of the absolute film aesthetic is Henry Langdon Child's Chromatrop or Chromatoscop. Moving kaleidoscopic patterns were generated by revolving in opposite directions two superimposed glass plates, on which were painted various striations.(1)

Castel and Colour Music

The earliest fully-documented experiments in colour-music pre-dated the first screenings of the Lumière brothers by one hundred and fifty years. Indeed the search for such an interrelationship began far earlier:

There exist comparisons between meters and scales and color-series in the Indian Vedas as well as in old Chinese, Persian and Arabian works. Aristotle in his De sensu et sensibili, advances the thought that the color groupings most pleasing to the eye rest on the same basis of simple number relationships as do the consonances of music. Vitruvius, Simonides, Horace, and others were variously concerned with the mutual relationship as it pertained to their own fields of architecture, poetry, etc. Throughout the Renaissance these ideas were known and discussed by men like Leonardo da Vinci, Leone Battista Alberti, Girolano Cardano, and others who left a large body of philosophical and speculative works.(2)

In Newton's Opticks of 1704 an attempt was made to prove a mathematical relationship between the seven primary colours of the rainbow and the musical intervals of the Dorian mode. However, Newton's grasp of music was limited and conservative. 'The chief objection is that Newton compared the intervals in their acoustic number relationships with the perceptual phenomena of the breadth of color bands in the spectrum, thus comparing physical with psychological distance.'(3)

Inadequate and unscientific as they were, Newton's theories generated considerable interest amongst artists and scientists throughout the eighteenth century.* The drawing of parallels between colour and pitch, with a view to ultimate synthesis, exercised in particular the mind of the French Jesuit priest, Father Louis Bertrand Castel (1688-1757). A mathematician and philosopher, he dabbled in numerous areas, from natural history to politics, theology, and the arts.

Within a posthumous collection of his writings, Castel's colour-music theories are presented in a section 'Clavessin pour les yeux,' where in arguing that sound is the 'unequivocal counterpart' of light, the author plots numerous analogies between the two, many spurious, or of limited application. Not content with mere speculation, Castel embarked upon the design and construction of a colour-music instrument in 1734, apparently modifying a clavichord so that on depressing a key the key lever not only brought a brass tangent in contact with a string, but revealed the light from coloured lamps. By 1739 Telemann was to publish a German translation of Castel's writings, Beschreibung der Augenorzel oder des Augen-Clavicimbels, testimony to the serious contemporary interest in his work.

In a passage relating to music and painting, Castel strikingly if naively anticipates Wassily Kandinsky's intuitions that colour and shape can somehow emit sound. In Wilton Mason's paraphrase:

The artist has only to arrange his colors on canvas in the same order and combination as their

* But La Fontaine, had he lived to read Newton's Opticks, would have lost no time in expressing his incredulity at the postulation of an audio-visual parallelism, for 'Les mots et les couleurs ne sont choses pareilles Ni les yeux ne sont les oreilles.' (from the Conte de Tableau)

musical counterparts in order to produce a "musical" painting. Thus it would be possible to have a room "tapestried with rigaudons and minuets, sarabandes and pasacailles, sonatas and cantatas, and if you like, a complete representation of all the music of an opera." In this fashion the design of a piece of music may be contemplated at leisure, one may see the contrast of all the parts, trace the series of cadences, note the progress of modulations.(5)*

Castel remarks upon the sometime inadequacy of concerts where only the ear is wooed, leaving the eye embarrassed and unfocussed; the 'clavessin pour les yeux' would fill this vacuum. He enthuses on the external and internal decoration which might be lavished on the clavessin, which would become 'an infinitely brilliant object' garnished with precious stones and other materials.

But what would it be if animated and given a type of life through movement, a regular, measured, harmonic, and lively movement? It would be charming, an enchantment, a glory, a paradise! One could make a play of all sorts of figures, human and angelic animals...even geometric figures. One could, by a simple play, demonstrate all the concord of the Euclidian elements....Or one could make a play of flowers...[the colours] so arranged that each stroke of the hand on the keyboard would represent a flower-bed, and the result of playing would be a moving diversity of flower-beds.(6)

That Castel was ill-equipped at this date to realise his vision is not remarkable, but his lush descriptions anticipate the raptures of, for example, Scriabin and Kandinsky, with uncanny accuracy.

Color is the keyboard, the eyes are the hammers, the soul is the piano with many strings. The artist is the hand that plays, touching one key or another purposively, to cause vibrations in the soul.(7)

Wassily Kandinsky

* Of Kandinsky, Popper mentions in passing that 'apparently he also invented a colour organ'. Regrettably, he says no more, nor does he provide evidence in support of this tantalizing aside.(4)

Despite the currency of Castel's theories, (8) they did not win universal approval. Diderot voiced his scorn for the colour clavecin in an amusing conversation between two fictional characters, Mangogul and Mirzoza:

Mangogul: "You will have heard people speak of, or perhaps you will even have seen a certain clavecin where he has disposed the colors according to the scale of sounds, and on which he claims to perform a sonata, an allegro, a presto, an adagio, a cantabile, as agreeable for the eyes as those pieces which are made for the ears."

Mirzoza: "I have done even better: one day I proposed to him that he should transpose a menuet of sounds into a menuet of colors for me; and he did it very well indeed."

- : "And did that amuse you very much?"

- : "Very much, for I was then a child." (9)

Castel's invention was also derided by Voltaire and Rousseau, the latter railing at length against the improper analogies contrived between colour and sound:

I have seen that famous clavecin on which it is claimed one can make a music of colors; it really showed very little knowledge of the operations of nature not to see that the effect of colors is in their permanence, and that of sounds in their succession.

All the opulence of color displays itself at one time on the face of the earth; everything is seen at the first glance. But the more one looks the more one is enchanted; nothing more is required but to look and to admire without ceasing.

It is not thus with sound. Nature hardly analyzes or distinguishes the harmonics; on the contrary, she hides them, under the appearance of the unison; or, if she sometimes distinguishes them in the modulated song of man, or in the warbling of the birds, it is successively, and one after another. She inspires songs, and not chords, melody and not harmony. Colors are the ornament of inanimate beings; all matter is colored; but sound is a manifestation of movement; the voice proclaims a sentient being; it is only

animate bodies which sing. It is no automatic flautist who plays the flute, but a mechanician who measures his breath and moves his fingers.

Thus each sense has its own field which belongs to it alone. The field of music is time, that of painting is space. To multiply the sounds heard at one time, or to develop colors one after another, is to change their economy, to put the eye in place of the ear, and the ear in place of the eye.(10)

Thus Rousseau coolly disposes of Castel's naive equations, pinpointing the essential discongruity of our senses. Goethe, whose investigations in colour were to dominate subsequent theorizing in this field, was also unsympathetic towards the concept of colour-music, whilst acknowledging the possibility of a 'höhere Formel' which might subsume colour and sound. 'In Geschichte der Farbenlehre Castel rates a mention, but only to permit the tart dismissal:

Sein Farbenklavier...woran er sein ganzes Leben hin und her versuchte, konnte freilich nicht zustande kommen.

(His colour-keyboard...to which he devoted a lifetime's experiment, really didn't come off.)(11)

* * *

I have spent some time relating this first experiment and contemporary criticism, for it permits one to gloss over much subsequent work in the field, derivative or broadly similar in intention.

Castel's gropings towards a new art of light-composition were to be succeeded in the nineteenth century by several sporadic engagements with related theories,* and by the construction of related keyboard instruments. In Colour Music (London 1844), D.D. Jameson described an instrument which 'consisted mainly of glass receptacles containing liquids of various colours, which acted as filters for light projections on to a wall covered with reflecting metal plates.'(13) Kastner invented a species of gas organ, the Pyrophone, in the 1870's, and a later, more developed version 'with thirteen branches, all decorated with foliage and furnished with burners containing several gas jets, which opened into crystal tubes. These burners were brought into play electrically...'(14)

At the end of the decade, the colour organ of the American, Bainbridge Bishop, used an electric arc to project colour combinations on a small screen built above the instrument, similarly attempting an audio-visual unison, and by 1911 Alexander Wallace Rimington

* For example, the metaphysics of the Romantic painter Philipp Otto Runge involved symbolic analogies between colour and musical pitch. The scientific researches of the physiologist Charles Henri and the observations of the art-critic Camille Mauclair should also be mentioned.

Throughout the nineteenth century creative minds worked increasingly towards an ideal unification of the arts. Music was esteemed as the loftiest medium, the exemplar to novelist, poet and artist. The romantic lyricist aspired to a euphonious 'musicality' of language, whilst the painter credited the visual image with possession of a sounding 'soul'.

For an illuminating discussion of these preoccupations, see Edward Lockspeiser's Music and Painting.(12)

(1854-1918) had published his influential Colour Music, the art of mobile colour. It was Rimington's colour organ that Scriabin was to employ in the performances of Prometheus:the Poem of Fire, Op.60 (1910), for which a light keyboard or Tastiera per luce was prescribed in the score. [Appendix 1.1] This projected twelve colours, analogous to the twelve steps of the chromatic scale. Scriabin's particular form of synaesthesia required two colour 'voices': one changing very slowly, about every two minutes, and the other accompanying each harmonic nuance in the music. Strong chromatic (musical) contrast was matched by an equated visual paroxysm, the hue always corresponding to the root of each passing harmony. Ultimately, as is known, Scriabin's theosophical bent took him to the brink of megalomania, with his visions of a transcendental Mystery (an incomplete work at his death in 1915), wherein the Gesamtkunstwerk concept of correspondences embraced not only sight and sound but the sense of smell also. Scriabin was plagued by technical difficulties in Prometheus - the light-projectors were reportedly ineffectual - but the piece stimulated in many contemporary artists a resurgent interest in multi-media experimentation.*

* For example, in March 1917, at the Teatro Costanzi di Roma, Stravinsky's Feux d'Artifice (composed in 1908) was performed to a 'ballet of lights...synchronised to the rhythms, controlled from a keyboard and accompanied by a series of coloured shapes disposed on the stage.' At Diaghilev's instigation the Futurist painter Giacomo Balla choreographed this 'ballet without dancers'; unfortunately the performance was wrecked by a blown fuse disabling the lighting keyboard.(15)

In the present century the most thoroughly-researched investigations into the potential of colour-music have been undertaken by later Russians.* In the late sixties a team appropriately called Prometheus, working at the Kazan Aviation Institute, was developing yet another light-instrument, to accompany the music of Scriabin, Rachmaninov, and Rimsky-Korsakov. The most recent technological advances in colour-film, electronic sound-synthesis, and sound dissemination were exploited. Konstantin Leontyev devised a light-show machine capable of translating directly from sound parameters - pitch, rhythm, intensity - into image parameters - colour, brightness, form - thus bypassing the requirement of a separately-composed voice.(17) Such unison, though, presupposes some agreement upon the psychological and perceptual correlations between hue and pitch/timbre...and this is unlikely to be secured.

This automated 'intensification' of music is, furthermore, patently redundant, and other artists have sought rather to articulate an autonomous silent art of moving visuals. Notable amongst these was Thomas Wilfred (1889-1968), who, having studied art and music, constructed his first light-organ, the Clavilux, in 1919. [Slide 1] Wilfred designated his art-form Lumia, unusual in that it rejected synaesthesia and correspondence in favour of self-sufficient light-composition. (The later Bauhaus experiments of Ludwig Hirschfeld-Mack on the other hand, revert to the unison of Scriabin

* But note also the experiments of the Milanese artist Luigi Veronese, who has pursued the dubious practice of comparing sound and visual wave-lengths. Veronesi made eight geometric abstract films between 1939-41, all apparently deriving from a Constructivist aesthetic. Although now screened silent, they were originally set to music. The hand-painted No.4 (1940), in which the montage is based on the Fibonacci numeric scale, used part of Stravinsky's The Soldier's Tale; No.6 (1941), also hand-painted, used Ellington's Mood Indigo.(16)

which, however revelatory and seemingly inextricable to the composer, can too readily appear fortuitous and arbitrary to the uninitiated spectator.) Wilfred was impatient with the lack of agreement amongst his contemporary 'synaesthetists', and was too well acquainted with the limited achievements of earlier experiment and the scientific rejection of direct transference between media to venture into audio-visual correlations. He calls upon Goethe in his defence of an autonomous art of light, unencumbered by any mimesis of music:

Color and Sound do not admit of being compared together in any way. They are like two rivers which spring from the same mountain, but from there on run their courses under totally different conditions, in two totally different regions, so that along the entire course of both no two points can be compared....[colour and sound thus operate]...in wholly different provinces, in different modes, on different elements, for different senses.(18)

Wilfred rails against those who, in the following decades of the nineteenth century, ignored Goethe, conceiving of colour and sound 'chained together' in a colour-music.(19) Music, if it were to be admitted at all, must be regarded as supplementary, an accessory, not a necessary partner in mystical oneness.

The Clavilux was first publicly performed in January 1922, in New York, and offered markedly greater technical sophistication than had ever previously been possible in real-time colour-composition. In addition to the customary keyboard it boasted 'a battery of six principal projectors and a certain number of grouped auxiliary reflectors.'(20) Such was the popular success of this machine that a Lumia Theatre was equipped in New York where, stationed at a large control-keyboard, the operator could choreograph a series of thirty-two independent projectors behind a translucent screen. In

1930 Wilfred set up the Art Institute of Light as a charitable foundation for research in Lumia. He continually modified the design of the Clavilux, effecting improvements as contemporary technical developments allowed. From an originally spontaneous improvisatory approach, Wilfred later composed works whose arrangements of colour and light were predetermined in the sense that they obeyed long cycles of controlled movement and metamorphosis. As late as the mid nineteen-sixties he was still engaged on Clavilux-compositions. His description of a pre-composed scheme bears interestingly upon similar abstract colour-play of the twenties. Of his Abstract he has written:

A triple radial solo form moves through an elliptical orbit in the vertical plane of the main sightline, while a contrasting double form moves through a double elliptical orbit in the same plane. The solo form completes thirteen orbital cycles while the accompaniment, the double form, completes six. This ratio of progress creates an intricate visual counterpoint, accentuated by a complementary color treatment.(21)

Some of Wilfred's more extended cyclic works are of astonishing duration: Aspiration only completes its processive cycle of screen projections after some forty-two hours.

Many other experimenters, including A.B.Klein (see his Color Music, The Art of Light, 1926), Achille Ricciardo, Leon Theremin, and Wladimir Baranoff-Rossiné, constructed instruments and gave recitals of colour-light works, both with and without musical accompaniment. The twenties and thirties saw the high-point of such activity.(22) The Dadaist Raoul Hausmann's 'optophone', and Alexander Laszlo's 'sonchromatoscope', both invented in the twenties, were joined by the Bauhaus experiments of Ludwig Hirschfeld-Mack and Kurt Schwerdtfeger, who publicly demonstrated their Farbenlichtspiel in 1924. Here was a

spectacle which - as we shall see - closely paralleled contemporary work in abstract film, but with the added stimulus of sophisticated and malleable colour-combination.* Hirschfeld-Mack's scores for Lichtsonate and Farbensonatine give some clue as to the nature of the concoction, which developed a seemingly impoverished music alongside moving light-forms. [Appendix 1.2] His Reflected Light Compositions required a specially designed projection apparatus to orchestrate the movement of coloured shapes on a screen. Four students were needed to read and realize their parts from a score which plotted musical sound in a one-to-one relationship with the rhythmic movement of the visuals. It was apparently possible to describe coloured shapes of every variety - angular forms, curvilinear forms, both discrete and superimposed. Performances were given in Berlin and Hamburg, and in Vienna in 1923.(25) Oskar Fischinger, who figured prominently in the context of 1930's abstract animation, was to invent a light-organ, the

* Seeking the best of both worlds, Laszlo Moholy-Nagy's incomplete silent film-study of 1930, Light-Play:Black-White-Grey, was a rather unhappy attempt to 'animate' his kinetic sculpture, the Light-Space Modulator (a construction of rods, perforated metal, and steel balls, set in slow clockwise rotation), by a pretentious form of 'fragmented montage', - a succession of arty angled shots, occasionally shown in negative and in superimposition. Constituting the first part of a six-part project, it is a superficially attractive, decorative piece, but devoid of formal rigour, gaining nothing (other than relative longevity) from filmic treatment. Its flaccid concatenation of shots was remarked by S. John Woods in 1937:

It was a pity that in this he forgot time. The movement was finite, not infinite; but the film started, ran and stopped without the moulding of time, which is as necessary to a film as to a symphony.(23)

Indeed, Moholy-Nagy's film most directly recalls Alvin Langdon Coburn's 'vertographs' (ca.1917), still photographic abstracts. Scharf regards these as 'the first photographic counterpart of Cubism...taken with a camera through a prismatic complex of mirrors, the original identity of the subject transmuted into striking, purely pictorial patterns.' Significantly, Moholy-Nagy occasionally found painterly inspiration in stills from his own films.(24)

Lumigraph, in 1950, long after his collaboration with the composer Alexander Laszlo in the presentation of the latter's Farblichtmusik displays in the twenties. On the Lumigraph luminous abstract forms were generated by movement of the hands across the lighted surface of the instrument. This machine was apparently playable after relatively little instruction, and Fischinger anticipated that it might eventually become popular in the home as a 'light-piano', accessible to children and adults alike. Unfortunately it never received commercial backing. More recently, kinetic artists have further explored the still barely tapped potential of coloured light forms in movement; this area of investigation is not congruent with our immediate concerns, however, namely the animated interplay of sound and visual on film. Earlier experimentation has been considered, though, for it must have influenced contemporary film-artists who preferred to express themselves in a medium which permitted not only control of real-time gesture, but intimate manipulation of metamorphosis through frame-animation.

The above survey shows that, although graphic artists strove to emulate the example of music, when music was itself incorporated it invariably occupied a humble role, being subordinate to and supportive of dominant visual stimuli, rather than interrelating polyphonically on some more equal footing. This outline of historical experiments with colour-organs offers a context within which to locate those similar endeavours in film that evolved either autonomous silent compositions or -audio-visual orchestrations. But there is another aspect of visual movement which must first be considered, one which has received far more weighty critical attention - namely movement as

represented in canvas-painting from the mid-nineteenth century onwards.

* * *

The Temporal Canvas

If, by the close of the nineteenth century, art was not overtly aspiring towards the condition of music, it did not disguise its obsession with the representation of time. The temporal dimension of experience increasingly preoccupied the artist; his various ploys to fix it, to inscribe it upon the canvas, and a growing realization of the ultimate impossibility of adequately summing the flux, finally generated sufficient dissatisfaction with such compromises as to compel a minority of painters towards an actualisation of temporality in film.

Certainly for Claude Monet, his several 'series' paintings were to be understood as interconnected, fragmented montage-elements which 'acquire all their value only by the comparison and succession of the entire series.' (26) Monet clearly felt the need to abstract from the experiential continuum essential spatio-temporal features - his work approaches that of Viking Eggeling and Hans Richter at the stage of their scroll-paintings; in both cases choice 'frames' are reproduced - in animation terms, the 'key' positions have been located, with the 'in-betweening' here left to the imagination of the spectator. The point of juncture is carefully weighed so as to establish the necessary quality of 'collision' (Eisenstein's term) between 'shots'. Each picture of a series cannot properly function in isolation, in

instantaneous frozen time. As Steven Z. Levine says of the Gare Saint-Lazare canvases of 1877, 'rather it is the durational recombination of those instantaneities into a quasi-cinematic narrative sequence that should interest us here.... Monet sutured together the threads of a temporal continuity.'(27) [Slide 2] How close Monet was to the philosopher Henri Bergson in his savouring of the passage of time can be gleaned from a phrase attributed to him by Roger Marx. Monet, speaking of his series pictures avers: 'there you discover, as in a microcosm, the existence of the elements and the instability of the universe that is transformed, at each moment, under our eyes.'(28) And Richard Langham-Smith has noted how

Monet...finally refused to paint for more 'than a few minutes at a time, to avoid ending up with a 'composite' picture, meaning one executed under changing lighting conditions. The 'series' paintings of the 'Haystacks' and 'Nymphéas', where Monet took a fresh canvas each hour, were an example of painting crying out for the techniques of cinema - an attempt to free painting from the bondage of the momentary image.(29)

However, it is perhaps the freedom to reject a uni-linear temporality which fascinates us in viewing these series, for the eye may wander back and forth, sampling within a temporal field as it will. From the select instants captured by Monet's camera-eye, the scene can, with the requisite imaginative will, be variously reconstituted in time. As Levine has observed,(30) Monet was not the first to elaborate the comparative context of the event. Giotto's frescoes of the life of Christ illustrate successive phases of the narrative within the one landscape, and in Hogarth, the Rake's Progress series identifies the crucial stages of the rake's life.—

However, the singular disadvantage to the artist of fixing successive but discrete motifs in series was the vulnerability of the constituent elements to dislocation through their indiscriminate dispersal, often dictated by commercial interest. This deprived such work of its coherence, and today it is often only through reproductions that a series can be reassembled, and viewed as the artist intended.

* * *

The impact of still photography upon artists in the latter half of the nineteenth century is well-known, several major figures having availed themselves of the camera to assist memory or, as exposure times grew shorter, to capture the fleeting gesture. This influence was most in evidence in the Futurists' work, for the 'analyses' of motion depicted in their canvases are directly indebted to the photographic investigations of the psychologist Etienne-Jules Marey (1830-1904), whose Chronophotographs dating from the 1880's, describing the trajectories of bodily movement, are echoed in Balla, Duchamp, and many others. In 1946 Duchamp recollected how 'Chronophotography was at the time in vogue. Studies of horses in movement and of fencers in different positions as in Muybridge's albums were well-known to me.' (31) [Slides 3 and 4]

Marey's photographic compound-images of motion were to inspire Duchamp's Nude Descending a Staircase, and Balla's Rhythm of a Violinist, La Bambina che corre sul balcone and Dynamism of a Dog on Leash, all of 1912. [Slides 5 - 9] As late as 1969, Norman McLaren's Pas de Deux, through the technology of the optical printer, portrayed

dance in multiple overlapping images which led the cinematic extension of Marey's work to perhaps its most sophisticated end. [Slide 10] Recently, video has been used to very similar effect, notably in the expanding field of pop-music promotions.

At first, the Futurists resisted any intervention of the cinematic principle in their work. Indeed they took a Bergsonian view of time as indivisible, for whereas in their canvases the very trajectory of movement was ensnared, past-present-future condensed in spatial fixity,

Cinematography does not trace the shape of movement. It subdivides it, without rules, with mechanical arbitrariness, disintegrating it and shattering it without any kind of aesthetic concern for rhythm...It merely reconstructs fragments of reality, already coldly broken up, in the same way as the hand of the chronometer deals with time even though this flows in a continuous and constant stream.(32)

Bragaglia and Boccioni

Futurist canvases conveyed dynamism through 'force-lines' whereby

Each object...reveals how it will be decomposed according to the direction of its forces....Moreover, each object influences its neighbours, not by reflections of light..., but by a real coming together of lines and by real conflicts of plane against plane, which follow the emotional law dominant in the painting...(33)

It may be noted, furthermore, that in our paintings there are tâches, lines and colour-zones which do not relate to anything in reality, but which, following a law determined by our internal mathematics, musically guide and augment the emotion of the spectator.(34)*

* See, for example, Umberto Boccioni's Gli Adii (1911), where the movement of smoke around a locomotive...'expresses the chaotic emotions generated by the experience of parting...' (35) [Slide 11]
from Archivi del Futurismo

Monet's passing interest (as in the Gare Saint-Lazare series) in the dynamics of the modern industrial world now became obsessional with the Futurists, not only manifested in their canvases, but also in their music. The Futurist movement, whilst being chiefly remarkable for its contribution to the visual arts, also influenced contemporary composers. Casella, Honegger, Stravinsky, Milhaud, and Ravel, and of course Varèse, were all in greater or lesser degree intrigued by the movement. They attended Futurist performances, and Stravinsky visited Milan to study Russolo's new instruments, the intonarumori. Pratella, the one professional Futurist musician, produced two manifesti of Futurist music, the second of which, Technical Manifesto of Futurist Music (1911), boldly advocated 'a single...atonal mode, the chromatic scale,...the realization of the enharmonic mode [microtonal temperament]...and a free, polyrhythmic manner.' However, it was not Pratella, but the Futurist painter and aspirant composer Luigi Russolo (1885-1947), who can now fairly be regarded as the father of a modernist musical aesthetic - 'musique concrete'.

That Russolo, first and foremost a painter, should have been drawn to a truly temporal medium - the 'music' of modern life - is most unusual; but is nevertheless indicative of the contemporary impatience with static arts. (See his Music (1911); oil on canvas. [Slide 12]) As early as 1913, in a manifesto entitled L'Arte dei Rumori he was rapturously envisaging painting with 'natural' sound:

Let us pass through a great modern capital, more attentive with our ears than with our eyes. An ever-changing pleasure will gratify our sensibilities as we distinguish the gurgling of water, air and gas in the metal pipes, the snorting and growling of the motors, breathing with their indescribable suggestion of animal

beings, the pulsation of pistons, the screeching of mechanical saws, the noisy bumping of trains on their rails, the cracking of whips, the flapping of flags. We will find amusement in imagining a way of 'orchestrating' the swinging doors of the shops, the buzzing of the crowds, the varied hullabaloo of railway stations, forges, spinning works, printing works, electric generating stations, and underground railways. We must not forget the absolutely new noises of modern war. We want to 'tune' these very varied sounds, and bring them into harmonic and rhythmic order...(36)

Much of this effusion could have issued from the pen of the 'musique concrète' composer Pierre Schaeffer thirty-five years later.*

Like Schaeffer, Russolo was not a trained musician; perhaps for both men, their ignorance of musical 'laws' proved of positive benefit, allowing their imaginations to operate unhampered by the repressive effects of tradition. Russolo never conceived of working with recorded sound; the gramophone was yet in its infancy. Oddly enough, his vision can be regarded as having overtaken Schaeffer and the Cologne school, finding its place amongst later developments in live electronics. For Russolo's Art of Noises was realized in live performance, using instruments of his own invention called 'intonarumori' or 'noise-makers'. [Slide 13] Russolo's noises were classified into six groups, the first four consisting of rumbles, explosions, splashes, whistles, hisses, mutterings, buzzings, etc.; the fifth of sounds of struck metal, wood, stone, terracotta etc., and the sixth of 'animal and human sounds' - shouts, squeals, laughs, groans, sighs, heavy breathing and the like. Altogether a crude division of effects, but sufficient to Russolo's purpose.

* Remarkably, this Futurist aspiration was to be echoed by the Neo-Plasticist Piet Mondrian, who also envisaged a glorious future where 'music as 'art' will come to an end. The beauty of the sounds around us - purified, ordered, brought to the new harmony - will be satisfying.'(37)

The ear cannot get its bearings amid the confused and fragmented noises of life. Therefore it must hear them dominated, completely mastered, conquered, and obliged to become elements of art....This lyrical coordination of life constitutes the 'nuova volutta acustica' which is alone capable of truly exciting our nerves, of profoundly moving our souls, and multiplying a hundredfold the rhythm of our lives.(38)

In April 1914, Russolo's first 'noise-concerts' took place in Milan, causing a riot on the scale of the Rite of Spring fiasco. (As with the Rite, later performances were usually received in relative calm.) These first Futurist noise compositions bore such titles as The Awakening of a City, Assembly of Aeroplanes and Motor Cars, Dinner on the Hotel Terrace, and Skirmish in the Oasis, each designed to condition the listener's response to sound in such an unfamiliar presentation. The few extant bars from the score The Awakening of a City are notationally quite adventurous, making use of a proportional system, and including glissandi of various speeds and quarter-tone indications. [Appendix 1.3] Remarkably, no recordings were ever made of these performances, nor can any first-hand accounts be traced of Russolo's many concerts from 1914-1929. Even the 'intonarumori' have vanished, presumed destroyed, leaving only scant photographic evidence of their uniform exterior case-work. Russolo's post-war invention, the Russolophon or rumorarmonio, (French patent, 1920) drew within the one console the precise control of a wide range of effects, sounding seven different noises which could each be pitched to produce intervals as small as an eighth-tone. It is interesting to note that such an instrument bears obvious similarities to contemporary image-generating organs, but it remained for the Whitney brothers ultimately to realize a synthesis of absolute visual and non-'instrumental' sound. Akin as it was to the cinema 'effects'

organ of the day, it was envisaged that the Russolophon might find a place in the film-theatre, and indeed, Hans Richter reported that Russolo's 'bruitistic' machine was eventually destroyed in 1930 at the rowdy film-premiere of L'Âge D'Or (Bunuel/Dali) at the 'Cinema 28' in Paris.(39)

* * *

Not only the Futurists were preoccupied by time. In France, the Cubists, notably Braque, Picasso, and Gris, attempted on canvas the representation of movement through a multiplication of view-points, overlaying angle-shots, medium and close-ups in a perpetual striving after the temporal-spatial essence of their perception. A static movement resulted; linear, textural, colour rhythms vibrated together, on the verge of rupture, of dismemberment. No single, unified axis of view was retained; the artist became mobile, choreographing his perspective as he explored the various facets of the thing seen. Such graphic dynamism required of the spectator an equivalent scanning flexibility - his grasp of the picture remaining incomplete until the many conflicting angles were resolved in an intuition of the whole. The concept of duration was implicit in this art.

Today oil painting allows the expression of notions of depth, density and duration, thought inexpressible, and encourages us to present within a limited space, governed by a complex rhythm, a true fusion of objects.(40)

Gleizes and Metzinger

Just as Monet localised time in his series paintings, and the Cubists faceted it in their 'simultaneous' canvases, just as the Russian avant-garde film-makers Eisenstein and Pudovkin and the

Frenchman Abel Gance were to deconstruct experience in order to rebuild it in man's enhanced imagining, so Russolo, in his compositions, had musicalized the concreteness of natural sound, and had thus prepared the ground for an ultimate audio-visual synthesis of both abstracted art-forms.

* * *

The writings of the philosopher Henri Bergson (1859-1941) had a profound effect on Cubist artists and on contemporary poets. In his vehement rejection of that scientific view which quantifies reality as a concatenation of discrete events, Bergson's intuitive disquiet communicated directly with artists' sensibilities, already discomfited by the effortless seizure of externals by the instantaneous blink of the camera-eye, which had so rudely usurped their time-honoured role of graphic representation, and deprived canvas-art of its inherited mystique. Verisimilitude must now take on a deeper meaning if the artist was to retain his self-respect in confrontation with the new technology, and a re-assessment of the image through an awareness of its inherent instability, its susceptibility to change, confirmed the inviolable supremacy of the creative insight above the mechanical eye.

Duration is the continual progress of the past which eats away at the future, swelling as it advances....(41)

Duration is like an endless flow. It is the core of our being, we feel it keenly, that essence with which we communicate. It is in vain that a dazzling prospect of universal mathematics is presented to us, we cannot sacrifice experience to the demands made by a system.(42)

Bergson

Already by 1911 a popularized and necessarily simplified Bergsonian view had been taken up by the artistic avant-garde. La duree now invested the structural analyses of their canvas imagery with a gestural dynamism which proclaimed the hegemony of the artist's binocular and sentient viewpoint. As Christopher Green writes:

It allowed the results of a continuous and mobile process of study to be merged into a single composition....The notion of interpenetration itself, with its attendant destruction of physical barriers in favour of a rhythmic continuity, is obviously at least in part Bergsonian, and, when extended to involve the factor of time,...the connection is even more obvious.(43)

Paradoxically, Cubist faceting lamentably failed to transfer Bergson's view of time on to canvas. How could this tentative liberation of time within a static art adequately summate an 'endless flow'? The successive representations of movement, phased as in Futurist work, or overlaid and subject to shifting perspectives as in that of the Cubists, could not but present time as a succession of points, of discrete 'stilled' states. This frozen movement, - still life, - was alien to Bergson's concept of duration as a seamless continuum. Thus it would appear that Bergsonian thinking reached the artistic avant-garde in a somewhat confused, diluted form, and that they absorbed from it (as creative artists will), only that which they could directly exploit, oblivious to, or uncaring for, any inconsistencies in their interpretations.

Bergson's fundamental theme of organic regeneration found a more sympathetic resonance in contemporary music, in, for example, Stravinsky's Rite of Spring of 1913, the *idée fixe* of which concerned primitive self-absorption in a never-ending renewal of organic life.

The pantheist, Delius, although recognized as an avowed Nietzschean, also seems close to Bergson in his concentration on flow, expressed through the sensuous lapping of his chromatic style, and his closeness to the recurrent seasonal passage of time. The Schoenbergian concept of constant metamorphosis, both in the 'freely atonal' pieces, and underlying the later twelve-note works, again translates the Bergsonian view, replacing a foregrounded thematic dialectic with intuitive gestural expressionism.*

As we have seen, Monet's series pictures were - as an artistic paraphrase of Bergson's philosophy - more successful than the Cubist and Futurist canvases, in that they more assertively acknowledged the open-endedness of the art-work. The constraint of the single frame was rejected; several moments, from an infinity of possible moments, were presented to the eye which, as it travelled from canvas to canvas, might relive the conceptual time of the oeuvre's creation. Hence these canvases of Monet might be justifiably termed 'open-form' in their refusal to define a visual argument in terms of a conclusive hermetic equilibrium. The definitive state was found wanting. And we shall later see that it may be fruitful similarly to regard Eggeling's film Symphonie Diagonale in this light. There were, after all, other precedents: Picabia's water-colours of New York and Harlem of 1913 likewise form open-ended series, as do Robert Delaunay's Tours of 1910-11, and his later Villes, Fenêtres, and Formes Circulaires - each describing evolving variations on a given theme. [Slide 14]

* In his earliest book, Time and Free Will, Bergson compared the very process of intuition to the perception of a melody.(44)

Further discussion of those later art-movements to which the film-artists themselves adhered will be deferred until Chapter 3, for their work is so intimately bound up with the concerns of their fellow-artists that any summary at this point would be premature.

Kandinsky and Theosophy

From this outline it can be appreciated to what extent artists around the turn of the century were intensely alive to the temporal dimension of spatial art. There but remained that decisive final step - the realization of time in real graphic movement. This became the mission of a small group of artist film-makers in the years immediately surrounding the First World War.

Although it is tempting to embark directly upon a consideration of their work, this introduction would remain very incomplete were the abstract paintings and theories of Wassily Kandinsky to pass unremarked. For Kandinsky, probably more than any other artist of his generation, was quite literally obsessed by the latent musicality of his work, and it is thus through a study of Kandinsky that a link between the canvas-artists preoccupied with the inscription of time, the colour-organ boffins, the makers of silent absolute films, and the composers of the period can be forged. The art and writings of Wassily Kandinsky (1866-1944) were to have a lasting influence on the future development of abstract film, both in Europe and, subsequently, America. The transcendental nature of his thinking - fundamentally grounded in a sympathy for the Theosophical movement founded by Helena Blavatsky in 1875 and greatly popularised by Annie Besant and Rudolf Steiner - was to be shared by many other artists, - Mondrian most

notably, but including the film-makers Viking Eggeling, Harry Smith, Oskar Fischinger, and Jordan Belson.*

Furthermore, Theosophical thinking was positively rife amongst contemporary composers in the first decade of the century. Not only was Scriabin to become obsessed by Madame Blavatsky's mysticism, but it is suggested that Schoenberg was also influenced, most notably in his unfinished oratorio Die Jakobsleiter.(45) We find that Hauer, the inventor of a "troped" serial language, 'started from Goethe's Theory of Colours, introducing ideas from Eastern philosophy into the creation of his theory of music teaching, and finally ended up with the "world builder", whose perfectly finished absolute music, "this godlike father-tongue", we should strive to learn.'(46)** Alois Hába, the composer of microtonal music, was to steep himself in the teachings of the former Theosophist Rudolf Steiner, and Holst and Sorabji may also have shared some sympathy with his thinking. Most recently, the overtly mystical compositions and pronouncements of the 'guru' Stockhausen have, in mediating between Eastern and Western musical traditions, gone some way towards rehabilitating the intuitive, spiritual side of compositional practice, in the face of that vehemently materialist aesthetic which imbued the serialist schools of the fifties and sixties. Drawing upon the Sri Aurobindo by

* The Theosophical Society was most instrumental in propagating an occult revival in the late nineteenth century. With no individual obligatory doctrine other than a common humanitarianism and transcendentalism it could appeal to a wide cross-section of the philosophically-inclined.

** Peter Vergo has noted that after World War One Hauer apparently engaged the artist Johannes Itten (1888-1967) in debate upon the subject of translating musical structures into visual terms. Itten was, like his later Bauhaus colleague Paul Klee, intensely musical, and like Hauer, drawn to mysticism. His crayoned picture Threads (1918) may represent a visual analogue to the linear intertwinings of musical counterpoint. (For a discussion of visual 'polyphony' see below.)(47)

Satprem (India Library, New York) in his programme note to the British premiere of Mantra for two pianos (1970), Stockhausen reveals his sympathy with the Theosophical thinking of Kandinsky:

There exists in India a secret knowledge based on the study of sounds and the difference of vibratory modality according to the planes of consciousness....The mantra or great poetry, great music, the sacred word, comes from the overmind. This is the source of all creative and spiritual activities (it is not possible to distinguish between the two...) ...for anyone who has the capacity to enter more and more consciously into relation with the higher planes - poet, writer, artist - it is quite evident, perceptible, that after a certain level of consciousness it is no longer ideas that one sees or tries to translate. One hears... When the consciousness is transparent the sound becomes clearly audible, and it is a seeing sound, a sound-image or a sound-colour or a sound-idea, which links indissolubly in the same luminous body the audition to the vision and the thought. All is full, contained in a single vibration...(48)

The Theosophists affirmed that the divine was accessible to intuition, that man's spiritual being could commune with the essence of life only after his conceptual and perceptual inhibitions were removed. Like those French symbolists inclined towards the occult, they believed that the supra-sensible world could be entered only by the initiate to whom esoteric secrets would then become available. (A conscious élitism informed many artistic circles at this time - notably those of Stefan George (whose texts Schoenberg set in Opus 10 and Opus 15), and Schoenberg's own 'Verein für musikalische Privataufführungen'.) A release from the limitations of a mundane exterior reality was sought in a para-normal internal reality. The truth lay within.

Outward appearances were found wanting in their relative conditioned half-truths; the inner essence though was imperishable and unconditioned, immutable and universal. In The Sounding Cosmos, (49) Sixten Ringbom has most persuasively argued the case for reading Kandinsky's work in the light of his professed Theosophical inclination. Most striking are the similarities between the projected abstract thought-forms of Annie Besant and C.W. Leadbeater, and several figures which recur in Kandinsky's art. (50) It would appear that an interest in the occult motivated Kandinsky throughout his life, nourishing his conviction that each visual phenomenon must necessarily further manifest itself in sound. In virtually all of his work and writings the representation of sound in painting is prominent, for the spiritual universe was most readily conveyed through sound. The absolute painting was to be a pure reflection of spiritual life; in eschewing a restrictive adherence to outward reality - the discredited material object - it could operate unqualified and unfettered. The absolute image was not structured by logic or mathematical models, but arose spontaneously, through intuition.

In his published lecture on Kandinsky's At Rest (1928), L.D. Ettlinger reveals that the attribution of universal meaning to abstract design was probably communicated to Kandinsky through the essay Sur les signes inconditionnels dans l'art (1827) of the Dutch painter D.P.G. Humbert de Superville, and summarised by Charles Blanc in his Grammaire des Arts of 1867. In Ettlinger's words, Superville had proposed a

theory of absolute means of expression, establishing first of all the vertical as a universal and cosmic line of direction. It is an extension of an upright man's axis towards the sun. The horizontal, the line on which the man stands, runs at right angles to it. And diagonals

can be drawn, rising or falling from the point of junction. Superville asks himself whether these lines affect feelings and emotions, and he concludes that the horizontal expresses rest and equilibrium, a rising line joy and agitation, a falling line grief and meditation....This theory of expressive forms is linked with a theory of expressive colour, and it is claimed that form and colour are inseparable. Moreover, colours are supposed to have a definite emotional impact just as forms...[but] Superville did not actually propagate non-representational art since he believed in the supremacy of religious Christian art...The signes inconditionnels were symbols of a mystic harmony between man and the universe, just as Kandinsky's spiritual vibration pulsates through the whole chain of being.(51)

The generation of spiritual vibrations, in essence sounding, but clothed in visual form, was dependent on the individual's awareness of 'inner necessity', of deep feeling and empathy for life. Thus was the primacy of feeling constantly asserted; the rational, logical mind must ultimately capitulate to the instinctive. This dualism is mirrored in the dilemma of contemporary expressionism, where intensely spiritual truths were confronted by an unpalatable material reality. Those three bourgeois fictions - reason, science, and morality - were to be disfranchised in a wholesale subversion of the phenomenal world. How close in mood is the Theosophical mystique to that of Bergson - both esteeming intuition above scientific analysis.

Perhaps because of the very intangibility of spiritual experience, that is, its resistance to translation, Kandinsky never succeeds in identifying 'inner necessity' with any clarity. His thinking is, like Sergei Eisenstein's, essentially intuitive, such that one must glean its originality, subtlety, and passing common sense from a style which is often turgid and obscure. As in On the Spiritual in Art,(52) it comes perilously close to the pretentiousness of a meaningless, overblown jargon, despite the artist's sustained

attempts to articulate and elaborate his theories. However, it would be wrong to accuse Kandinsky of any simplistic desire to mimic sound in his art. As he states: 'for my part I have not tried to paint music, for I consider such painting basically impossible and unattainable.'(53)

Sound was not literally manifest through the visual but enjoyed a symbolic significance.(54) Following the Indian concept of anahata, or non-manifest sound, in Kandinsky's interpretation it at once signified a synaesthetic sensation, the presence of movement, tension, and inclination, and the spiritual dimension of the universe. The spiritual content was revealed in sound-vibration; forms placed reverently on the canvas were thus messengers from the higher world, in their absolute-ness most clearly projecting to human perception that inner sound of spiritual ease. These forms sounded, not in isolation, but together, creating a divine harmony.

The lengths to which Kandinsky pursued this analogy of shape and sound - symbolic as it professedly was - were remarkable, and as we shall find, cast some light on Eisenstein's apparently far-fetched audio-visual contrivances in his analysis of the 'Battle on the Ice' sequence from the film Alexander Nevsky. Jerome Ashmore summarises some telling instances of visually-generated sound, drawing from Kandinsky's Point and Line to Plane:

If a point is placed in the center of a square, an observer hears a single sound. But, if the point is placed elsewhere in the square, two sounds occur, one the sound of the point itself and the other the sound of its off-center location in the square. If two points are placed off-center, the sound becomes more complex. From such an origin, a storm of sounds can be created merely by adding points of various sizes in various places. The basic sound of any single

point will vary with its size and shape.

The growth of a line out of a point is organic and marked by a corresponding strengthening of sound. In this process, a point is acted on by positive and negative forces. Sometimes the positive pressure dominates, sometimes the negative. The point changes its course according to the dominating pressure, but innately continues to sound. The sound of the width of a line may be correlated with the pitch of a musical instrument. Kandinsky says, "A very fine line represents the sound produced by the violin, flute, [or] piccolo; a somewhat thicker line represents the tone of the viola [or] clarinet; and the lines become more broad via the deep-toned instruments...culminating in the broadest line representing the deepest tone produced by the bass-viol [sic] or the tuba."(55)

Such a superficially naive equation provokes one's incredulity, prompting an interpretation of Kandinsky's views as issuing from a highly-developed synaesthetic confusion of sense modalities. Otherwise, such simplistic correlation rings uncomfortably true to Disneyesque visualization of musical parameters. It would appear that Kandinsky whole-heartedly embraced the concept of synaesthesia (indeed, it is probable that he 'enjoyed' synaesthetic response...apparently he had a photographic memory - and the two often go together) which was a current preoccupation in psychology, and rather than aligning himself with the associationist school would have concurred with Francis Galton's view of simultaneous response whereby, as it were, 'one portion of our mind is being contemplated by another part of it.'(56)

Whilst for Kandinsky all painting, absolute and materialist alike, made sound-vibration manifest, it was only on a canvas uncluttered by representational specificity, that the inner sound became 'undamped', ringing clear and pure, transmuting and awakening

from its dumb trance the 'still life' of a deceptively sterile geometricism. However, the sceptic might well ask, was this wishful thinking, a self-deception engendered by Kandinsky's fundamentally mystical approach?

Perhaps it is irrelevant to enquire quite how the artist supported his conviction of the sufficiency of non-representational forms. What counts is their transparent 'rightness', which can be enjoyed irrespective of the viewer's own cast of, or impatience with, gnosticism.

Within the present context, Kandinsky's insistence upon the musicality of his work is of immediate interest, and can to a degree be divorced from its function in his sphere of cognition. His implicit denial of any distinction between spatial and temporal expression excitingly anticipates the actual resolution of virtual into real movement in the absolute films of the twenties. His correlation of sound with colour (and with line), and his frequent borrowings from musical terminology - the orchestration of plastic symbols, rhythm, interval, metre - argue his affinity with Scriabin, who likewise strove to embrace the totality of life's experience in a symphonic cosmic Gesamtkunstwerk. In Ashmore's words:

With sound conceived as ultimate, spiritual, and fundamental in abstract painting, there is a corollary that all physical things, if reduced to vibrations, will disappear and that what remains will be plastic elements in a pure state and, under the talent of the artist, amenable to revelation as sounds, movements, rhythms, and emotional transports which give to each painting its particular resonance....sound is his sovereign concept.(57)

In relation to film, Kandinsky's belief that the several pictorial

elements combined into a Gestalt of ultimately resolved sounding tensions, of collisions between components, anticipates Eisenstein's theory of collision-montage:

Painting is a thunderous collision of different worlds intended to create the new world within and out of their strife. This new world is the painting. Technically every masterpiece is created as the cosmos was - through catastrophes which in the end create a symphony of spheres from the chaotic noise of the instruments.(58)

In fairness to Kandinsky it must be asserted that he never wilfully sought shelter within such obscurantism. Indeed his expressed goal was the revelation of the universal to the common man through an artistic communication which might transcend all limiting world-views. The psychic translucence of absolute art was to provide the solution for him, as it was for his fellow-Theosophist, Mondrian, and also for Viking Eggeling.

Visual Polyphony

By the nineteen-twenties it had become commonplace amongst abstract artists to draw upon musical analogies in seeking out fundamental laws of structuring. In 1922 Walther Gropius, founder of the Weimar Bauhaus, was proposing a searching investigation into the 'Kontrapunkt der Konstruktionsform', (59) and in 1928 Oskar Schlemmer, like Eggeling and Richter before him, found fruitful analogies in the contrapuntal writing of J.S.Bach when discussing abstract dance.(60)

Schelling it was who, in his Philosophie der Kunst, asserted that 'architecture in general is frozen music'. Perhaps one can read architecture in terms of a musicalized proportioning, in terms of a temporally perceived tension-resolution; indeed, the starkly geometrical buildings of the Bauhaus school derive directly from a canvas-art which interpreted itself very much in musically-analogous language - rhythm, counterpoint, orchestration.

The apparent scientific exactitude of contrapuntal music held tremendous appeal for the abstract artist, still unsure of his footing in composing with the non-representational.* 'Counterpoint' was the keyword, dignifying the exploratory with an aura of academic solidity. Pictorial problems could thus appear amenable to rational solution, being structured within formalised principles. Influential on Paul Klee - whose experiments with 'polyphonic' visuals formed a consuming interest of his Bauhaus years - were the contrapuntal concepts of the Orphists. Frank Kupka, quite consciously drawing upon Bachian models, showed a Fugue á deux couleurs in the 1912 Salon d'Automne, and together with Delaunay and Kandinsky, inspired Klee to formulate laws of polyphonic organization based on eighteenth century practice, - from Bach to Beethoven.**

Music is the only art of sound which does not exist in nature and must be almost wholly created. Man has created words to articulate his thought.

* The Puteaux group, for example, vigorously pursued analogies between art, mathematics, and music. Led by the brothers Jacques Villon, Marcel Duchamp and Raymond Duchamp-Villon, it could boast a membership including Fernand Léger, Albert Gleizes, Jean Metzinger, and Guillaume Apollinaire.(61)

** Klee compared Delaunay's 'Simultaneous windows' paintings with Bach fugues. See Die Alpen, VI (12 Aug 1912), p.700. (Die Alpen was a Berne periodical for which Klee was critic.) From the start, Klee senses parallels between music and the graphic arts, both temporal arts, for 'the pictorial work sprang from movement, it is itself fixed movement, and it is grasped by movement (eye muscles).'(62)

He has created writing, the aeroplane and the locomotive. Why then should he not create in painting and sculpture, independently of the forms and colours which surround him in the world?...I believe that I can find something between vision and hearing and that I can reproduce a figure in colours just as Bach did in music.(63)

Frank Kupka

Andrew Kagan argues convincingly that Klee was well acquainted with polyphonic theory, as presented in Johann Josef Fux's influential treatise on Palestrinian polyphonic writing, the Gradus ad Parnassum of 1725, and with its practice in, especially, the works of Mozart. For Klee, Mozart was the musical Godhead.(64)

Like Eggeling, Richter, Ruttman, and Kandinsky, Klee enjoyed a musical education, showing tremendous promise as a young violinist. (Although unsympathetic to avant-garde compositions, he remained an enthusiastic lover of 'classical' music throughout his life.) From a study of his unusually large canvas Ad Parnassum of 1932, Kagan interestingly parallels Fux and Klee, both in their respective arts giving instruction in contrapuntal theory. In the context of his Bauhaus lectures, Klee had 'graphed' a passage from Bach's Sonata in G Major for Violin and Cembalo,(66) 'to illustrate the possibility of quantifying pictorial rhythms and linear dynamics.'(67) [Slide 15] (In passing, it is interesting to note that Oskar Fischinger's impulse towards animated abstraction had originated in a graphic analysis of Shakespeare's Twelfth Night, where 'on large sheets of drawing paper, along a horizontal line, I put down all the feelings and happenings, scene after scene, in graphic lines and curves.'(65) [Slide 16]) Klee was to make many independent drawings and paintings exemplifying polyphonic texturing, where linear trajectories were strongly equated

with melodic contour. Richard Verdi suggests that in Fugue in Red (watercolour, 1921) Klee's profound musical understanding had allowed him to translate to canvas a composer's handling of 'expectancy levels'. [Slide 17] In the visual echoes of overlapping planes we thus witness a re-presentation of the phenomenon of musical 'becoming'.(68) Verdi even essays identification of subject, countersubject, and invertible counterpoint in Klee's patterning, and anticipates Kagan's thesis in asserting Klee's devotion to eighteenth-century models of thematic cellular design and extension. In his use of 'displacement, mirroring, rotation', does Klee not share this preoccupation with Eggeling?(69) Klee also aligns with Eggeling in his impatience for 'the venerable practice of exploiting music as a fund of metaphors for the "ineffable" in painting....[Rather] he sought to introduce to art theory and instruction a particular type of discipline and precision which he found in music theory and instruction.'(70)*

Eggeling's scrolls and many of Klee's pictures share an identical concern for establishing fundamental 'scientifically-based' laws which might underpin the polarised energies of their graphic designs, counterbalancing thrusts, defining vectors, defying or acknowledging gravitational pull. Indeed, Klee saw the resultant vertical relationships which issued from a complex interweaving of linear strands as to some degree thwarting material temporality, as faceting the musical argument, and thus resisting a uni-directional interpretation.

* For Eggeling's Generalbass der Malerei read Klee's Höhere Polyphonie.

Simple movement strikes us as banal. The time element must be eliminated. Yesterday and tomorrow treated as simultaneous. In music this need was partly met by polyphony. The quintet in Don Giovanni is closer to us than the epic movement of Tristan. Mozart and Bach are more modern than the nineteenth century. If in music the time factor could be overcome by a step acceptable to our consciousness, a late flowering might still be possible....Polyphonic painting is superior to music because its time is more spatial. The idea of simultaneity comes out more richly....Delaunay tries to follow the example of a fugue and put the pictorial accent on the time factor - this he does by choosing an immensely elongated format.(71)

He strove consequently to 'fix' the polyphonic by elaborate processes of layering, producing simplified 'graphic scores' where, one may believe, pitch is plotted on the vertical axis, and time on the horizontal, with timbre and articulation indicated by linear characteristics of angularity or sinuosity.* In addition, Klee developed Robert Delaunay's 'polyphonic' concept of colour layering, whereby a peculiar dimensionality is effected, not truly three-dimensional depth-perspective, but nonetheless establishing foregrounds, middlegrounds, and backgrounds by means of subtly-applied translucent glazes, to convey simultaneity** Harry Smith's film No.7 later attempted something similar in creating multiple colour-shape overlays by optical printing.

* * *

* 'There is polyphony in music. In itself the attempt to transpose it into art would offer no special interest. But to gather insights into music through the special character of polyphonic works, to penetrate deep into this cosmic sphere, to issue forth a transformed beholder of art, and then to lurk in wait for these things in the picture, that is something more. For the simultaneity of several independent themes is something that is possible not only in music....'(Paul Klee)(72) With Kandinsky, Klee believed that art's mission was not to reproduce the visible, but to make visible.

** See, for example, Polyphony (1932): tempera on canvas; and Ad Parnassum (1932): oil and cassein on canvas.

From this survey of the interrelations between sounds and visuals in colour-music and in the art of the late nineteenth and early twentieth centuries, the centrality of the concept of time has become evident. In the next chapter the regard for musical structuring and counterpointing by film-makers and theorists concerned primarily with live-action cinema will be considered, for their approach was markedly influenced by that of earlier artists to whom the technology of film-making was unknown or foreign. It will be seen that many avant-garde film theories propounded in the twenties were imbued with the concepts first communicated by those figures mentioned above. Kandinsky's influence remains vital, not only on his fellow artists, but also on contemporary musicians; hence it is through him that we find music and the visual arts most compellingly conjoined.

CHAPTER TWO

THEORIES OF MUSIC IN NON-NARRATIVE FILM

A Supportive Role

It must be acknowledged that, when viewing absolute animated films with electronic music, most audiences will relate back to their experience of the use of music within the commercial narrative film; consequently it seems appropriate to consider the general theory and practice of composing for non-narrative sequences in feature films. Scoring for dramatic narrative sequences - which constitutes the norm in commercial cinema - is not dwelt upon, since it obeys different laws, being constrained by the need to 'set the atmosphere' in the manner of a Pavlovian conditioning. In narrative cinema, music is at its most subservient, for its gesturing is wholly prescribed by the exigencies of plot; in this regard, little has changed since the days of the silent film-music compilation manual, where music fragments were characterised by mood and/or their recommended placement...aeroplane-music, chase-music, 'mysterioso', etc.. Only in relatively non-narrative passages of film can the balance be redressed in favour of music's occupying a more equal role in defining its own temporal trajectory.

Film music has thus served the same essential purpose from its initial use to its application today. Most of the time it fulfils a basic supportive role in enlarging upon and translating the visual mood into a generalised aural equivalent. Whilst the plusher orchestrations of later years may appear an advance on compilation-music, their function is the same - to lend an extra acoustic dimension to the two-dimensional flickering of the screen image, to draw the drama on the screen into the auditorium, and to enhance the temporality of the event (and hence its frailty and

instability, its very 'presentness') through music's essential evanescence. For the silent image is strangely extra-temporal. As shot succeeds shot one conceives of a series of 'stills'; memory epitomises sequential visual activity. Thus the truly silent film is both subjectively and physically a temporal extension of points of stasis. The addition of music lends film a trajectory through time; whereas music may expand upon the film's mood, the visuals are themselves paced by the music, their accents subconsciously felt in counterpoint with sound.

No sooner does music intervene than we perceive structured patterns where there were none before. Confused shifts of positions reveal themselves to be comprehensible gestures; scattered visual data coalesce and follow a definite course. Music makes the silent images partake of its continuity. Besides creating that brightness which keeps them close to use, it incorporates them into the inner time in which we grasp significant contexts. Ghostly shadows, as volatile as clouds, thus become trustworthy shapes.(1)

Siegfried Kracauer

It is comparatively rare for mainstream or, for that matter, independent film-makers to give initial consideration to the music in their films. Commonly, a composer will not be involved with a film until the post-production rough-cut or even fine-cut stage, often at short notice, when he will be required to provide music of a length and type ordained by the film's director. In the production process common to nearly all feature films of the sound era the composer's role is thus defined, his contribution being regarded as supportive, in some way, of what already exist as visuals and as speech and effects tracks. This practice evolved naturally from that of silent-film making, where a print would often be ready for release

before the music-director, or 'fitter', was required to assemble a compilation of classical and popular materials to accompany it live. Inevitably at that time when sound could not readily be synchronized with visuals, the latter had to be defined and realised first, with live music and effects added at each and every performance. Although few film-makers in the silent era gave much thought to this music, D.W.Griffiths in his association with Joseph Karl Briel in Birth of a Nation (1915) is a notable early exception,* and indeed in the first days of sound film (1928-9) it was sufficiently unusual to elicit comment if directors worried about audio-visual correspondences of more than the most trivial, obvious kind. The figures of Eisenstein, Pudovkin, and Eisler are foremost in their advocacy of a more creative handling of film-music; in other cases experimentation did not progress beyond the speculative stage, as voiced in the theories of Arnheim, Balázs, and Kracauer. After 1930 and the establishment of sound film, little progress was made in furthering the understanding of music's role in commercial cinema. Indeed, it can be argued that as long as representational narrative cinema is still wedded to a scripted story-telling so long must its music endure a secondary supportive role. Only in a film medium where pro-filmic concerns outweigh those of story-telling, can music take its place alongside the visuals in the forefront of the audience's attention. Although, as will be seen, there is little theorising on the function of music in strictly absolute films, non-narrative sequences (by which should

* Followed by: Fernand Léger (Ballet Mécanique - music by George Antheil 1924); René Clair (Entr'acte - music by Erik Satie 1924); and Sergei Eisenstein (Battleship Potemkin 1925, and October 1928 - music by Edmund Meisel).

be understood those passages in which the drive of dramatic action is deliberately retarded to permit a momentary reflection) in otherwise narrative films find frequent reference, and it seems appropriate to consider these writings here, since the thought-processes involved share some affinity with those adopted when working in absolute film. Furthermore, in the case of the Russian formalists there is an enthusiasm for composition with natural sound which anticipates the 'concrete' experiments of Pierre Schaeffer and Pierre Henry by over fifteen years; the montaging of optical sound-tracks by Pudovkin and Vertov, for example, extends their relevance.

Eisenstein and the Monistic Ensemble

Sergei Eisenstein (1898-1948) inherited from Scriabin and Kandinsky a profound conviction of the necessary integration and synthesis of sounding and visual forms. From the start, his theorising devolved upon notions of a monistic ensemble of elements which denied the apparent dualities of the world. Matter and mind, perception and conception, sound and gesture, - the multiple reverberations of an evolving cosmos were through mental fusion absorbed as emanations from a single source of energy. His early concept of montage as a series of stronger or weaker collisions relates, as has been observed, to that of Kandinsky...the interaction of abstracted forms builds a Gestalt which is other than and greater than its component parts. No isolated sign can have meaning; only in context, present or implicit, can its import be communicated. Through montage a heightened sense of reality could be generated; in Peter Wollen's view this belief sprang from the young Eisenstein's visions

for a theatre

"of such emotional saturation that the wrath of a man would be expressed in a backward somersault from a trapeze." This dream of emotional saturation was to stay with Eisenstein all his life. It became a preoccupation with the idea of ecstasy.(2)

Learning from Pavlovian reflexology those constructional principles which might elicit the anticipated reaction from the spectator, and inspired by a heady mix of Freudian psychoanalysis and Marxist dialectics, Eisenstein further refined his technique through a study of the montage of Lev Kuleshov and Dziga Vertov. According to Wollen, Eisenstein informed Hans Richter that Vertov should be credited with the invention of musical rhythm in the cinema.(3) Vertov's axiom of film-writing - a concentration on the juncture between motion, not on the motion itself - broke with the illusionist nature of film, confronting the individual frame in its endeavour to solve the semantic problems of cinema. Notably in The Donbass Symphony (1930; contemporary with Walther Ruttmann's Weekend) he incorporated sound-montage within his theory, closely interrelating sound and image through unison and various levels of asynchronism. Despite his overriding preoccupation with documentary 'truth', his theorising and film-making practice to a degree runs parallel with, and no doubt influenced, that of the German absolute film makers, who were also interrogating film as film.

Gradually, through working on Strike (1924), Battleship Potemkin (1927) and October (1929), Eisenstein elaborated and refined his theory of a 'montage of attractions' to incorporate five levels - metric, rhythmic, tonal, overtonal, and intellectual - making liberal

use of musical terminology through analogy to assist in the formulation of a cinematic language. According to Wollen:

Thus, while pondering over the editing of The General Line he came to the conclusion that his montage should concentrate not on the dominant in each shot (tonal montage) but on the overtones. At the same time he put increased stress on finding the correct rhythm. And when he discussed the relationships between the different senses and different lines of development, he introduced the idea of counterpoint and later of polyphony....This stress on a 'synchronization of the senses', and on analogies with music set the stage for the full-scale reflux of symbolism which overwhelmed Eisenstein's thought during the 1930's.(4)

Throughout his career his formalist aspirations - an extension of the Constructivist practice which flowered so briefly in Russia in the 1920's - and his susceptibility to the mystique of symbolist correspondences* - were a thorn in the flesh of an authority whose demands for 'social realism' accorded ill with Eisenstein's 'degenerate' synaesthetic preoccupations. Eisenstein seems to have been torn between communicating his Marxist commitment through a

* Baudelaire's eponymous sonnet was so widely known as to warrant quotation here. Through sonorous, musical incantation, it affirms a symbolist faith in the fundamental spiritual unity of man and nature:

Comme de longs échos qui de loin se confondent
Dans une ténébreuse et profonde unité
Vaste comme la nuit et comme la clarté,
Les parfums, les couleurs et les sons se répondent.
Il est des parfums frais comme des chairs d'enfants,
Doux comme les hautbois, verts comme les prairies...

Baudelaire : correspondences

The line 'Les parfums...' was drawn from E.T.A.Hoffmann's novel Kreiskleriana, where the author, describing the hypnagogic state, observes: 'It is not so much in the dream state as in the preceding delirious stage, particularly when one has been immersed in music, that a relationship is established between colours, sounds and perfumes.'(5) For further discussion of this hypnagogic state see the passage on Kandinsky and Schoenberg below.

propagandist film-making ideology, and investigating the potential of this 'synchronization of the senses'.

Like Goethe, Eisenstein was aware of the discrete identity of the perceptions. In dismissing Lessing's Laokoon, oder über die Grenzen der Malerei und Poesie (1766), he says:

And yet we cannot reduce aural and visual perceptions to a common denominator. They are values of different dimensions. But the visual overtone and the sound overtone are values of a single measured substance. Because, if the frame is a visual perception and the tone is an aural perception, visual as well as aural overtones are a totally physiological sensation. And, consequently, they are of one and the same kind... For both, a new uniform formula must enter our vocabulary: 'I feel.'(6)

As imprecise as Eisenstein's language is - and the inconsistencies and tautological vociferations of his eclectic writing belie the pungency of his thought - the concept of a higher unity, a 'höhere Formel' (Goethe) is once again apparent. Eisenstein's erudition, often placed more at the disposal of his intuition than of his reason, drew him to identify with the Wagnerian tradition; a Gesamtkunstwerk was to be his goal - an interpenetration of sense-stimuli, much in the vein of Kandinsky - was to obsess him until the end of his life. The associationist analysis of synaesthesia was more congenial to him than that of Galton, for colour stimulus operates 'as in a conditioned reflex which recalls a whole complex, in which it had once played a part, to the memory and the senses.'(7)

In 1940, Eisenstein's Bolshoi Opera production of Wagner's Valkyrie was a vital catalyst in shaping his approach to the sound film Ivan the Terrible, where a similar fusion of elements, an intermingling of stimuli, 'men, music, light, landscape, colour and

motion', was to be essayed....'brought into one integral whole by a single piercing emotion, by a single theme or idea.'*(8) The element of dialectic, of an intellectualized interrelationship of polyphonic strands, still persisted in this last film, but was overlaid by a grandiose conception of the organic where the analytical (usually, in Eisenstein's case, post-facto analysis anyway) was subsumed by the intuitive, by the ecstatic vision.

* * *

Examining his audio-visual theory more closely, we may note how Eisenstein elaborates upon the seminal influence which experience of Japanese Kabuki theatre had on his attitude towards the coordination of sense-stimuli. In the Kabuki monistic ensemble there is no subsidiary voice, no inferior line, nor any bland concurrence or redundant assertion. All elements are of equal significance.

In place of accompaniment, it is the naked method of transfer that flashes in the Kabuki theatre. Transferring the basic affective aim from one material to another, from one category of "provocation" to another.(9)

It is apparent that some equivalence of visual and aural sensation was recognized in his interpretation of this theatre. For occasionally, at points of utmost tension the Japanese 'suddenly give both, "squaring" them, and brilliantly calculating the blow of their sensual billiard-cue on the spectator's cerebral target.'(10) This then is a rare doubling, enhanced by its circumspect use. For Eisenstein, the only acceptable 'common denominator' is found in the concept of overtone; speaking of Old and New, he maintains that 'from

* Indeed, what interested Eisenstein most in Wagner were the composer's opinions on synaesthetic spectacle.

the contrapuntal conflict between the visual and aural overtones will be born the composition of the Soviet sound film.'(11) Quite what he intends by this term 'overtone' is never clarified; one supposes that it means little more than 'spiritual resonance' or some such, since musical overtones bear a precise acoustic relation to their fundamental, whilst no such hierarchical structure is recognised in colour or shape. (Perhaps Eisenstein's metaphors suffer in English translation, where musical terminology is, it seems, if not misappropriated, at best applied in an overgenerous manner to the visual.) Eisenstein's theorizing appears, to the musician, most stimulating when he is dealing in generalities; the broad sweep of audio-visual analogy is invariably charged with an infectious enthusiasm. But in detailed analysis the poverty of Eisenstein's musical knowledge is sadly revealed: no instance more telling than the post-facto dissection of the Battle on the Ice sequence from Nevsky, where Eisenstein contends that Prokofiev and he empathised with such intuitive subtlety. Indeed, Eisenstein's earlier collaboration with the composer Edmund Meisel in Battleship Potemkin and October demonstrates a more conscious and caring approach to complementary sound, and incidentally affords us instances of the extent to which, in the late twenties, it was possible to synchronize music and visuals closely prior to the development of sound on film. For both films Meisel worked with Eisenstein in planning the interrelation of music and picture, and from the extant scores it is apparent that exact coordination was often required.

Eisenstein's definitions of the several levels of silent-film montage-structure require consideration, for they bring to the fore a compositional device - that of juxtaposing more or less dissimilar

imagery for rhythmic (shock) effect - which is peculiar to film-making, fundamentally alien to theatre and dance, and only broadly analogous to the inherently weaker 'cuts' in music. The butt-ending of two pieces of film was, for Eisenstein, the fount of film's unique power and visual excitement. A leisured choreography of the camera in a 'long take' was anathema to him; such feeble monocular 'realism' was inimical to a medium which excelled in the creative dislocation of space and discontinuity of time.

Metric montage established a 'beat' by the absolute length of film-pieces, 'joined together according to their lengths, in a formula-scheme corresponding to a measure of music.'(12) In rhythmic montage, the 'content within the frame is a factor possessing equal rights to consideration.'(13) At the level of tonal montage, Kandinsky's analogies surface; for here 'the concept of movement embraces all affects of the montage piece. Here montage is based on the characteristic emotional sound of the piece - of its dominant. The general tone of the piece.'(14) Fourthly, in defining overtonal montage, Eisenstein struggles to articulate the inexpressible in hazarding that it grows from 'the conflict between the principal tone of the piece (its dominant) and the overtone'.(15) He is unable to prescribe methods by which these parameters might be scored in a complex film-composition, resorting to description - post-facto enlightenment - of choice sequences from completed films to instance the higher reaches of montage. Even here he is imprecise:

In some sequences Old and New succeeds in effecting junctions of the tonal and overtone lines. Sometimes they even collide with the metric and rhythmic lines as well. As in the various "tangles" of the religious procession...It is interesting to note that, in selecting the pieces for the montage of this sequence, we

unconsciously furnished ourselves with proof of an essential equality between rhythm and tone, establishing this gradational unity much as I had previously established a gradational unity between the concepts of shot and montage.

Thus, tone is a level of rhythm.(16)

One suspects that this means no more than that the composer/silent-film maker must bear in mind the organic unity of a work whilst he is elaborating its several sections or delineating discrete elements; counterbalancing (apropos musical composition) texture, timbre, tempo, articulation, dynamic, repetition, and variation. Deprived the tested terminology of absolute music, and unable to transpose it bodily into the spatio-temporal art of silent film, Eisenstein seeks to quantify the latter through analogous epithets gleaned from his musical browsings, but fails to find adequate metaphors. For not only does the musical Gestalt differ fundamentally from the visual (the former unfurling in time only to be grasped retrospectively; the latter scanned in the instant), but the conflict of Eisenstein's visual material resided primarily in its being not absolute (although he talks often as if it were) but abstracted from a camera-eye-reality of men and machines, wherein the rhythmic conflict partly arises from the degree of abstraction imposed on the material. Only in the extreme case does Eisenstein acknowledge this tension - in his definition of intellectual montage, which 'is montage not of generally physiological overtone sounds, but of sounds and overtones of an intellectual sort: i.e., conflict-juxtaposition of accompanying intellectual effects.'(17) (Admittedly Eisenstein was later to reject the crassness of such overt literary metaphor in favour of a more oblique handling.)

When faced with the impending commercial acceptance of sound on film, Eisenstein and other silent film directors foresaw the possible debasement of their medium to that of a mere recording instrument, deprived of its unique autonomy of visual cadence.* Directors sensed that this new medium, still only just realizing its enormous potential as an art form, and still only thirty years old, would lose its good character in a misguided attempt to vie with the new-fangled radio. How could the 'talkie' become a universal language, as had the silent screen? If synchronous speech must come, let it be integrated within the monistic ensemble; let it function as one element - an extreme of audio-visual consonance - that must be rigorously structured within a vastly more complex medium of interpenetrating image and sound.

A key document, "Statement" [Appendix 2], advocating flexibility in the use of film music was issued in 1928 by the triumvirate of Eisenstein, Pudovkin and Alexandrov, who voiced their pessimism in a manifesto urging that sound should be regarded as another element of montage, that it should be commentative upon, and be set in counterpoint with, the visuals, and should thus resist that unthinking, automatic synchronization which in commercial hands promised to be its fate.(18)

The obligatory unison of synchronous sound and image as exemplified by the very early 'talkie', where actors clustered round the microphone greedy for its ear, was condemned as a mere utility. Sound presented the film-maker with a challenging new dimension, to be

* For despite Eisenstein's close collaboration with Edmund Meisel, it would seem that, in common with other silent-film directors, the fine-editing of film was undertaken in ignorance of, and uncurious about, the precise contributions of the musical accompaniment.

introduced circumspectly into an already developed silent 'language'. For sound could evoke an aural image which might be orchestrated against the visual with a precision and subtlety denied the relatively loose concurrence of live accompaniment to silent films. This concept of an 'aural image', dangerous as it is in its implication of 'concreteness' of sound (whereby it might be thought that sound-visual interplay were readily controlled in quantitative terms) was at the root of experiment and theorizing in the thirties and forties, and remained the concern of a small minority opposed to the prevalent, and in their view, pernicious Mickey-Mousing and leitmotiving of Hollywood, whose style in musical accompaniment, as much as in every other aspect of film-making, so came to dominate the aesthetic of commercial cinema.

Around 1928-30, considerable interest was generated by experimental work in sound-on-film, some of which was directed by Edmund Meisel in Berlin. At the Berlin Musikhochschule in 1930 the then avant-garde figure of Paul Hindemith, together with Ernst Toch, created short musical montages by means of gramophone recordings. Records were run more quickly and more slowly than usual, with the relationship of pitch to speed, and the remarkable timbral changes, observed. Signal-mixing was effected, together with other transformation procedures. Optical sound could be edited with a flexibility only later available in the fifties, with the introduction of magnetic tape. It was found that geometric shapes could be photographed on to the optical track and reproduced as sound, thus rekindling the enthusiasm of synaesthetists and others obsessed by perceptual transference. Percussion orchestras (see Antheil's Ballet Mécanique (1924), and Varèse's Ionisation (1929-31)) were modish among

the avant-garde, and of course, boasted a genealogy deriving from Russolo's Futurist noise-organs of 1914. This enthusiasm communicated itself to the film-makers, who found that they could construct 'musique concrète' assemblages from natural sound. (Pudovkin's sound-track for Deserter is considered later.) Such a compositional approach was exploited by Dziga Vertov in Enthusiasm, (and by Granowsky in The Song of Life), where the sounds of machinery pitched 'in various keys' were combined to produce 'veritable melodies'. Granowsky too worked with strips of sound run off backwards - for instance, to achieve the sudden cessation of a tone without reverberations.(19) And Edgard Varèse, many years before his first tape-composition Déserts (1949-54), actually imitated the effect of reversed sound in Intégrales (1924-5).(20) In 1933 the film-critic Rudolf Arnheim belatedly surmised:

What will be heard when all the natural sounds are extended by slow motion and compressed by acceleration? Nobody can imagine. What will laughter sound like when slowed down to a tenth of its normal pace - or a sermon speeded up by the accelerator?(21)

Eisenstein was the greatest film-theorist to be signatory to the 1928 manifesto. His several books and articles demonstrate a high regard for sound, and more specifically, for music. In the chapter "Synchronization of the Senses" from The Film Sense, the author terms his handling of audio-visual relationships vertical montage, in distinction to the varieties of montage already established in silent film, - metric, rhythmic, tonal, overtonal, and intellectual.

He was fully conversant with the early history of colour-music, discussing Newton, Castel, Diderot, and others, and quoting liberally from the French Symbolists, in particular René Ghil. The art and theories of Kandinsky and Malevich were also known to him. Unabashed by the existence of those numerous earlier attempts to equate sounds and colour, Eisenstein elaborated his investigations into audio-visual correspondence in this area. He coined a term for the employment of this variety of correspondence - 'chromophonic' montage, or colour-sound montage. After offering some most varied, wide-ranging examples of sound and colour correspondences, Eisenstein finally allowed that there could be no absolute synaesthetic relation of the two, this remaining subjective, C sharp being gray to one individual, pink to another, and so on. To some extent though he did see himself as Scriabin's heir, citing the Poem of Fire and the Mystery in support of his theory of vertical montage. Not surprisingly, though, he denounced the theosophical base of this thinking, feeling a political obligation to disassociate himself from such mystic tendencies. Eisenstein's explanation of the term 'vertical montage' calls irresistibly to mind Scriabin's score of Prometheus, with its top system set out for Luce or light-keyboard:

Everyone is familiar with the appearance of an orchestral score. There are several staves, each containing a part for one instrument or a group of like instruments. Each part is developed horizontally. But the vertical structure plays no less important a role, interrelating as it does all the elements of the orchestra within each given unit of time. Through the progression of the vertical line, pervading the entire orchestra, and interwoven horizontally, the entire harmonic musical movement of the whole orchestra moves forward.

When we turn from this image of the orchestral score to that of the audio-visual score, we find it necessary to add a new part to the instrumental parts: this new part is a 'staff' of visuals, succeeding each other and corresponding, according

to their own laws, with the movement of the music
- and vice versa.(22)

Eisenstein's musical taste was wide-ranging and his enthusiasms strongly felt. Yon Barna has drawn attention to his particular delight in polyphonic organization, remarking his passion for Bach. (Note the shared enthusiasm of Klee, Kupka, Eggeling, and Richter.) Apparently 'for one screening at the Meyerhold Theatre the then pianist, Leo Arnstam, compiled from Bach's works a musical arrangement for Potemkin.'(23) Drawing an example from Old and New, on which he intended to collaborate with Meisel (prevented by the latter's death in 1930), Eisenstein suggested that the course of visual montage was 'an uninterrupted interweaving of...diverse themes into one unified movement. Each montage piece has a double responsibility - to build the total line as well as to continue the movement within each of the contributory themes.'(24) He later seems to have felt that, for all its limitations brought about through the necessity to meet an early deadline, several sequences of the sound-film Alexander Nevsky realised an ideal interpenetration of aural and visual, successfully integrating sound with an already sophisticated pictorial language. The sequence on which he lavishes most analytical attention is that of the Battle on the Ice. He works from an assumption that every element of the montage should combine towards a desired 'general sensation'. His problem is how to cross-relate the already highly-developed respective media of film and of music, both of which have developed an autonomous, coherent flow-structure. The 'primary question' is one of 'finding those means of establishing the proportions between pictures and sounds'... of 'finding an inner synchronization between the tangible picture and the differently perceived sounds.'(25)

Eisenstein defines various types of audio-visual coordination, beginning with the simplest - lip-synch; then shots edited in time to the metre (rhythm) of a piece of music, where however, 'it is possible to arrange a wide variety of syncopated combinations and a purely rhythmic 'counterpoint' in the controlled play of off-beats, shot-lengths, echoed and repeated subjects';(26) then not only rhythmic but also melodic movement. Here Eisenstein seems to equate the ''linear' element of plastic art'(27) with melodic rise and fall - a dangerous parallelism reminiscent of Oskar Fischinger's essays in visualized music, described later. He sees further correspondence between timbre or tone-quality (translated from the Russian as 'tone') and colour. 'In a rough analogy pitch can correspond to the play of light, and tonality to colour'.(28) Eisenstein sums up synchronizations in five possible categories: 'natural', metric, rhythmic, melodic, and tonal. Whilst a sequence might occasionally, though rarely, utilize all these means, in general a degree of 'dissonance' will occur between visual and aural. When this happens

we explain that the visuals 'exist for themselves', that the music 'exists for itself'; sound and picture each run on independently, without uniting in an organic whole. It is important to keep in mind that our conception of synchronization does not presume consonance. In this conception full possibilities exist for the play of both corresponding and non-corresponding 'movements', but in either circumstance the relationship must be compositionally controlled. It is apparent that any one of these synchronization approaches must serve as the 'leading', determining factor in the structure, dependent on the need.(29)

Hanns Eisler, however dismissive of Eisenstein's claims for Alexander Nevsky, concurs here. Concerning music and image he also asserts that 'the important task is to stimulate fruitful tensions between

them.'(30) Thus, a rigorously composed, continually fluctuating tension between image and sound is required, thereby enhancing the dialectic of their relative disassociation.

Whilst denying the validity of absolute audio-visual correlations, Eisenstein does admit the structural value of those peculiar to an individual work:

The decisive role is played by the image structure of the work, not so much by employing generally accepted correlations, but by establishing in our images of a specific creative work whatever correlations (of sound and picture, sound and colour, etc.) are dictated by the idea and theme of the particular work.(31)

Later, discussing the use of colour, he again confirms that it is not absolute relations which are decisive, but local artificially-devised correlates. Indeed, even in black and white film (then the norm) tonal qualities may resist attribution of a single 'value', even assuming contradictory meanings, 'dependent only upon the general system of imagery that has been decided upon for the particular film.'(32)

This refusal to determine absolute correspondences is encouraging, breaking away as it does from that long, persisting tradition of equating sounds and colours as if there were some necessary connection between aural and visual frequencies.

Despite furnishing an unhappy musical example from Bach's cantata Christum wir sollen loben schon (No.121) which supposedly expresses 'a long series of violent convulsions'(33) (this interpretation, via Albert Schweitzer, is rightly condemned as perverse by Eisler), Eisenstein's views on interrelationship of sound and visual are

stimulating:

Musical and visual imagery are actually not commensurable through narrowly 'representational' elements. If one speaks of genuine and profound relations and proportions between the music and the picture, it can only be in reference to the relations between the fundamental movements of the music and the picture, i.e., compositional and structural elements, since the relations between the 'pictures' and the 'pictures' produced by the musical images, are usually so individual in perception and so lacking in concreteness that they cannot be fitted into any strictly methodological 'regulations'. The Bach example is eloquent proof of this:(34)



But even here, Eisenstein and Schweitzer are investing a conventional two-part contrapuntal figure with a gestural significance to which it does not aspire. Bach's frequent use of musical symbolism - as in the Chorale Prelude Durch Adam's Fall, where Adam's transgression is represented by a falling diminished (hence sinful) seventh in the bass, and where the serpent is symbolised by sinuous chromatic writing - is in any case dependent for its full comprehension on an intimate understanding of the doctrine of figures and affections. As Bukofzer observes, however prevalent such metaphorical procedures were, pictorial interpretation was always complemented by absolute elaboration.

For example, the descending bass line in Vom Himmel kam which graphically represents the "descent from heaven" appears in the course of the composition in inversion in complete repudiation

of its original meaning....This conflict of meanings was not illogical to Bach because every figure was as such subject to the doctrine of figures, which regarded inversion as one of its most important devices.(35)

Manfred Bukofzer

It is surely preferable therefore to discard any such gestural correlations as Eisenstein professes to identify in Alexander Nevsky and the Bach example, since simplistic parallels may offend by virtue of their very crassness, whilst the more subtle pass by unremarked.

It would seem though that Eisenstein invariably visualized strongly when listening to music, creating in his mind 'some sort of plastic images, vague or clear, concrete or abstract', (36) images peculiar to the individual's conception of a particular piece. He regarded visualization as entirely normal, as he did the propensity to 'depict' musical nuance by hand gesture.(37) (One is reminded of Klee's conductoral designs in The Thinking Eye, and of Fischinger's colour-keyboard, activated by the movement of the hands.) This promotes a choreographic interpretation of music which can hardly recommend itself to the literate listener who regards musical stimulation as wholly self-sufficient, and any such paraphrase as an unwarranted gloss. Rather enigmatically, Eisenstein summarises his attitude towards audio-visual interrelation:

We must know how to grasp the movement of a given piece of music, locating its path (its line or form) as our foundation for the plastic composition that is to correspond to the music.(38)

Whilst acknowledging the example of ballet choreography, he sees the problems of film and music as different, more complex in so far as the various constituents of a montage-sequence can be regarded as

movable, capable of being rearranged to form various emotional trajectories.

Eisenstein's amazing eclecticism comes to the fore at this point, enabling him to cite from a large number of painters and authors instances of what one might term modes of continuity. Whilst stressing that it is a 'movement of emotion which must serve as a fundamental factor in outlining the whole image', he argues that this subsuming movement can be led by one of several means: by what he terms 'intonation', or the 'movement of the voice' - presumably meaning melodic contour; or 'by means of changing nuances within the light- or the colour-imagery structure, or by the successive unfolding of volumes and distances.'(39) Eisenstein numbers Delacroix amongst his examples, observing how the painter 'found his line through that path followed by the spectator's eye in moving from form to form, as the forms are distributed throughout the volume of the painting.'(40) And apropos Viking Eggeling, Eisenstein's reference to the Venetian architect, Giovanni Battista Piranesi (1720-78) is remarkable, for this language could as fittingly describe the graphic interplay of Eggeling's Symphonie Diagonale:

... - a line built from the movements and variations of 'counter-volumes' - the broken arcs and vaults of his Carceri, with their intertwined lines of movement woven with the lines of his endless stairs - breaking the accumulated spatial fugue with a linear fugue.(41)

Eisenstein admired James Joyce's literary technique of interior monologue in Ulysees, and when the two met in Paris, found Joyce equally drawn to his filmic theories for inscribing thought-processes. Eisenstein's aspirations for the sound-film led Joyce to assert that, if Ulysees were to be filmed, only Ruttmann or Eisenstein should be

entrusted with its direction. In the course of discussing (the ultimately aborted) An Amercian Tragedy by Theodore Dreiser, Eisenstein's exuberant visions of an audio-visual montage suggest his Joycean sympathy for an abstract treatment of the medium:

Like thought, [my montage sketches] would sometimes proceed with visual images. With sound. Synchronized or non-synchronized. Then as sounds. Formless. Or with sound-images: with objectively representational sounds....

Then in passionate disconnected speech. Nothing but nouns. Or nothing but verbs. Then interjections. With zigzags of aimless shapes, whirling along with these in synchronization. Then racing visual images over complete silence. Then linked with polyphonic sounds. Then polyphonic images. Then both at once. Then interpolated into the outer course of the action, then interpolating elements of the outer action into the inner monologue.(42)

* * *

Eisenstein elsewhere examines a fragment from the 'beginning of Reel 7' of Alexander Nevsky to illustrate his detailed handling of audio-visual relationships. [Appendix 1.4] This post-facto analysis might be expected to clarify Eisenstein's theories, or to reveal the extent to which, in practice, his grandiose plans for correspondences could actually be effected, and to what extent they 'work'. But again, a stumbling-block throughout is the inexactitude in musical terminology. (He talks of an identical motion of sound and visual, brought about by vertical correspondences.) However, since the concept of motion, tempo, rhythm, appears central to any sensitive handling of this medium, especially so in the case of absolute animated film, where narrative structure cannot function as support, it is necessary to study Eisenstein's analysis in some detail, there being so very few

similar attempts at understanding point-by-point audio-visual correspondences. Certainly other film-makers have not, even now, tackled this problem so boldly. (Eisler's criticisms of this example will be discussed later.)

Eisenstein is careful to explain that the method in the sequence selected from the 'Battle on the Ice' is typical of that used in the rest of the film; however, the shots of this particular sequence are deemed most suitable for reproduction and analysis in book form in view of their absence of real movement: it is as if a programmed sequence of stills were being discussed.*

It is hard to accept Eisenstein's analysis of the absolute compatibility between Prokofiev's music and these images, music which one suspects actually relates to the visuals only in the most general atmospheric manner...providing a repetitive and ominous sequential figure in minor keys. It seems from his description of the 'trajectory' of musical movement that Eisenstein is conditioned to hearing music wholly via its notational layout - from left to right. His diagrams of musical gesture are so graphed, thus according with the eye-movements encouraged by the balance of material within the film frames. On the strength of these graphs alone he declares that

* It is difficult to reconcile this approach with his statement in Film Form :

To argue about the pictorialism of the film-shot is naive. This is typical of persons possessing a decent esthetic culture that has never been logically applied to films. To this kind of thinking belong, for instance, the remarks on cinema coming from Kasimir Malevich. The veriest novice in films would not think of analyzing the film-shot from an identical point of view with landscape painting.(43)

there is found a

complete correspondence between the movement of the music and the movement of the eye over the lines of the plastic composition. In other words, exactly the same motion lies at the base of both the musical and the plastic structures.(44)

This is frankly a non sequitur, too simplistic by far, ignoring as it does the progressive unfolding of musical and instantly-visible images, already remarked by Rousseau. The gross artificiality of the audio-visual relationship is often blatant:

It is interesting to note that Shot 1V, which corresponds to measures 7 and 8, contains two flags, while the music contains four eighth-notes. The eye appears to pass over these two flags twice, so that the front seems twice as broad as that which we see before us in the frame. Passing from left to right, the eye 'taps off' the eighth-notes with flags, and the two remaining notes lead the perception away beyond the frame-line to the right, where the imagination continues indefinitely the front-line of the troops.(45)

This is clearly unacceptable post-facto analysis unrestrained by musical common sense. In no way can the eighth-notes, or quavers, be related directly to the flags, which are visible throughout the passage in question. Eisenstein admits the implausibility of his argument, but attempts to counter criticism in asserting that 'the motionless whole of a picture and its parts do not enter the perception simultaneously'. In a sense this is true, but does not of itself allow Eisenstein the luxury of quantifying the speed of eye-movements into precise durations equated with the musical component. The movement of the eye over a static picture cannot be so closely defined: each individual will scan at a different tempo; even the trajectory of attention may differ, and whilst the scan is likely

to resemble a repeated, cyclic action, it may focus on new material on each 'take'.

Another equation yields further evidence of Eisenstein's misunderstandings in this field: 'the entrance of the sound is in the middle of a shot of empty landscape, so that the sound is heard as if from the middle of the picture - head on.' (46) In clarifying this dubious proposition Eisenstein adds: 'first, the sound bursts from the temporal centre of the shot, so that our perception, guided by analogy and a sense of space, places the sound in the spatial centre of the shot.' (47) This remains highly suspect.

Eisenstein freely acknowledges that his analysis is wholly retrospective, but does not seem to find this any cause for concern in the light of his very intensive study of this section. That Prokofiev has apparently not commented on the audio-visual relationships is remarkable; surely, if anything approaching Eisenstein's interpretation was in Prokofiev's mind, the latter would have indicated as much.

Indeed, one can say that Eisenstein's theories in their pure form are much more attractive than in his detailed application of them, which weakens his position by its residual insensitivity to the differences between aural and visual perception.

* * *

In his Composing for the Films, Hanns Eisler goes out of his way to contrast against his own treatment of Fourteen Ways of Describing Rain this very same sequence from Alexander Nevsky, selected by

Eisenstein as a paragon of audio-visual fusion. Eisler finds the musical-visual analogies wholly inadequate, taking Eisenstein to task over his confusing notation with sound:

but the notation is already a fixation of the actual musical movement, the static image of a dynamic phenomenon. The similarity between the music and the picture is indirect, suggested by the graphic fixation of the music; it cannot be perceived directly, and for that reason cannot fulfil a dramatic function.(48)

Despite an unaccountable misidentification (of Shot No.V as 'an avalanche') Eisler's criticism is valid. He finds Prokofiev's accompanying G sharp minor triad a 'conventional and worn-out phrase'...'so inconsequential that it might relate to anything or nothing at all.'(49) Furthermore, the non-developmental nature of the music does not serve the generally cumulative nature of the imagery, in Eisler's view; no musical change matches the visual cuts from medium shot to close up, and even the 'pedantry' of equating elements of the visuals with attacks in the music is inconsistent, being 'practiced one moment and forgotten the next.'(50)

Eisler is justifiably merciless in his rejection of Eisenstein's analysis as a serious contribution to the understanding of audio-visual relationships. He will only acknowledge Prokofiev's contribution here as following 'the beaten tracks of good old cinema music', concluding tartly: 'the music is that of the old Kinothek, only the terminology is that of Kandinsky's manifestoes.'(51)

In short, Eisenstein, not being musically literate, thoroughly misunderstood Prokofiev's neo-classicism, elevating it to a function which it could not, nor pretended to, fulfil.* That the 'high-sounding aesthetic arguments', (53) as Eisler terms them, are consequently to be written off unregarded would, I feel, be folly, for Eisenstein was as well equipped as any to speculate in general terms on the contribution of sound in films. Eisler suggests that what Eisenstein has proposed theoretically could rather relate to the field of abstract painting than to the comparatively conventional narrative-dominated structures of a film-opera like Alexander Nevsky. Whilst to Eisler this suggestion carries pejorative overtones, in the context of this present thesis it offers further justification for surveying Eisenstein's views at some length.

* * *

* It is known that Eisenstein had considerably less control over the detail of Alexander Nevsky than he did in the case of his earliest films, or with Ivan the Terrible. In Notes of a Film Director he actually admits that he

was willing to give up all that fascinated me in the principles of audio-visual combinations, for it seemed impossible to ensure an organic unity of music and picture in the short time allotted to us.

Yet in the same breath he can aver that in all important sequences the audio-visual combination was 'brought to a level of perfection...' (52)

Pudovkin and Deserter

Music...must in sound film never be the accompaniment. It must retain its own line.

Vsevelod Pudovkin (54)

Eisenstein was not the only Soviet film-maker to caution against a simplistic unison of sound and visual. Although he is properly revered as the major film-making theorist of his time, Vsevelod Pudovkin's writing in Film Technique and Film Acting also furthers a formalist aesthetic, and reveals his more intimate acquaintance with sound organization.

Five years after co-publishing the 1928 manifesto, Pudovkin completed his film Deserter (Mezhrabpomfilm; 1931-1933) regarding which his theoretical concerns found voice. He writes of the treatment of sound in one sequence:

For the Symphony of siren calls with which Deserter opens I had six steamers playing in a space of a mile and a half in the Port of Leningrad. They sounded their calls to a prescribed plan and we worked at night in order that we should have quiet.(55)* Perhaps a purer example of establishing rhythm in sound film occurs in another part of Deserter - the docks section. Here again I used natural sounds, heavy hammers, pneumatic drills working at different levels, the smaller noise of fixing a rivet, voices of sirens and the crashing crescendo of a falling chain. All these sounds I shot on the dock-side, and I composed them on the editing table, using various lengths, they served me as notes of music. As finale of the docks scene I

* This description bears an uncanny resemblance to Pierre Schaeffer's early disc-recording experiment of the late nineteen-forties. In 1948, for the Concert de locomotives, his first musique concrète score was drafted: 'Eight bars of a train starting off. An accelerando for a single locomotive, then a tutti of carriages...'(56) For the Deserter sequence Pudovkin drew immediate inspiration from Walther Ruttmann's Die Melodie der Welt (The Melody of the World) of 1930, a commercial 'sponsored by the Hamburg-America Line to encourage travel by sea.' This began similarly with 'an abstract Symphony of ship sirens...deep and high, long and short in different rhythms in the harbour of Hamburg...'(57) Ruttmann had already made his sound-only montage Wochenende (1928).

made a half-symbolic growth of the ship in images at an accelerated pace, while the sound in a complicated syncopation mounts to an ever greater and grandiose climax. Here I had a real musical task, and was obliged to "feel" the length of each strip in the same spirit as a musician "feels" the accent necessary for each note.(58)*

Pudovkin declared that already the expressive potential of sound was lagging behind its technical possibilities, and deemed it wrong to regard sound as merely a mechanical enhancement of image.(59) Image and sound must pursue their own rhythmic course, unhampered by the dictates of a realist aesthetic.(60) In the course of furnishing several telling examples of asynchronous sound-effects in live-action film, Pudovkin states a crucial truth:

it is not generally recognised that the principal elements in sound film are the asynchronous and not the synchronous; moreover, that the synchronous use is, in actual fact, only exceptionally correspondent to natural perception. This is not, as may first appear, a theoretical figment, but a conclusion from observation.(61)

In the handling of music, Pudovkin instances a treatment (realised by the composer Shaporin after Pudovkin's suggestion) of a passage in Deserter of a workers' demonstration where, although the workers' conflict with police ebbs and flows, now one, now the other, dominant, the music preserves throughout the 'dominating emotional theme' of 'courage and the certainty of ultimate victory.'(62)**

* By 'accent' one understands Pudovkin to intend agogic, or durational weighting. The parallel with Russolo's earlier noise-compositions (for example, Assembly of Aeroplanes and Motor Cars) is obvious.

** Prendergast argues that Prokofiev, far from composing in accord with some subsuming audio-visual scenario, was similarly doing no more than catch the 'general tension' of the pre-battle scene in Alexander Nevsky.(63)

'What role does music play here?' asks Pudovkin. 'Just as the image is an objective perception of events, so the music expresses the subjective appreciation of this objectivity. The sound reminds the audience that with every defeat the fighting spirit only receives new impetus to the struggle for final victory in the future.'(64) This didactic intention can usefully be transposed from its narrative context to the medium of absolute film, where similarly the primary thrust of a visual argument may be impelled by its identity with a musical counterpart.

In 'Rhythmic Problems in My First Sound Film', Pudovkin bemoans the foreseeable loss of 'dynamic rhythm' which in the form of montage-cutting had given such power to the fast editing of the best silent films; he instances the 'Odessa Steps' sequence in Eisenstein's Potemkin, and episodes from Griffiths' Intolerance. He argues strongly against the attitude of early sound-film makers that, since sound cannot be cut with the same rapidity as visuals whilst preserving coherence, visuals must consequently be slowed to the tempo of sound, especially speech. The technical encumbrances of very early sound-film recording exacerbated the problem, encouraging fixed camera positions and wooden acting; virtually returning the art to its state at the turn of the century, when it unsuccessfully attempted to emulate the Theatre. As Pudovkin observes, cinema is imagery, theatre is words, and similar treatments are inappropriate. For 'there is no necessity, in my view, to begin a sound when its corresponding image first appears and to cut it when its image has passed. Every strip of sound, speech, or music may develop unmodified while the images come and go in a sequence of short shots, or, alternatively, during images of longer duration the sound strip may change independently in a

rhythm of its own.'(65)

Pudovkin proceeds to exemplify his method of sound-film montage; it deserves quotation in full, demonstrating a handling of sound - here speech and crowd noise - of considerable subtlety, especially bearing in mind that Schaeffer's musique concrète experiments were still some sixteen years distant.

In the first reel of Deserter I have a meeting addressed by three persons one after the other, each producing a complexity of reactions in their audience. Each one is against the other two; sometimes a member of the crowd interrupts a speaker, sometimes two or three of the crowd have a moment's discussion among themselves. The whole of the scene must move with the crowd's swaying mood, the clash of opposing wills must be shown, to achieve these ends I cut the sound exactly as freely as I cut the image. I used three distinct elements. First, the speeches; second, sound close-ups of the interruptions - words, snatches of phrases, from members of the crowd; and third, the general noise of the crowd varying in volume and recorded independently of the image. I sought to compose these elements by the system of montage. I took sound strips and cut, for example, for a word of a speaker broken in half by an interruption, for the interrupter in turn overswept by the tide of noise coming from the crowd, for the speaker audible again, and so on. Every sound was individually cut and the images associated are sometimes much shorter than the associated sound piece, sometimes as long as two sound pieces - those of speaker and interrupter, for example - while I show a number of individual reactions in the audience. Sometimes I have cut the general crowd noise into phrases with scissors, and I have found that with an arrangement of the various sounds by cutting in this way it is possible to create a clear and definite, almost musical rhythm: a rhythm that develops and increases short piece by short piece, till it reaches a climax of emotional effect that swells like the waves on a sea.(66)

Pudovkin's subsequent description of his recording material for the May Day demonstration in Deserter further convinces one of his imaginative command, and persuades one that here he was realizing Russolo's vision of a Symphony of swinging doors, buzzing crowds, and all the hullabaloo of modern industrial society.

A hundred thousand men throng the streets, the air is filled with the echoing strains of massed bands, lifting the masses to exuberance. Into the patchwork of sound breaks singing, and the strains of accordions, the hooting of motor-cars, snatches of radio noises, shouts of huzzas, the powerful buzzing of aeroplanes.

[my italics](67)

In editing the recorded material to create a rhythmical composition, Pudovkin, like Eisenstein, drew upon musical metaphor, 'orchestrating' his film-strips like 'instruments'. A transition between the sound of two marching bands would be effected by 'some dominating sound like a mass hurrah or a whistling propellor', (68) and a macro-rhythmic sound-montage generated from the juxtaposed internal rhythms of each component. Pudovkin makes it clear that the concurrent image sequence preserves its own rhythmic line, so that image and sound run together in 'counterpoint'. Thus it is clear from these descriptions that Pudovkin deserves mention in the early history of musique concrète, foreshadowing Pierre Schaeffer's first essays in musique concrète using gramophone records, and even achieving more sophisticated results permitted by the more tractable medium of film-stock. Indeed, Pudovkin's method appears no less advanced than that employed in the so-called 'classic' tape-studio of the nineteen-fifties.

* * *

Eisler : Composing for the Films

Eisler's book Composing for the Films deserves further mention, although by and large it lies tangential to the concerns of this thesis, bound by the struggle to speak within the commercial world. Eisler contemptuously dismissed those colour-music fanatics who dabbled in films. Speaking of the 'abstract' film, he maintains: 'the antidote to commercialism in motion pictures is not the foundation of sects which dwell, let us say, on the affinity between certain colors and sounds and which mistake their obsession for avant-garde ideas. Arbitrarily established rules for playing with the kaleidoscope are not criteria of art.' (69) He rails with Eisenstein against identifying colour with sound. For what is the point of mere duplication? It will weaken rather than strengthen. (70)

However, more positively, he does attempt to identify the locus of relationship between music and film, in a passage which can be interpreted as bearing as much upon absolute animation as upon narrative films:

The concrete factor of music and pictures consists in the gestural element. [This echoes Eisenstein's partiality for 'depicting' music by hand-movements; see above.] This does not refer to the movement or 'rhythm' of the motion picture as such, but to the photographed motions and their function in the picture as a whole. The function of music, however, is not to 'express' this movement - here Eisenstein commits an error under the influence of Wagnerian ideas about the Gesamtkunstwerk and the theory of aesthetic empathy - but to release, or more accurately, to justify movement. The photographed picture as such lacks motivation for movement; only indirectly do we realize that the pictures are in motion, that the frozen replica of external reality has suddenly been endowed with the spontaneity that it was deprived of by its fixation, and that something petrified is

manifesting a kind of life of its own. At this point music intervenes, supplying momentum, muscular energy, a sense of corporeity, as it were. Its aesthetic effect is that of a stimulus of motion, not a reduplication of motion. In the same way, good ballet music, for instance Stravinsky's, does not express the feelings of the dancers and does not aim at any identity with them, but only summons them to dance. Thus, the relation between music and pictures is antithetic at the very moment where the deepest unity is achieved.(71)

Looking to a future film-music theory, Eisler requires an investigation of audio-visual interrelation through which music and image might be found to inhabit one shared hierarchical organization. Thus either element might be foregrounded or permitted to recede, the role of 'Hauptstimme' conveyed across the media as other voices took on a subsidiary function. Furthermore, music should on occasion be heard independent of images and words, and should proclaim its individuality rather than drift in and out unobserved.

The true muteness of the talking picture would thus be revealed and would have to become an element of expression. Or the picture might be treated as a musical theme, to which the actual music would serve as mere accompaniment, consisting of musical base figures without any leading voice.

Conversely, music might be used to 'outshout' the action on the screen, and thus achieve the very opposite of what is demanded by conventional lyricism.(72)

Eisler understandably finds Eisenstein's fundamental concept of a shared audio-visual movement ambiguous.(73) He notes that there are, after all, several types of musical movement: the metric divisions or pulse; the smallest note-values; and 'the so-called Grossrhythmus, the proportion between the parts and their dynamic relationship, the progression or the stopping of the whole, the breath pattern, so to speak, of the total form.'(74) Eisenstein nowhere adequately

differentiates between these, or other forms of sounding movement, and Eisler's accusation of 'empty phraseology' seems justified.

Eisler's own experimentation on the Film Music Project is however of little importance to the present study, reliant as it was on available material released by major film-companies. These documentary-style films composed of live-action footage invariably elicited from Eisler a response based on the 'mood' of the filmic material; he was not at any stage confronted with the problem of relating sound and visuals of non-photographic kind. In his account of the music for Nature Scenes however, his treatment resembles that appropriate to an absolute film, for in this sequence there was 'no action or any human element'.(75) The absence of any dramatic continuity threw the composer back on musical structures, whereupon the dangers of misalliance arose. Eisler's solution lay in observing and closely responding to the image-flow whilst still preserving an autonomous musical argument.(76)*

Other than the above major attempts at formulating some theory on the relation of music and non-narrative film, one finds numerous passing references to the problem, some of which deserve consideration.

Milano : a Morphology

It is interesting to turn from Eisler's aspirations for a theory of audio-visual interrelation to an article contemporary with the establishment of the Film Music Project, - an article of which Eisler

* If Eisler had seen the Columbia Color Rhapsodies or the Harman-Ising cartoons of the thirties, he must have acknowledged their primacy in striking a wholly satisfactory balance between functional and autonomous musical continuity. In Chapter 7 following, it will be seen that in confronting this problem in Opus I, I eventually settled for a similar compromise-solution to that advocated by Eisler.

was apparently unaware. This is Paulo Milano's "Music in the Film : Notes for a Morphology"(77). It attempts just such a determination of potential levels of musical contribution as Eisler was to advocate. Milano's approach is of value in clearing the ground of narrative-dominated considerations, and is thus of direct relevance to the problems posed in absolute animated film and tape music. He abstracts the relationship of music and film-image to three types:

- (A) dominant visuals, to which the musical matter depends, as comment or auxiliary;
- (B) dominant aurals, in converse relation;
- (C) an equal collaboration of the two to unite in a composite and interdependent relation.(78)

To clarify the balance of musical and visual matter, Milano then provides a graph [Appendix 1.6]. Reading left to right, film-music is categorised as follows:

- | | |
|-------------------------|--|
| 1.Neutral | An 'arbitrary' accompaniment; a form of 'furniture music' (Satie) common in early silent cinema but virtually unknown today. |
| 2.Casual | That with a natural, usually visible source, but without its contribution as music esteemed. |
| 3.Rhythmic comment | Where music reflects some visual rhythm, e.g. a character walking. |
| 4.Illustrative | Supporting the fluctuating tempo of dramatic action. |
| 5.Psychological comment | Characterizing the visuals, underlining a situation or 'expressing' a character's mood. |

(These definitions are mine, developed from the original.)

Milano notes that psychological commentative music is the species most frequently found. In all the above, music is ancillary to a given image-sequence.

A 'counterpointed' relationship (the apex of his graph) finds the media in complementary mode, in a form of asynchronism, where music's function can again be psychological, illustrative, or rhythmic. However, neither image nor music now dominates; 'they operate on a level of aesthetic equality'.(79)

Plotting an inverse graph of subordinate images, Milano identifies comparable supportive image-types:

- 5a. Psychological comment 'During the process of a song, the camera searches the faces of the various listeners to register emotions that reflect those of the song.'
- 4a. Illustrative As in 'the dramatized shots of the instrumentalists in Fantasia.
- 3a. Rhythmic comment Milano cites Disney cartoons, and especially Oskar Fischinger's Studies.
- 2a. Casual An unlikely category; Milano instances shots 'chosen in the cutting room, perhaps, to make some link with the score; for example, shepherd-boy playing bag-pipe coinciding with some part of a bagpipe solo in the score.'
- 1a. Neutral Another artificial category: 'Meaningless shots (of orchestral players and spectators) accompanying the score in an attempt to alleviate one's boredom at a filmed concert.'(80)

Having established these divisions, Milano is content to rest his case, concluding that a comparison with past and present solutions to the relations between music, dialogue and dramatic action might offer further enlightenment.

For all its transparent limitations - the misleading impression given by his graph that both visual and sound naturally aspire towards an ideal 'counterpoint'; and the rather forced analogies of image with sound category - his passing mention of Fischinger's work catches the

attention, with the implication that a perceptually equal weighting might be conferred on the commentative capacity of picture upon sound, as much as the reverse. This is an interesting notion, one which strengthens the present author's conviction that in absolute film, reciprocal commentary of this kind may be established as normative, given audio-visual subject-matter deliberately selected in order to facilitate such cross-reference.

Satie and Entr'acte

Relâche isn't art, Relâche isn't a false pearl.
No more art, just life, the joy of instantaneous
invention.

Francis Picabia

Potentially one of the most radical solutions to the problems posed by film-music composition was found by Erik Satie in his Entr'acte music (from the Dadaist ballet Relâche) to the film by René Clair. Relâche, ballet instantanéiste en deux actes, was staged in December 1926 by the Ballets Suédois, with the scenario, slight as it was, based on an idea of Picabia, the Dadaist painter and writer. In composing for Entr'acte, Satie appropriated his concept of 'musique d'ameublement' (furniture music), - a musical ambience rather than any explicit reinforcement of the cinematic image. Whilst Clair's film opens properly inconsequential in its non-association of ideas, towards its close it does quite inconsistently develop a theme - the hackneyed (albeit funereal) chase-sequence - which Satie matches with a more conventionally supportive *accelerando* accompaniment. But in its earlier sections no consecutive temporal logic can be traced, and Clair appears to have been more interested in rhythmic structuring -

the several forms of Eisenstein's montage? - than in plot.

Satie's economically scored 'functional' film-music is pointedly inexpressive, disinterested, sometimes crudely derivative, setting up ostinati and brief recurrent melodic phrases, often against a prominent percussion battery. The casual incorporation of a tired dance-hall tune only serves to flesh out a pre-ordained key and metric scheme. Satie counterpoints this sound-montage with the flow of images, imitating its cutting-rate, but rejecting slavish synchronism.

Roger Shattuck has commented upon Satie's pre-compositional rhythmic structure for the Entr'acte music:

Satie merely uses eight measures as the unit that most closely matches the average length of a single shot in the film. He fills each of these units with one stereotyped phrase repeated eight times. Between the units he inserts a double line, a new signature, and frequently a change in tempo. The transitions are as abrupt and arbitrary as the cuts in the film. Typical measures lend themselves to infinite repetition and do not establish any strong tonal feeling.(81)

In Michael Nyman's Experimental Music two pages of Satie's metric and key scheme are reproduced, testifying to the coolly calculated way in which the directionless musical blocks succeed one another, occasionally synchronizing with the action by the simple expedient of closing each longer sequence with an open-ended ostinato passage.(82) [Appendix 1.7]

Thus image and sound relate primarily through their fundamental rhythmical ordering - that of shot-length and metric/key scheme. Satie consequently appears to dismiss as irrelevant the niceties of a more subtle interrelationship such as Eisenstein was to formulate

through his theories of montage later in the twenties. In any other context this attitude must be considered a pointed refusal to confront the composer's task, but here it is entirely appropriate, according with a Dada aesthetic of wilful disruption. (Later, the dancer Merce Cunningham was to work with John Cage on scenarios where a numerical basis similarly underpinned the otherwise non-synchronism of music and gesture. The independent dynamics of the two, defining their own trajectories, generated a total experience richer in some ways than any overt subscription of one to the other.) For musical progression, Satie has substituted a procession of unrelated gestures; much of the evolving perspective, the propulsion of traditional tonality, is thwarted by a persistent disregard, or denial, of its potential dynamism; it has become atrophied. Satie offers us only 'cheap imitations' of the developmental in his patterning of static, hermetic ritualisations which, absolved from contextual responsibility, sit-out their prescribed duration in wan self-sufficiency, simulating glee.

Contra Wagner, Satie urged Debussy to shun dramatic symbolism, for 'there is no need for the orchestra to grimace when a character comes on the stage. Do the trees in the scenery grimace? What we have to do is to create a musical scenery, a musical atmosphere in which the characters move and talk.' (83) Satie's whimsically genteel disrespect for life's proprieties was manifested in Entr'acte as a scornful but ambiguous little raspberry in the face of the hack film-music 'fitter', feverishly compiling away at the behest of the action.

Satie's parodistic embodiment of 'pornographic' music was only too exact; even his former admirers were disquieted by the banality of Relâche's zestful lampoon, and until Cage, none were to recognise the

consequences for 'functional' music.

Clair and Montage

As has been seen, musical terminology became common parlance in post-War art-circles, and this usage was taken up by film-makers and aestheticians with almost embarrassing alacrity. The critic, Jacques B. Brunius poked gentle fun at all those who

racked their brains to discover a connection between cinematographic and musical rhythm. Notably Dr Paul Romain, who for years on end sent in an average of two articles a month to Jean Tedesco, the editor of Cinea-Cine Pour Tous, designed to prove that the best films were composed like concertos, and supporting his argument with all the musical terms ad hoc.(84)

As early as 1925, the year of Eisenstein's Battleship Potemkin, René Clair was - as an antidote to Romain's apparently simplistic analogies - altogether more sophisticatedly postulating a tabulation of montage-types which anticipates that of Eisenstein himself; here, in comparable terms, we meet metric, rhythmic, and overtone montage clearly differentiated:

On the screen the sequence of events occurs in time and space. The sentimental quality of each event gives its measurable duration a quite relative rhythmic quality.

I used to think, before stooping over the luminous table on which the pictures are assembled, that it would be easy to give a film regular rhythm. I discerned three factors in the films' rhythm, thanks to which one might obtain a cadence not unconnected with that of Latin verse:

1. The length of each shot. [metric montage]*

* The 'Eisensteinian' interpretations in square brackets are mine.

2. The succession of scenes or motives of action (interior movement.) [- the collision factor?]
3. Movement of objects recorded by the lens (exterior movement: the actors' gestures, the mobility of scenery, etc....) [rhythmic montage]

But the connections between these factors are not easy to establish. The length (1) and the succession (2) of the shots have their rhythmic value subordinated to the 'exterior movement' (3) of the film, of which the sentimental quality [overtonal montage?] is inestimable. And what metrical law can resist the balance between spectator and landscape, both equally mobile round the pivot formed by the screen, this incessant passing from the objective to the subjective thanks to which we experience so many miracles?(85)

It comes as no surprise then that Clair, acutely sensitive to the intangibility of cinematic rhythms (conditioned as they are by their 'legibility'...see Burch in Chapter 5 below), abandoned any attempt at rigid formalisation and categorisation of rhythmic types. 'As for me, I can easily reconcile myself today to admitting neither rules nor logic into the world of images.'(86)

From Brunius' description, though, one is tempted to surmise whether Dr Romain's journalism may not have a bearing on Eisenstein's later audio-visual correlations. The 'flag-counting' incident in Eisenstein's analysis smacks of Romain's 'recognizing in the black and white of the film the black and white pattern of a musical score, not excluding the demi-semiquaver rests.'(87) Eisenstein's equation of notational trajectory in music with the left-to-right graphic line of his images in the Nevsky analysis, shares a similar misplaced belief in the identity of temporal and spatial contours.

Meisel and Montage

Like Satie, the German composer Edmund Meisel (1894-1930) also analysed the montage of silent films before starting work. Speaking of his method, which was altogether less cynical than Satie's, Ernest Bornemann wrote in 1934:

Meisel analysed the montage of some famous silent films in regard to rhythm, emphasis, emotional climax and mood. [Perhaps not dissimilar to Eisenstein's categories of metric, rhythmic, tonal and overtonal montage?] To each separate shot he assigned a certain musical theme. Then he directly combined the separate themes, using the rhythm, emphasis and climaxes of the visual montage for the organization of his music. He wished to prove by this experiment that the montage of a good film is based on the same rules and develops in the same way as music. The result of this experiment was that some so-called "good" films did not in any way produce music, but merely a chaos of various themes, unordered and unorganized. Others of the films he chose, however, resulted in a kind of strange rhapsody, unaccustomed and extraordinary to the ear, but nevertheless not without a certain musical continuity. By far the best result was from Eisenstein's Potemkin. (88)

Meisel had served his apprenticeship in the political theatre of Erwin Piscator before gaining some notoriety as a film-composer. As is well-known, his percussive score so enhanced Potemkin's political vehemence that it was actually banned from the film's later German screenings. Eisenstein had required Meisel's music to redouble the impact of his imagery, and in the course of a creative collaboration the two agreed to forego simply illustrative comment, concentrating on a psychological reinforcement through reliance on abrasive percussive rhythms and remorseless melodic ostinati. Eisenstein claimed that here a single law of construction had resulted in a 'united

audio-visual image...anticipating the potentialities of an inner substance for composition in the sound film.'(89) Later, in a similarly close collaboration with Prokofiev on Alexander Nevsky (where shots were sometimes cut to a previously recorded music track), Eisenstein really believed he had realized his ideal.

Meisel was to collaborate again with Eisenstein, on October (1928), and with Ruttmann on Berlin (1927).* As already noted, he experimented at the D.F.I.(German Film Research Institute) in synchronizing images to rhythmic percussive sound-tracks and, had he lived, might well have done important work in experimental film sound.

The post-war celebration of the machine-age, and the consequent Russian concept of collision-montage, found its progenitor in Russolo's noise-orchestra. The percussion orchestra seems to have been associated with avant-garde film throughout the twenties. Apart from Meisel's orchestral battery in Potemkin and October, one may note Antheil's colourful percussion ensemble for Leger's Ballet Mécanique (1924), including a Futurist ensemble of anvils, propellers, two octaves of electric bells, motor horns, pieces of tin steel, and sixteen player-pianos, the latter controlled from a single console.

* A screening of October to Meisel's score was given under my direction in November 1979 at the University of York. This was the first British performance since 1934. No full score was extant, but had to be reconstituted from several incomplete sets of parts made available through British, American, and East German sources.

Varèse in Hollywood

In the same year that Eisler began work on the Film Music Project, Edgard Varèse (1883-1965) wrote an article entitled "Organized Sound for the Sound Film", (90) subsequent to his settling in Hollywood in the spring of 1940. Contemporary with Meisel's percussive sound-track researches, the post-Futurist Varèse had composed Ionisation (1929-31) for percussion orchestra, and to celebrate his domicile in the New World he was again to write lavishly for percussion within the gargantuan ensemble of Amériques. (The film-historian William Moritz has stated that Oskar Fischinger (see Chapter 4) met Varèse and Cage around this time and discussed with them 'his ideas about synthetic sound, about visual and auditory ornamentation correlation, and the aural identity and integrity of every sound.' (91) Needless to say, Varèse's theories proved unappealing to Hollywood producers, and he never actually wrote for films.* He saw organized sound intervening 'at the point where the spoken word has reached the limit of its efficacy, and where the precision of the image only tends to limit the flight of the imagination.' (92) He argued against the continued use of concert instruments to convey onomatopoeic impressions of natural events (he instances a tornado), demanding instead 'combinations of sound possible today but which never before today could have been produced.' (93) The vision of a sound-spectrum totally available to the recording-machine intoxicated him, finally finding expression in

* Varèse did not write for the Calder sequence in the surrealist Dreams that Money Can Buy (1944) by Hans Richter, although he is credited in Art in Cinema, p.90, with composing for one sequence.

Déserts (for orchestra and tape), of 1949-54, for which a film was to have been an integral part, but which remained unrealized. Like Eisenstein and Pudovkin twelve years earlier, he urged a 'contrapuntal' treatment, an antithesis between sounds and visuals:

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 cannot be achieved by the device of an imitative repetition of the visual. Although certainly unintentional, there is something very comical, even of 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....Often the most exciting moment of a dramatic situation will be far more enhanced by an abrupt, timely suspension of all sound than by any musical outburst. The simultaneous opposition of dynamics is a most effective device and I wonder that it is so seldom used.(94)

Varèse concluded by urging the creation of just such a research-unit as Eisler was to direct.

Arnheim, representing the Formalists

The major film theorists, excepting Eisenstein and Pudovkin themselves, have disappointingly little to contribute on the subject of the interrelation of music, sound and visuals in non-narrative film. Their pronouncements invariably devolve either upon notions of pictorial 'reality' - the way in which filmed image and editing techniques qualify the material photographed - or upon music's ability further to inflect the supposedly 'real'. (Kracauer, for instance, quite rightly regards absolute film as an extension of contemporary

art. 'The question is whether rhythmical "symphonies", fully abstract or not, should be considered cinema at all. To the extent that they are animated cartoons they constitute a genre outside the photographic film proper and can therefore be disregarded at once.'(95)) This normally central issue does not demand consideration in the present context, since the fact that cartoons have long been photographed on cine-film in order to promote the illusion of movement is extrinsic to the essentials of the animation medium, as a study of the disc and drum animations from cinema's pre-history will later show. In most theoretical writing, purely kinetic values are rarely appraised unencumbered by a dominant narrative framework, and there is correspondingly little written on music which does not regard its role as primarily supportive - whether universalizing or defining - of the screen-action.

* * *

From Rudolf Arnheim's Film of 1933, a major formalist text, the chapters on "Parallelism and Counterpoint", and "Asynchronism" (from Part V, Sound Film) are of some interest. The marked limitations of microphone-recording must be borne in mind when reading Film today, for Arnheim's strictures on sound cannot properly be divorced from his dissatisfaction with the available technology. Generally, he concurs with Eisenstein's approach, maintaining the necessity for a contrapuntal handling of sound and image:

The principle of sound film demands that picture and sound shall not do the same work simultaneously but that they shall share the work - the sound to convey one thing and the picture another, and the two jointly to give a complete impression.

That is the principle of sound-film counterpoint; the antithesis is parallelism which occurs when, for example, a clock is seen and heard at the same time.(96)

Arnheim does not preach against parallelism, requiring only that sound should convey 'something that is not already conveyed by the picture.'(97) The indiscriminate ear of the microphone was bewailed, - unlike the camera-eye, which was selective. Again, crudity of apparatus was to blame. (Despite such limitations, René Clair was advocating discretion in the use of sound: 'There is no need to hear all the doors bang and every character breathe. Nor to hear conversation every time anyone's lips move. Selectiveness must be exercised.')(98) Arnheim extolls the virtues of 'contrapuntal' treatment at some length (by 'counterpoint' in this context, one should understand no more than that the seen is not itself generating the heard), and the resulting enhancement of one's awareness of off-screen space is remarked. The 'asynchronous' similarly can be exploited to good effect. Here sound and image are temporally separate, although Arnheim is wary of 'the mere superimposition of things that have only an intellectual link without any sensory connection...'(99)

Thus far, Arnheim has considered the use of 'natural sound'; his views on music in film are generally unremarkable. He observes that particularly the better silent films can suffer from the addition of mediocre scores, since invariably music was not considered during the production of creations regarded - to all intents and purposes - as self-sufficient visual statements. The situation in sound film was improved in so far as the music was now specially composed, and no longer drawn from a compilation-catalogue of emotive fragments.(100)

Balázs, representing the Realists?

Béla Balázs, known to the musician primarily for his libretto to Bartók's opera Duke Bluebeard's Castle (1911), but also a significant film-theorist, contributed an important article on film-sound in 1932 for the periodical Experimental Cinema. Like Paulo Milano he advocates a systematic study of all possible correlations between image and sound, and within the context of specially-scripted films. These short cinematic exercises should be called 'play-films' to distinguish them from documentaries, and their aesthetic purpose should be indicated through a sub-title. To initiate a series of experimental 'play-films' Balázs proposes a study of specific sound-cinema effects. These would include:

1. The increase and decrease of tone-volume.
2. The correlation between the volume of the sound and the sharpness of the image. The parallel increase and decrease of the sound and the image (the increase of intensity) - or the comic effect of the opposite action - a suddenly interrupted sound in connection with the increased action on the screen.
3. Parallel or syncopated movement in the rhythm of the picture and the rhythm of the sound. The musical rhythm as a preliminary allusion to the incipient intrinsic movement. The dramatic accent of a rest (pause) and silence.
4. Correlation between the character of an image and the tonality - Is it possible to perceive the subject of a picture by its musical accompaniment? - The employing, as the picture goes on, of all possible sound variations. - 'What do you hear now?' (The identification of the sound with its source.) (The world of near-sighted and blind people.)
5. The unity of a sound picture. Association of definite events with definite noises or music. Symbolism of the sound.

6. Association of images with music. The awakening of the perception of an image through music. The cinematographic accompaniment to a given music work.
7. The correlation between music and sounds in nature.
8. The sound montage as musical shaping of noises.
9. Sound synchronization of silent pictures.
10. The simultaneous perception by the audience of the image on the screen and the sound and the text, as though it is spoken from behind the stage.
11. Fantastic and grotesque sound. The distortion of real sound in memory and in imagination.(101)

Whilst less neat than Milano's symmetrical graphing of audio and visual dominance, Balázs's several categories are more immediately stimulating, in that they clearly promote just those artificial and locally-operative liaisons which Eisenstein was later to recommend in Film Form. To the absolute film maker they are of especial interest, being largely independent of any implied narrative context, and hence directly relevant to his art. Balázs would have relished Pudovkin's contemporary sound-montaging techniques in Deserter; he may already have witnessed the dynamism of Meisel's progressive scoring to Eisenstein's silent films.

Surprisingly, some twenty years later, Balázs's major text Theory of the Film talks harshly of an avant-garde misdirected by a decadent formalist expressionism to the sterile unrealities of 'subjectless' absolute film. His impatience with the profilmic - film about film - sours to vitriol as he castigates those whose work could be appreciated only by elitist coteries.(102) However, still in two minds about the validity of such esoteric experimentation he does allow that

what might appear symptomatic of decadence may simultaneously 'be the first manifestation of the form-language of a new class or age.'(103)

Despite this qualification, he is disappointingly dismissive of Viking Eggeling's absolute Symphonie Diagonale, wherein he could discern nothing of 'the redemption of the chaotic material of life [forced] into shape at the cost of a struggle.'(104) For Balázs, this 'pure' style, this visual music, purged the film of all vitality. In not depicting or even resembling outward realities, Eggeling's silent mobile graphics lost touch with life's 'raw tang'; 'they were the creatures of the director and he could do what he liked with them. This great ease, and especially the utterly complete, residueless precise solutions it permitted...sufficed to destroy all artistic credit of such a playing with form.'(105)

He sees merit only in 'visualized music', where an animated choreography may, in its visual reinforcement, render more perceptible the subtler nuances of music. He instances the 'convincing' work of 'Schiffer, a Viennese, [who] very cleverly accompanied the rhythms of Strauss with a dance of lines...If we apply the viewpoints of our aesthetic epistemology to this art form, we find that it is not as objectless as was the silent abstract film. Its object is the music...'(106)

It seems strange that Balázs should not have preserved his aspirations for an abstract counterpointing of sound and visual, as outlined in the article of 1932. Although one can understand his distrust of the clinical, rather anaemic rhythmic interplay that constitutes Symphonie Diagonale, this does not excuse a wholesale rejection of such graphic orchestration, which in conjunction with a

complementary (not paralleled) music-track, might have been seen to realize that complex symbiosis which he had once urged.

* * *

There is little writing on the use and function of music, and more generally of sound, in any kind of experimental film-making; only fairly recently have 'structural' independent film-makers like Peter Kubelka and Michael Snow taken a serious interest in the interrelationship of sound and visuals. There are two clear reasons for this - to a musician - unfortunate state of affairs. Firstly it should be remembered that almost without exception the avant-garde film-makers of the last fifty years have been artists - painters, sculptors - whose desire to see their work animated drew them to film-making; they thus came from a traditionally silent medium into a medium which commercially was geared to sound - both in the 'silent cinema' days when this sound was provided by live chamber and orchestral ensembles, and in the succeeding era of sound film, when the popularity of the all-talking/singing/dancing film proved the commercial necessity of a lip-synch medium. The solitary film-maker, usually self-financed or assisted by friends, was ill-equipped both technically and financially to emulate commercial practice in this regard, for the paraphernalia for making sound films in the early thirties was cumbersome and extremely expensive, and clearly beyond his means. Not until the fifties was sound-filming feasible for independent artists, and then with little tradition - other than that of commercial sound- and music-tracks to support them - most balked at the challenge and continued, to all intents and purposes, to make silent films which might later be garnished with some not-too-inappropriate track, often lifted from a commercially

available recording.*

Thus one could indict the independent artist for not progressing any further in sound than the silent-film maker who (as in the classic case of Eisenstein and Potemkin (1925), where the film is 'Golden-Section' structured in terms of visual rhythm alone), rarely concerned himself at all beyond the visual self-sufficiency of his work.

In concluding this Chapter, responses from both Arnold Schoenberg and Wassily Kandinsky to the problems of audio-visual fusion bear interestingly upon the integration of music and film. Schoenberg's awareness of cinema's abstract potential is itself notable, and not only Kandinsky's theories but also his visual imagery have had a marked influence on the author, and have - as is obvious on viewing - conditioned the choice of absolute imagery for his first experimental sound-film, Opus I.

Schoenberg : Die Glückliche Hand

Schoenberg's expressionist 'Drama with music', Die Glückliche Hand, Opus 18, of 1909-13, for which he wrote both the music and a highly personal, tormented libretto, was (even at this early date) originally intended for filmic treatment. For this work, in which Schoenberg ('Ein Mann') rails against the inconstancy of that

* For example, Kenneth Anger's films, and Harry Smith's compilation of Beatles' tracks... and note the advice in Art in Cinema concerning suitable gramophone accompaniments to experimental silent films.(107)

'bitch-goddess Success', the composer's vivid symbolic language of gestures included a comprehensive musicalisation of stage lighting far more integrated than appeared in Scriabin's Prometheus. The intricacy of Schoenberg's instructions can be appreciated by reference to the score, which plots the interrelation of sound and colour in a carefully devised notation. [Appendix 1.8] Writing to his publisher Emil Hertzka probably in Autumn 1913, Schoenberg outlines his ideas about the contribution film should make:

What I think about the sets is this: the basic unreality of the events, which is inherent in the words, is something that they should be able to bring out even better in the filming (nasty idea that it is!). For me this is one of the main reasons for considering it...And there are a thousand things that can easily be done in this medium, whereas the stage's resources are very limited.

My foremost wish is therefore for something the opposite of what the cinema generally aspires to: I want

The utmost unreality!
[Höchste Unwirklichkeit!]

The whole thing should have the effect (not of a dream) but of chords. Of music. It must never suggest symbols, or meaning, or thoughts, but simply the play of colours and forms. Just as music never drags a meaning around with it, at least not in the form in which it (music) manifests itself, even though meaning is inherent in its nature, so too this should simply be like sounds for the eye and so far as I am concerned everyone is free to think or feel something similar to what he thinks or feels while hearing music.

What I have in mind is therefore the following: A painter (say: I, Kokoschka, or II, Kandinsky, or III, Roller) will design all the main scenes.* Then the sets will be made according to these

* Alfred Roller, a founder-member of the Viennese Secession, is probably the least well-known of these three artists. He designed for several of Mahler's Vienna productions, sharing both Mahler's and Schoenberg's contempt for naturalistic conventions:

For me the set must be constructed only out of essentials, which do not represent the setting, but which above all must be conditioned by the purpose, like the words or the tempo.(108)

designs, and the play rehearsed. Then, when the scenes are all rehearsed to the exact tempo of the music, the whole thing will be filmed, after which the film shall be coloured by the painter (or possibly only under his supervision) according to my stage-directions. I think however mere colouring (will) not suffice for the "Colour Scene" and other passages where strong colour effects are required. In such passages there would also have to be coloured reflectors casting light on the scene.(109)

Schoenberg's demand for this 'utmost unreality' anticipates the Futurist insistence upon the same in their manifesto "The Futurist Cinema" issued three years later, on 11 September 1916 by Marinetti, Corra, Ginna, Emilio Settimelli, Giacomo Balla and Remo Chiti:

...The Cinema is an autonomous art. The cinema must therefore never copy the stage. The cinema, being essentially visual, must above all fulfil the evolution of painting, detach itself from reality [my italics], become anti-graceful, deforming, impressionistic, synthetic, dynamic, free-wording.

ONE MUST FREE THE CINEMA AS AN EXPRESSIVE MEDIUM in order to make it the ideal instrument of a new art, immensely vaster and lighter than all the existing arts. We are convinced that only in this way can one reach that poly-expressiveness toward which all the most modern artistic researches are moving. Today the Futurist cinema creates precisely the polyexpressive Symphony which just a year ago we announced in our manifesto...(110)

(It is worth noting that the manifesto concludes with the inclusion of 'composed noises' as one of the six elements contributing to the Futurist conception of cinema.)

That Die Glückliche Hand remained unrealized as a film is most regrettable. Schoenberg was close to both Kokoschka, whose style is strongly akin to Schoenberg's own Expressionist portraits, and to Kandinsky who, ever drawing musical analogies in his theoretical tracts on painting, respected the composer's paintings almost as much

as his music, and must surely have responded generously to his friend's suggested collaboration, had the proposal ever reached him.*

Whilst Die Glückliche Hand was never filmed, it is well-known that Schoenberg, although distinctly loath to prostitute his talent in composing for Hollywood, did indeed compose Begleitmusik zu einer Lichtspielszene, Opus 34 (1930), consisting of 'Drohende Gefahr', 'Angst', and 'Katastrophe'. But here there was clearly no intention that visuals should be added at any stage, for any such addition must unacceptably delimit the supercharged black emotionalism of the music.**

Kandinsky : Der Gelbe Klang

As we have seen, Kandinsky, an amateur cellist and pianist, was addicted to a synaesthetic approach to the arts, summoning timbral analogies between music and colour of the order of yellow trumpets, blue flutes, and vermilion tubas. His paintings often bear titles gleaned from music's vocabulary, - for example, the several Compositions and Improvisations which 'resemble less a preparatory drawing for a painting than a blueprint carefully organized, like a musical score, according to the desired arrangement of tones and

* Stephen Solomon Vise, in his doctoral thesis "Wassily Kandinsky and Arnold Schoenberg : Parallelisms in Form and Meaning," (Washington University, 1969), plots many useful analogies.

** See, though, Frits Weiland's film Begleitmusik zu einer Lichtspielszene, a lamentable failure in its bland, undynamic accompaniment of the music with stills of Schoenberg's visionary paintings and of Kafka's Prague.

rhythms.'(111)

Kandinsky sought to develop his awareness of abstract form-relationships on broadly musical lines:

A painter who finds no satisfaction in the mere representation of natural phenomena, however artistic, who strives to create his inner life, enviously observes the simplicity and ease with which such an aim is already achieved in the non-material art of music. It is easily understandable that he will turn to this art and will attempt to reciprocate it with his own medium. From this derives some of the modern search in painting for rhythm, mathematic abstract construction, color repetition, and manner of setting color in motion.(112)

In a sense, Kandinsky anticipated Schoenberg's conception by drafting a stage work, Der Gelbe Klang (Sonority in Yellow), in 1909, with perhaps the intention of filming it.(113) (Kandinsky would have relished the German word for timbre: 'Klangfarbe', or tone-colour.) This was an essentially non-narrative synaesthetic conception (thus owing something to Scriabin) of music and visuals using coloured lights and grotesque figures.* Kandinsky describes the work in "Über Bühnenkomposition,"(115) sketching in the sequence of action for each of the six tableaux:

* Eisenstein's puckish humour cannot resist pillorying Kandinsky's wholly idiosyncratic synaesthetic brew in Der Glückliche Hand, which although admittedly evoking 'obscurely disturbing sensations' remains ever 'vague and remote'. In a footnote, Eisenstein naughtily compares Kandinsky with Humpty-Dumpty, for 'When I use a word, it means just what I choose it to mean - neither more nor less.'(114)

(From Tableau One)

...Soon the music begins, first in high registers. Then directly and quickly it drops to lower ones....Offstage a chorus singing without words becomes audible. It sings without feeling and sounds very wooden and mechanical. After the end of the choral singing, a pause; no movement, no sound. Then darkness....The music becomes more exact....(116)

In the second tableau Kandinsky is musically far more precise:

The music is piercing and tempestuous, with repeated A's, A flats, B's and B flats. The individual notes are finally drowned in a tempest of sound, followed by complete silence, a pause. Individual notes sound plaintively once again. A's and B's, for quite some time, until the next pause.(117)

The later tableaux show Kandinsky to be thinking musically in terms of repetition of actions and associated music. The A's and B's return, decor is re-presented, vocal effects recur.

The music for Der Gelbe Klang was written by the Russian composer Thomas von Hartmann, and the theatre-work performed at the Moscow Stanislavsky Art Theatre, 'only to encounter a total lack of comprehension.'(118) Visually, Kandinsky was imagining 'the utmost unreality' of a non-naturalistic nightmare world: yellow giants, red spirit-birds, and thick blue vapour complemented the music. The elements of musical sound, visual colour, and physical movement were clearly the most prominent aspects of his conception; in Stuckenschmidt's words, these three elements

are subordinated to a common goal. Thus the music grows softer when it might overshadow one of the other kinds of movement, and language is used only to create an atmosphere, not for its semantic possibilities.

In the same way, the human voice is to be used in its "pure state," without any concern for the meaning of what it is saying.(119)*

Some remarkable similarities can be found between Der Gelbe Klang and Die Glückliche Hand, revealing underlying affinities between Kandinsky and Schoenberg. Practically, both works require coordinated crescendi and diminuendi of light and colour, and both prescribe spoken choral parts. Aesthetically, both commune directly with the hidden subconscious, escaping into a spiritual reality.(121) As did Kandinsky, so Schoenberg sought to transcend the physical senses, striving, through his music, for direct access to the spiritual plane. In Der Blaue Reiter Almanac he cites Schopenhauer's insight into musical intuition:

The composer reveals the innermost essence of the world and pronounces the most profound wisdom in a language that his reason cannot understand; he is like a mesmerized somnambulist who reveals secrets about things that he knows nothing about when he is awake.(122)

This equation of the composer's intuition with hypnotic states prompts a momentary digression to speculate on the supposedly spontaneous generation of abstract imagery mentioned by several artists and composers. In his An Essay on Eyesight(123) the surgeon Oliver Jelly refers to the involuntary appearance of colour and shape 'behind the eye', which may arise as an image complementary to one actually perceived, but can equally often occur without external stimulus. Jelly regards the manifestation of 'adventitious

* For example, in Tableau 3 an off-stage tenor cries out a gabble of meaningless words, such as 'kalasimunafakola'. This anticipates Hugo Ball's phonetic Dada-poems, first heard on 14 July 1916 at the Dada evening in Zurich. His meta-verbal art sought 'to abandon a language ravaged and laid bare by journalism. We must return to the deepest alchemy of the Word, and leave even that behind us, in order to keep safe for poetry its holiest sanctuary.'(120) It also reminds one of the wilful obscurities in Stefan George's symbolist poetry, where art as a priestly cult is transmitted through magical, oracular incantations.

geometrical shapes (circles, squares, spindles or pattern)'(124) as 'automatic colour vision',(125) and identifies a peculiarly intense 'film' or 'field' colour palette typically produced in such phenomena.

As physiology tells us, nervous discharges are not absent when the eyes are seeing nothing. As strong a battery of impulses can be recorded when the eyes are turned off something as when they are turned on.(126)

Such automatic vision can be artificially promoted through drug-abuse (see Aldous Huxley's vivid description of mescaline-induced imagery in The Doors of Perception),(127) and through diseases such as typhoid, but it also occurs in half-sleep - the hypnagogic state first remarked by E.T.A.Hoffmann in Kreisleriana, and which Jacques B. Brunius has noted is produced, even involuntarily, by cinema:

The theatre's twilight closes like an eyelid on the retina and turns thoughts adrift from reality....The order of the screen's images in time is absolutely similar to the arrangement that thoughts or dreams can devise. Neither chronological order nor the relative values of duration are real....It is impossible to imagine a more faithful image of mental processes.(128)

Jelly discerns 'field' colour in the paintings of Van Gogh, Gauguin, the Fauves, Chagall, Ernst, and Kandinsky. Kandinsky's Black Increasing (1927) is submitted as a key example, wherein 'areas of 'field' colour...appear in amorphous but immiscible shapes. Moreover it also shows automatic object appearance.'(129) [Slide 18]

For his part, Jelly disputes that such unheralded apparitions are symbolic of a higher meaning;(130) but the Theosophists, Kandinsky amongst them, would have vehemently disagreed, hierarchising colour as much as shape with moral values, and endowing their introspective landscapes with spiritual significance.*

For the composer Cyril Scott, the audition of music could similarly evoke thought- and colour-form

in the astral space, and according to that form and colour is to be gauged the spiritual value of the composition under review. If the preponderating colours be lilac, violet, blue, pink, yellow, and apple-green, combined with a firm of lofty structure and vastness, then the work is one of intrinsic spiritual value; if, however, the preponderating colours be muddy brown, greys, cloudy-reds, etc., then the work may be recognized at once to be one of a lower order. This method of gauging the spiritual value of art, however, is only possible to him who has awakened the latent faculties of the pineal gland and pituitary body.(132)

Stockhausen also testifies to 'witnessing' spontaneous imagery when elevated by strong emotion (presumably equivalent to a drugged state, but here the product of adrenalin):

And I've discovered that when there are very good moments when we are performing or when I'm listening to other music, that it becomes just red-violet, no shape, it's all just like a

* With regard to Kandinsky's first 'improvisatory' abstractions, it is also interesting to note the considerable popularity of contemporary scientific films which were revealing for the first time to a general public the wonders of animalcule forms through the medium of cinemicrography. Commercial screenings of such films became increasingly common in the pre-war years. Their revelations of the hidden world of organic forms - hugely magnified on the screen - confirmed the existence of a biological reality previously inaccessible and unimagined. [Slides 19, 20] The similarity of these minutae to 'behind-the-eye' imagery could surely not have passed unnoticed; could not this swirling microscopic universe somehow mirror the astral planes of the psyche? Were these newly-revealed living forms a manifestation of those archetypes which artists were seeking beyond the superficially 'real'?(131) [Slides 21 - 25]

curtain....Only after a while do you get to the next step after violet, a goldish color, and then you may be sure that the cosmic juice is flowing into you.(133)

[when dreaming...] I once saw a very precise hexagonal form, and it was breathing very slowly like a heart in exactly this red-violet light....this hexagon came up to me very slowly; moving away, coming again...three times...and it was finished....the violet I'm talking about seems to be completely interwoven with reddish light spots that have this more yellowish tint...(134)

It seems possible, therefore, that for both Schoenberg and Kandinsky, concentrated listening - either externally, to performed music; or internally - to imagined sound - could trigger some form of dormant synaesthetic confusion whereby abstract imagery and 'field' colour were perceived.* Perhaps then, Schoenberg's Begleitmusik zu einer Lichtspielszene has less to do with the cinema than with such Thought-Form images as the Theosophists described and illustrated. Schoenberg would assuredly have rejected any objective film-visuals, demanding once again 'the utmost unreality' and 'sounds for the eye'. It is maybe not too fanciful to link Schoenberg's Begleitmusik titles: Imminent Danger; Fear; Catastrophe, with - for example - those Thought-Forms illustrated by Ringbom: Rage; Sudden Fright; Jealousy.(136) [Slide 26]

Therefore, not all art is perceptual (responsive to the material world); absolute imagery is indeed primarily conceptual, and being thus an emanation from within, it necessarily aligns with

* Olivier Messiaen, too, must surely be adjudged a synaesthetist: 'When I listen [to music], or when I read a score or listen inwardly, I see mentally corresponding colors that revolve, move and mingle as the sounds revolve, move and mingle, and in the same time....I see them internally; it is not my imagination, it is no more than a physical phenomenon, an interior reality.'(135)

absolute sound composition, which - unless specifically designated programme music (and even then) - owes no debt to externals.

When a ready susceptibility to this form of wilful self-hypnosis is allied to an eidetic (totally-retentive) memory* (which normally but not invariably disappears with the passing of childhood and a developing awareness of spatial interrelations), the literally self-effacing artist can believe himself no more than a medium, through whom the transcendental current flows. His task is simply to store and transmit - via his art - the 'messages' received. That Kandinsky saw this as his mission is likely, and indeed, every artist has sensed, at one time or another, an unseen hand guiding his pen or brush. The amazing rate at which Schoenberg was able to compose during his Expressionist period (notably the monodrama Erwartung, Opus 17; 1909) argues that here too, the hypnagogic and eidetic found fruitful communion.

Schoenberg's emancipation of tonality parallels Kandinsky's emancipation of the object;(139) not - in Der Gelbe Klang - through painterly abstraction, but through a divorce from the material world. The laws of cause and effect were now supplanted by an 'inner necessity'. Summarizing the parallels between Der Gelbe Klang and and

* 'Optical perceptual (or eidetic) images are phenomena that take up an intermediate position between sensations and images. Like ordinary physiological after-images, they are always seen in the literal sense. They have this property of necessity and under all conditions, and share it with sensations.'(137)

'For the great majority of adults there is an unbridgeable gulf between sensations and images. It has always been known that for a few individuals this is not true. Some people have peculiar 'intermediate experiences' between sensations and images....We must conclude that their 'experiences' are due to eidetic images.'(138)

Die Glückliche Hand, Lawder sees them both in the Gesamtkunstwerk tradition:

Both were attempts at truly synthetic works of art in which color, movement, and sound would fuse in the spectator's mind to form a single expressive phenomenon, and through their successive interaction would arise a new order of aesthetic experience.(140)

The first production of Die Glückliche Hand was not until 14 October 1924 in Vienna; hence there was no contemporary impact on other artists before or during the War. In 1930 Oskar Schlemmer directed a production of the opera at the Berlin Kroll Opera, having earlier been influenced and inspired by witnessing Pierrot Lunaire; this encouraged him to write to Schoenberg asking 'if he would compose for the modern dance.'(141) Schlemmer was an artist connected with the Bauhaus, and today noted for his Triadic Ballet, premiered in 1922. From the description given by Ernst Scheyer, this work cannot help reminding one of the stage-directions for Schoenberg's opera, and of the 'scripts' for Kandinsky's dramatic works:

The ballet consisted of three parts. During the first part the stage was draped in lemon-yellow; the dances were comical-burlesque. The second part was ceremoniously solemn and took place on a rose-tinted stage. The third part was a mystical fantasy danced before black curtains. The twelve dances, with eighteen different costumes, were performed alternately by three dancers, two male and one female.(142)

Scheyer however was more impressed by Schlemmer's own Stick Dance, which in its abstraction relates closely to contemporary film-experiments. [Slide 27]

Phosphorized sticks hovered as light-lines in space, forming always new amazing combinations of geometric figures.

But behind them operated, in black leotards, dimly perceived, man the dancer.(143)

One senses that the contemporary dance of Isadora Duncan, Mary Wigman, Martha Graham, and others may have had some influence on artists and musicians alike. Hans Richter reports that the Zurich Dada group used to congregate at the Laban ballet school, meeting Wigman and other dancers.(144) Wigman's unerotic dancing was based on the Dalcroze rhythmical gymnastics (eurhythmics) method. She wore Grecian costume, sometimes dancing without music. In 1920 she began to invent abstract titles - Rhythm, for example - and in 1923 she choreographed the group dances Circle and Triangle.(145) The expressional, as opposed to story-telling, dance of these revolutionary figures exemplified the liberation of gesture from narrative which avant-garde painters and film-makers were seeking in the early years of the century. The modern dance of Alwin Nikolais, George Balanchine, and Merce Cunningham springs directly from this innovatory work.

It is a prayer, this dance, each movement reaches in a long undulations to the heavens and becomes a part of the eternal rhythm of the spheres.

Isadora Duncan (1878-1927)

* * *

Many years after the production of his theatre-piece Der Gelbe Klang, Kandinsky collaborated with Georg Hartmann, director of the Friedrich Theatre in Dessau, in intermingling musical and visual in his decor for a 'staging' of Mussorgsky's Pictures at an Exhibition (Dessau, April 1928). Here again, moving coloured light accompanied the several parts of the composition, integrating visual and auditory

sensations in a symbolic fusion. Whilst acknowledging that the paintings which originally inspired Mussorgsky were naturalistic and anecdotal, the music was not slavishly programmatic, and Kandinsky felt free to use largely non-objective shapes 'that came to mind while listening to the music. The main materials were:

1. The shapes themselves,
2. the colours on the shapes to which were added:
3. the colours of light as painting in depth,
4. the independent effect of coloured light and
5. the composition of each image as it related to the music and, necessarily, its decomposition.'

Kandinsky describes the setting for The Old Castle, picture Four, thus:

The stage is bare but in total darkness...At the first espressivo, three long vertical stripes only become visible in the background. They disappear. At the later espressivo, the huge, red back-cloth comes in from the right...Then the green back-cloth in the same way from the left. The central figure appears from the darkness. It is illuminated with intense colour.(146)

After the manner of Schlemmer's Bauhaus abstract ballets, the shapes were

either suspended, pushed in from the side or carried across the stage by stage hands who remain concealed behind them. The shapes are partly opaque, partly transparent or sometimes have cut-out sections for the direct incidence of light. Their actions are co-ordinated in precisely calculated synchronization with the music, with the movements of coloured, graduated light which is woven into the abstract stage event through spot-lights, lamps and, in one case, through a kaleidoscope projected onto the back wall.(147)

Georg Hartmann described Gnomos in great detail. Here the parallel with Walther Ruttmann's later Opera becomes remarkably clear (see Chapter Three):

When the first 10 powerful bars in G-flat major strike up, there appears on the right-hand side of the stage, arranged according to the severity and clarity of contrast on the stage, a white surface starkly bisected by black stripes. The repetition of the theme in the next seven bars brings with it, after the disappearance of the first image, another white surface as motif, but this time broken up by vertical rather than horizontal black stripes. This too vanishes, only to re-appear in the middle of the stage with the following bars. Then, by means of a small black figure closely resembling an exclamation mark, which becomes visible at the violently stressed sforzando chords (from bar 19), it turns and points, with equal force as it were, to the images now taking shape on the white surface.(148)

And in his ceramic decoration for Mies van der Rohe's Music Room at the 1931 Berlin International Architecture Exhibition Kandinsky seems most close to Viking Eggeling, for the geometric graphics unfurl across the walls of the room in a pronounced horizontal format reminiscent of the latter's scroll drawings. The varied repetition of elements, enlarged, diminished, extending the walls back into deep space, strongly evoke the layering of polyphonic strands in music. Carola Giedion-Welcker remarks how, 'Full of movement and rhythm, as if captured by the increasing and diminishing intensity of a song, forms seem to vanish, reappear, come together, and in an almost musical manner, to suggest both distance and presence.'(149) [Slide 28]

* * *

From this overview of investigation into the correlation of sound and visuals in movement (both latent and manifest), it seems now quite inevitable that the newly-invented medium of film should have furnished the technological means to aid artists in their struggle to gain control over the synchronous organization of the media. And yet how alien cinema appeared to the vast majority of the avant-garde - composer and artist alike - will also have been observed. Perhaps, as with the computer today, its newness and power were found intimidating; similarly, its proper use required an understanding of scientific areas (optics and chemistry) rarely entered by creative artists.

In the following chapter, the earliest experiments in film abstraction will be studied and the relation to their subsuming art-movements of the period observed. That these first efforts were largely conceived (like the silent films of the period) without consideration being accorded to any eventual musical accompaniment should not be construed as lessening their importance in the present context; for not until the unfamiliar dynamic world of moving absolute visuals had been explored could it be handled with any understanding in conjunction with the familiar, perhaps dangerously over-familiar, world of musical sound. Without exception, the early absolute film-makers conceived of their work in musically-analogous terms, deriving their descriptive vocabulary primarily from music, and structuring time according to musical criteria of repetition, variation, diminution, and augmentation. For a variety of reasons, primarily economic, it will be seen that little radical experimentation occurred in this field throughout the 1930's, and with only isolated forays in the forties and fifties; so that, with such a

fragmented history, any present-day work in absolute animated film with tape music owes an enormous debt to those few who originally undertook the lonely journey into the foreign medium of film animation. It should be noted at this point that, for reasons of space, the far larger field of abstract (live-action) experimental film will not be considered. Although the more extreme examples approach absolute animated film in their detachment from the perceived world, it is the relationship of absolute animated film to canvas art which is here under observation, not the relationship of abstracted to 'realistic' live-action film imagery. When the tension between a notional reality and a witnessed abstraction become of prime concern, sheerly graphic and rhythmic values can no longer take precedence; and it is upon these latter that this thesis focusses.

CHAPTER THREE

EARLY ABSOLUTE ANIMATION TO 1930

In der Malerei fehle schon längst die Kenntnis des Generalbasses, es fehle an einer aufgestellten, approbierten Theorie, wie es in der Musik der Fall ist....

(The knowledge of 'thorough-bass' has long been wanting in painting. An established, tested theory is needed - as is the case in music.)

Goethe: Gespräch über Kunst(1)

Our desire is, to penetrate nature in such a way as to reveal the internal structure of the real.

Schoenmaekers(2)

The eventual resolve of artists to breathe life into their work through recourse to the technicalities of film animation was, as we have seen in Chapter One, symptomatic of those animistic yearnings which so stirred the avant-garde around 1900. Now the entranced, cataleptic soul of the absolute canvas was to be vivified through a release into time.

* * *

Prehistory of Animation

The principles of film-animation had been known long before film-stock, cine-cameras and projectors were invented at the end of the nineteenth century. As early as 1832 Professor Joseph Antoine Ferdinand Plateau (1801-1883) designed and constructed a Phenakistiscope ('deceit-look') to give the illusion of movement. This device, like cinematic projection, relied upon the 'phi' or the 'persistence of vision' phenomenon for its effect - in this context, the sluggishness of the eye in distinguishing between similar pictures shown in rapid succession - and like many later devices presented a cyclic motion equivalent nowadays to a film-loop, where the last picture of a sequence repeatedly leads the action directly into the first. The principle was taken up by other inventors, resulting in Stampfer's Stroboscope, W.G.Horner's Zoetrope or Zootrope ('life-wheel'), and in 1877, in Emile Reynaud's Praxinoscope

('action-look'), a more sophisticated piece of equipment.* In all these instances hand-drawn pictures formed the imagery.

The development of the photographic process itself is beyond the concern of this study, as is, by and large, the early history of live-action cine-filming. However, the work of Eadward Muybridge and Etienne-Jules Marey cannot be ignored since, as noted above, it was a major source of artistic stimulus at the beginning of the twentieth century. In 1877, Muybridge set up a series of cameras to film a galloping horse, settling the elementary question whether - as depicted in Stubbs and elsewhere - it ever had four legs off the ground at once. By a variety of animation-in-reverse Muybridge, positioning a total of twenty-four still cameras parallel with a race-course, filmed the horse as it galloped past breaking twenty-four threads which activated the camera shutters. By such crude means the successive phases of a galloping action were fixed; a continuous movement had for the first time been broken up into instantaneous segments, and the scientific world was not slow to recognise this achievement. In his Archaeology in the Cinema C.W.Ceram observes of this 'series photography' that 'to conceive of nature in quanta is the

* The Phenakistiscope was 'a revolving disc with slits at the edge and figures drawn on it which came to life when viewed in a mirror through the slits with the disc revolving.'(3)

'The Zoetrope was a revolving drum with slits, through which the spectator looked at a strip with drawings on it.'(4)

The Praxinoscope 'also used a series of drawings on a strip, but animated them more successfully by means of mirrors set at an angle.'(5)

.. 'In 1882 Reynaud combined the principle of the Praxinoscope with a projector and by 1888 had developed longer films with the pictures painted on strips of celluloid. For public performance he used back projection (the apparatus being concealed behind a screen) and he accompanied the films by special music, and ingeniously contrived sound effects.'(6)

summit of technical thinking.' (He gives as a graphic example of this approach the 'breaking up of a circular movement [which]... corresponds to construction of a circle out of an infinite-sided polygon.'(7) One notes that in computer animation a circle is simulated by just this method.)

Diametrically opposed to this view was the philosopher Henri Bergson who criticised modern man's spatial concept of time as discrete 'cinematographic' units.* H.Wildon Carr has summarised this facet of Bergson's philosophy thus:

The intellect is cinematographical. This description is perhaps the happiest of any of the images that Bergson has used to illustrate his theory. The cinematograph takes views of a moving scene; each view represents a fixed position, and when the views are arranged side by side on the film and passed across the screen in rapid succession they present to us a moving picture. The views as they lie before us on the ribbon, as we look at them in passing from one to the next, do not give us this picture; to have the picture we must restore the movement, and this the cinematograph does. The fixed things that seem to us to lie side by side of one another at every moment in space are views that the intellect takes. These views seem to us to form the movement by their succession, the replacement of one by another seems to be the change, but the reality is the movement; it is a continuous change, not a succession of states, and the fixed things are views of it. These views are the physical objects that science deals with, and the method of science is cinematographical; change for it is nothing but the succession of fixed states. But a movement is indivisible, a change is indivisible, the divisions that we make in it, the immobilities that seem to compose it, are not

* But it is questionable how modern this concept may be. Jean Charlot, in his Art from the Mayans to Disney, draws our attention to 'the wild boar painted in the caves of Altamira...endowed with four pairs of legs, two in running and two in crouching posture, the two tempos of a gallop purposely filmed a few thousand years ago by the quick eye of the hunter.'(8)

divisions, but views of it. Nothing is immobile.
Immobility is purely an appearance.(9)

It should not be assumed that the intrusion of the 'cinematic' into painting was universally welcomed. According to Aaron Scharf the Futurists were early denounced for this. Severini's Dance of the Pan Pan (1911) was criticised as 'a desperate attempt to introduce the sensation of duration into space, and this work reveals the cinematographic tendency of painting.' Surprisingly perhaps, Robert Delaunay also disapproved, as did Cubist supporters.(10) Perhaps it was the apparent insensitivity of the cine-camera to psychological time which at first upset the canvas artist. By the nineteen-twenties though, the medium of cinephotography was to be embraced as the ideal means of simulating Bergson's 'indivisible movement'; in a posthumous collection of Viking Eggeling's notes and quotations one finds that Bergson's L'évolution créatrice (1907) had made a most marked impression, as it did on numerous other artists of his generation.*

We know that the photographic experiments of the physiologist Etienne-Jules Marey also had a great impact upon artists, notably the Futurists, whose paintings appear to draw inspiration directly from Marey's chronophotographs. The goal here was to register on a single photographic plate the successive phases of movement. An intermittent flashing light, like a theatrical strobe-light, illuminated the action. Thus past, present, and future were gathered up into a spatial fixity. Neither single 'instantaneous' photograph, nor blurred time-exposure, this unique technique approached as closely as possible the cinematographic, whilst the images remained immobile on

* Including Kandinsky who, writes Grohmann, 'read Maeterlinck with enthusiasm and was acquainted with Bergson's Creative evolution.'(11)

the photographic plate. The spatio-temporal trajectory of the action was held in frozen dynamism: consequently, the images have tremendous kinetic potential. These images somehow epitomise the preliminary work-process of animation; as one sheet is laid above another the flow of movement begins to present itself, and on completion of the sequence in line-test the superimposed images appear very like those in Marey's chronophotography. Flipping through the sheets then crudely releases the potential energy of the arrested time stored within.*

* * *

A progressive aspiration towards 'universality' imbued and united the post-war avant-garde Constructivists, De Stijl, and Bauhaus members. Film was to appear an especially attractive medium, for it promised a mass accessibility denied canvas art. Until the late twenties, when the artist's social conscience became troubled by political rumblings and economic privations, a halcyon period of radical experimentation ensued. The concept of a pure visual language was common to all geometrical abstraction and to surrealism - both

* For over a century, from 1868 to the 1960's, 'flicker books' have been a popular form of peep-show entertainment. These books are identical in principle to the schoolboy practice of drawing stick-men in various positions at the bottom corner of a text-book and then flipping rapidly through the pages with a thumb to see the figures jumping feverishly to life. Casler's Mutoscope, very popular in American 'Mutoscope Parlours' in the 1890's, and Short's Filoscope, are examples of this principle put to commercial use. In both, a sequence of live-action photographs could be reconstituted into a semblance of fluid motion. Very recently, little books of flip-cards have been reintroduced for educational purposes - demonstrating the correct method of artificial respiration, for example. The abstract Mutoscope designs of Douglass Crockwell should be noted, as should Elfriede Fischinger's booklet made from one of Oskar's films. (Note that animators invariably flip through every half-dozen or so line-test drawings to check for smooth movement.) [Footnote continues overpage]

being non-verbal, and both, as has been seen, relating to the occult movements of earlier years. Absolute film makers, receiving music as a temporal exemplar, invented new silent languages of shape metamorphosis.

However, the striving after a 'Generalbass' or thorough-bass of motion-picture graphics which so came to obsess the Swede Viking Eggeling did not coincide with the first experiments in absolute animated film, for this ambition to formulate a universal language was preceded by the avant-garde's need to come to terms with the new technology of cinema, enabling it to participate in the modernist aesthetic. In Paris, even before World War I, the critics Delluc and Canudo had first recognized film's potential for expressing purely plastic values, coining the term 'photogenic' to denote a new non-narrative application of the medium, affording release from theatrical mimeticism. By the nineteen-twenties their theories came to dominate French cinema aesthetics.*

[Footnote continued from previous page] Aaron Scharf points to a medium mid-way between the scroll and the flip-card book:

Lissitzky described the space represented by the cinema as 'imaginary' and he was absorbed by the analysis of cinematic form. This interest had probably been heightened by his knowledge of the work of Viking Eggeling and Hans Richter, two pioneers in experimental cinema whom he met in Berlin about 1921. In propounding his typographical principles, Lissitzky called for 'the continuous page - the cinematographical book.' That possibly is reflected in a work like The Story of Two Squares of 1920 (published in 1922) in which, following the titles and the introduction of the two 'actors' (black square, red square), the story runs in visual sequence and even seems to duplicate the cameraman's devices of tracking in and out.'(12)

Christopher Green has remarked how, some seven years earlier, a related experiment had been made by the Delaunays, who 'had made their most extreme declaration of belief in the compatibility of poetry and painting: Sonia Delaunay gave a running colour accompaniment to Cendrars's 'Prose du Transibérien...' It was published as the first 'simultaneous book' in the autumn.'(13)

* In 1919 Delluc published Cinea et Cie, then Photogénie, Charlot, and Drames du Cinéma, amongst the earliest documents on cinema aesthetics. Canudo founded a Club des amis du septième art.

Corra and Ginna : Six Futurist Films

The earliest known abstract animated film studies* date from around 1910-1912, and were the work of two Futurists, Bruno Corra and Arnaldo Ginna (actually his brother; their surname was Ginanni-Corradini). Rejecting out of hand the psychological realism of a cinema which aped the bourgeois theatre and nineteenth-century novel, Corra and Ginna were, like all later workers in this medium, antagonistic towards a dominant commercial cinematic practice. An article published by Corra in 1912 - "Abstract Cinema - Chromatic Music" - is our source of information regarding their hand-painted films, which have apparently not survived.** Corra had pursued the popular line of equating, however arbitrarily, frequencies of sound and colour, beginning his experiments with a twenty-eight keyed coloured-light console, and completing a number of works for the instrument.

* But in Experimental Animation Russett and Starr state: 'A booklet entitled Deutsche Filmkunst, by Simon Koster, includes three frames from a film entitled Kaleidoskop, dated 1906 and captioned "Der erste Absolute Film" (the first abstract film). No further information about it has yet turned up.'(14)

For interest compare the opening and closing credits to Emil Cohl's Drame chez les Fantoches of 1908, produced by Gaumont. Immediately following the Gaumont logo a white disc, centrally placed, diminishes to a small white point. This breaks up and metamorphoses into ten irregularly-shaped pieces which disperse only to be momentarily encircled in a white ring (for six frames). They finally re-form into a door and window, whereupon the story begins. Until this point, the activity has remained wholly abstract.

** A short strip of handpainted film was reconstructed for the exhibition Film as Film, Hayward Gallery, May-June 1979. It was common practice to hand-colour early films, often using a stencelling technique. The results - as in several Pathe films - were remarkably good.

Technical deficiencies determined Corra and Ginna upon abandoning this medium of colour-composition, and they turned to clear film-stock and the high light-output of a carbon arc projector to give them brilliance and stability of colour. Their hand-painted films antedated those of Len Lye and Norman McLaren by twenty years. According to the writer Mario Verdone, they were titled as follows:

1. Accordo di colore (6.5 mins); from a picture by Segantini.
2. Studio di effetti tra quattro colori; in red, green, blue, and yellow.
3. Canto di primavera; after Mendelssohn's Spring Song and a Chopin waltz theme.
4. Les Fleurs; after a poem by Mallarmé.
5. L'arcobaleno (7.5 mins)
6. La danza (7.5 mins)(15)

Unlike some later techniques, where artists have painted down the length of the celluloid, this earliest attempt took the laborious course of treating the single frame as a unit. Since these experiments, translating music and poetry into animated abstractions, prefigure so much similar work from the 1920's and '30's on, a passage from Corra's document describing the five brief films is given here to illustrate the kind of visual imagery created.

To hand I have three chromatic themes sketched in on strips of celluloid. The first is the simplest one could imagine. It has two colours only, complementaries, red and green. To begin with, the whole screen is green, then in the centre a small red six-pointed star appears. This rotates on itself, the points vibrating like tentacles and enlarges...until it fills the whole screen. The entire screen is red, and then unexpectedly a nervous rash of green spots breaks out all over it. These grow until they absorb all the red and the entire canvas is green. This lasts a minute.

The second theme has three colours - pale blue, white and yellow. In a blue field, two lines, one yellow, one white, move, bend together, detach themselves and curl up. They then undulate towards each other and intertwine. This is an example of a linear as well as a chromatic theme. The third is composed of seven colours, the seven colours of the chromatic spectrum in the form of small cubes arranged initially on a horizontal line at the bottom of the screen against a black background. These move in small jerks, grouping together, crashing against each other, shattering and reforming, diminishing and enlarging, forming columns and lines, interpenetrating, deforming etc.(16)

The last two films, L'arcobaleno (The Rainbow) and La danza (The Dance) are also described. Of L'arcobaleno:

The colours of the rainbow constitute the dominant theme, which appears occasionally in different forms with ever increasing intensity until it finally explodes with dazzling violence. The screen is initially grey, then in this grey background there gradually appears a very slight agitation of radiant tremors which seem to rise out of the grey depths, like bubbles from a spring, and when they reach the surface they explode and disappear. The entire symphony is based on this effect of contrast between the cloudy grey of the background and the rainbow, and the struggle between them. The struggle increases; the spectrum, suffocated beneath the ever blacker vortices which roll from the background to foreground manages to free itself, flashes, then disappears again to reappear more intensely close to the frame. Finally, in an unexpected dusty disintegration, the grey crumbles and the spectrum triumphs in a whirling of catherine-wheels which disappear in their turn, buried under an avalanche of colours.

And of La danza:

...the predominant colours being carmine, violet and yellow, which are continually united, separated and hurled upwards in an agile pirouetting of spinning tops.(17)

It is not known whether these films were ever publicly screened, but

Corra's vivid descriptions of their anthropomorphic development strongly evoke the image-play of the extant fragments from Walther Ruttmann's later Opera with their synchronous musical accompaniments. These early Futurist experiments are historically important in first effecting a close coordination between sound and filmed abstraction. Verdone has stated that Ginna, who painted abstract canvases as early as 1908, was of a strongly mystical disposition, conceiving his work as psychographic, embodying 'soul-states' (stati d'animo).(18) This occultism may align with contemporary Theosophical thinking as represented in Besant and Leadbeater's 'Thought-Forms', and immediately recalls our speculations in Chapter Two concerning hypnagogic and eidetic imagery generation.

Survage : Le Rythme Coloré

These descriptions vividly recall the independent experimentation of the Cubist painter Léopold Survage (Moscow 1879 - Paris 1969) who, whilst employed in Paris as a piano-tuner (he was the son of a Russian piano-manufacturer), was similarly conceiving of a three-minute colour-film of moving abstract forms which might embody his (by now familiar) aesthetic aspiration: 'la figuration du spirituel'.(19) Survage was clearly overwhelmed by the French Symbolist movement when he arrived in Paris in 1908: 'Les choses ont un pourquoi. Tout ce qui existe exprime des forces, qui jouent entre elles. Tout est lié, et tout correspond. Tout est symbole. Tout est harmonie, tout est rythme.'(20)

In the final issue of Les Soirées de Paris, a periodical published by Guillaume Apollinaire, Survage described his intentions regarding his film-project called Le Rythme coloré; this would appear to be a first conscious attempt towards a 'Generalbass' of painting, as required by Goethe.[Slides 29, 30] He has left a full account of his work, together with a large number of coloured gouache sketches prepared for the film, fifty-nine held in the Museum of Modern Art in New York, and a further twelve in the Cinémathèque Française.*

COLOR, MOVEMENT, RHYTHM

Painting, having liberated itself from the conventional forms of objects in the exterior world, has conquered the terrain of abstract forms. It must get rid of its last and principle shackle - immobility - so as to become as supple and rich a means of expressing our emotions as music is. Everything that is accessible to us has its duration in time, which finds its strongest manifestation in rhythm, action and movement, real, arranged, and unarranged. I will animate my painting, I will give it movement, I will introduce rhythm into the concrete action of my abstract painting, born of my interior life; my instrument will be the cinematographic film, this true symbol of accumulated movement. It will execute the "scores" of my visions, corresponding to my state of mind in its successive phases.

* Blaise Cendrars, in "The Birth of the Colours" (La Rose Rouge, July 17, 1919) states that Survage had 'more than 200 sketches', and proceeds to offer a verbal analogy to their organic growth...a curious inversion of the influence six years earlier of Cendrars himself on Sonia Delaunay.(21)

SURVAGE: 59 studies for the film Colored Rhythm, 1913. Watercolor, brush and ink, fourteen and one eighth inches times ten and three eighths inches, and thirteen inches times twelve and a quarter inches. Collection, The Museum of Modern Art, New York. (These are held in the form of 35mm-colour-slides, by the University of York Morrell Library.)

Twelve designs for a sequence in his abstract film Le Rythme Coloré ca.1913. Collection Cinémathèque Française.

I am creating a new visual art in time, that
of colored rhythm and of rhythmic color.(22)

(Signed) Leopold Sturzwage

Paris, 1914

Survage's statements are remarkably mature in their conception, seen in the light of later experiments with cinematic absolute imagery. He begins by making clear that (unlike Ginna and Corra) he is not illustrating or interpreting a piece of music, clearly sensitive to the charge of redundancy which can be brought against such (now ubiquitous) visualizations. It is an 'art autonome', grounded like music upon the same psychological premises. He immediately divines the real analogy with music - eschewing pitch/colour correspondences - in naming rhythm, the mode of succession in time, as the common dimension. Visual form is the fundamental element at his disposal, and this is determined by three factors: shape, rhythm, and colour. He seems to have little faith in the capacity of static abstraction to communicate feeling, and maintains that rhythm, abstract movement, is required to animate forms, literally to give them life.(23)

Survage clearly had some acquaintance with animation technique; certainly his approach - the presentation of a sequence of key-points in the flow of movement - would indicate this. The proposed film interested the French studio, Gaumont, but was sadly left unrealized owing to the outbreak of World War One.* The 'in-between' drawings were to be done by other draughtsmen - although a study of the extant

* Gaumont developed a three-colour process around 1911, according to Russett and Starr.(24) This company produced Emil Cohl's early cartoons.

Survage never realized his film, nor did he again aspire towards the cinematic, remaining a painter.

gouaches suggests that Survage was unduly optimistic in expecting his intentions to be unambiguous in this regard, consecutive sketches (always assuming that their present ordering is still consecutive) being too dissimilar to permit conventional 'in-betweening'.

Survage's designs show brightly-coloured, free-floating abstract figures 'moving' in a non-gravitational black space; there is no seeming inevitability to sequences in the course of action, unlike Symphonie Diagonale of Eggeling, where the severe ascetic limitation of visual material and movement encourages musical thinking in terms of anticipation and recall.* Survage emphasises that it is rhythm which relates his visual conceptions to the principles of sounding music; unfortunately, in the absence of a filmic realization from the sketches, it is impossible to estimate the success of his conception. By his own argument, which proclaims his dissatisfaction with the 'extra-temporal' resonances sounded by contemporary canvases, the rhythm cannot be appreciated from these 'frozen' moments alone:

A static abstract form is still not expressive enough. Whether round or pointed, oblong or square, simple or complex, it only produces an extremely confused sensation; it is only a simple graphic notation. Only when set in motion, undergoing change, entering into relations with other forms, is it able to evoke feeling...It is in this way that visual rhythm is analogous to sound rhythm in music. In both domains, rhythm plays the same part. As a consequence for the plastic world, the visual form of any body is only valuable to us as a starting-point, as a means of expressing and evoking our interior dynamisms, and certainly not to render the meaning or import such and such an object might have, in fact, in our

* In Experimental Animation Cecile Starr reveals that not only was Eggeling living in Paris during the same years as Survage, obsessed with similar problems in evolving a language of universal images, but that 'Eggeling's friend and neighbor, Amedeo Modigliani, whose studio was just across the hall, knew Survage well enough to paint his portrait; and the writer Tristan Tzara was a close friend of both Eggeling and Survage.'(25) It thus appears at least possible that Eggeling had some knowledge of Survage's Coloured Rhythm conceptions.

lives...So much for form and rhythm, which are inseparable.(26)

Survage's desire for moving coloured forms to aspire towards 'the condition of music' was later echoed by the influential Swiss critic and dramatist Bernhard Diebold, in an article "Expressionismus und Kino," of 1916:

The film painted by an artist, on the other hand, deals freely with forms as if they appeared in nature itself. As in music, masculine and feminine forms dance and fight, come and go; their continuously moving forms appear to distort, always according to the prescribed ways of the most exact theories of all arts, through dissonance, variations, succeeding again to primeval form by divinely frozen organ notes and archaic cadences; thus the linear or painted storms, flames, winds, and waves all move about, all bound together in rhythmical order, against, over, and behind one another: battling, entangling, playing one another out, and, finally, dissolving or drowning the figuration of a red major element into the enemy blue minor.(27)

Although this effusion suggests that Diebold was responding to a recently-viewed film (indeed, it recalls Corra's descriptions), there is no evidence to suggest that it was other than perhaps a sibylline revelation of Ruttmann's Opera to come. Five years later, Diebold - whose name crops up repeatedly in these War and post-War years, and whose enthusiasm for the new medium of cinematic abstraction encouraged several young artists to venture into the field - was to be an enthusiastic witness of the first private screening of Ruttmann's Opus I, where he 'was accompanied by his young friend Oskar Fischinger, who had clipped and saved Diebold's earlier articles (which he kept for the rest of his life); Fischinger was just beginning his own first steps into experimental animation at that time, with Diebold as his mentor.'(28)

For all their intrinsic interest, Survage's film studies and the realized films of Corra and Ginna seem to have exerted almost no direct influence on post-War experimenters who, whilst similarly intent upon formulating a visual language analogous to music, resorted to film largely innocent of any precedent. Their progressive elaboration of a theory of visual movement will now be chronicled at some length.

Eggeling, Richter, and Ruttmann

It is convenient to consider these three film-makers together, for although Ruttmann worked quite independently of the other two, they have come to be regarded as, jointly, the first artists actually to realize and publicly screen absolute animated films.

Of the three, Eggeling's reputation is the least sullied by time; dying in middle age at forty-five, his one extant film - a solitary ascetic black and white study called Symphonie Diagonale (the French title is apparently authentic) - stands as the culmination of his life's work, the very ordinariness of his earlier drawings setting in relief the unique breakthrough achieved with this film. [Slides 31 - 36] Richter and Ruttmann, on the other hand, both lived on, the former dying only recently in 1976. In the later nineteen-twenties Richter was to move on swiftly from his few absolute film experiments - Rhythm 21, Rhythm 23, and Rhythm 25, into Surrealist fantasies, for he was never as single-mindedly committed to pure abstraction as was his one-time co-worker Eggeling. Like De Stijl's editor, Theo van Doesburg, (alias the Dadaist, Bonset), Richter could change hats with legerdemain, now Dadaist, now Constructivist, now Surrealist. He can

indeed sometimes irritate by his very fecundity, having an easily prolific style possessing little of the strength and gritty determination of Eggeling's masterwork. Ruttmann's career after his early absolute film Opera was brilliant for a time, including work on Berlin, and Melodie der Welt, also a sound-montage, Weekend, but ended tragically in his death during World War Two.

A common concern of the three was, inevitably, the 'musical' nature of their work. All of them enjoyed a musical background: Eggeling (1888-1925), born to an enthusiastically musical family, sang and played the piano; his father, of German birth, was a versatile and talented musician, and owner of a music shop in Lund, in southern Sweden. Richter was an amateur pianist, whose 'own first encounter with the arts also took place through music. As a child, I often used to hide under the piano at my mother's weekly musical evenings and listen, overcome with emotion.' (29) Ruttmann was also musically literate, and an accomplished string-player. Only in Ruttmann's films was music to become an integral element, specially composed.*

* Eggeling's Symphonie Diagonale is intended as visual music (not visualized music, a term customarily applied to Fischinger's work), and should be screened silent, for its rhythms are autonomous. Adolf Behne, writing in 1921 and thus presumably discussing the no longer extant Horizontal Vertical Orchestra, recognised that this film 'not only exists without musical accompaniment, but quite rejects the need for one.' (30) Strange then that in the 1947 publication Art in Cinema, Richter should have averred that 'music for the silent avantgarde film is essential....With my own Rhythmus 21 and Eggeling's Symphonie Diagonale, I play Bach.... I have no inhibitions about using whatever music there is. However I do not believe in the synchronization of sound and image...I agree with Man Ray that we must avoid complete synchronization. We should find a way to let the sound and the picture move on its own in the same direction, but nevertheless, separately.' (31) Quite what this statement might mean, one cannot say; it reads suspiciously as if Richter is merely asking for some psychologically 'appropriate' sound-accompaniment, no more advanced than the aesthetic of the old-time silent-film pianist. Richter has elsewhere stated that in its first public showing in 1922 [sic], Symphonie Diagonale was accompanied 'with fragments of Beethoven's symphonies.' (32)

Eggeling : the 'Universal' and Symphonie Diagonale

After an unhappy spell as book-keeper, Eggeling acted as a skating and art master in Switzerland, and subsequently moved to Paris around 1911, where he remained for four years, adopting the life of 'an unattached artist', (34) and thus realising an ambition which had first fired him ten years earlier. In Paris, Eggeling is known to have been acquainted with André Derain (whose work he much admired) and Jean Arp, who remembered that Eggeling 'habitait Boulevard Raspail un atelier sinistre et humide, en face de lui demeurait Modigliani, qui venait souvent le voir, récitant Dante et se saoulant...Eggeling peignait peu en ce temps, il discutait pendant des heures sur l'art.' (33) His earlier work is figurative, but gradually reveals his admiration for Cezanne, and later attraction to Cubism. Richter has noted also an integration of 'the free-flowing and often sentimental lyricisms of 'art nouveau'' within his subsequent constructivist style. (35) The ornamentation of art-nouveau or 'Jugendstil' also strongly influenced the Dutch De Stijl group H, from which Piet Mondrian later refined his own highly reductive, geometric Neo-Plasticism. In common with Eggeling's mature graphic style, the pure values of Mondrian's canvas-abstractions make, as Herbert Read notes, 'a strong appeal to transcendental sensibilities - to those people who are willing to follow any of the arts in their approximation towards the aesthetic condition of music.' (36) Already by 1917, according to Arp's testimony, Eggeling was 'struggling to elaborate a 'new plastic language', seeking 'the rules of a linear counterpoint'. (37) This effort resulted in scrolls exhibiting strange abstract figures whose development was shown in successive stages of

enlargement, subdivision, multiplication, disappearance, and partial reappearance. Eggeling referred to these scroll-drawings as 'Symphonies'.

Around 1915 he had returned to neutral Switzerland, settling in Zurich with his second wife, Marion, in 1918. Here he was confronted by Zurich Dada, which then included Hugo Ball, Richard Huelsenbeck, Tristan Tzara, Eggeling's friend Jean Arp, and Marcel Janco. Dada was very active, raging against the senseless butchery of the war both through a self-destructive 'artistic revolt against art'(38) and - a typical paradox - through a search for fundamentals 'to cure the madness of the age.'(39) It attracted Eggeling's attention by its anti-establishment fervour, and more particularly by its commitment to abstract art, of whatever nature, for 'Naturalismus war psychologisches Eingehen auf die Motive des Burgers, in dem wir unseren Todfeind sahen...'(Huelsenbeck)(40) Eggeling was no mere passenger in the group, but took part in many of their activities - Soirées, writing of manifestos and reviews - remaining aloof however from their nihilist stance and audience-baiting tactics. Grete Wehmeyer has revealed the extent to which the rarefied avant-garde art-world, irrespective of nationality, fed upon itself in these immediate post-war years. The programme of the eighth Dada-Soirée (9th April, 1919), in the Zurich 'Saal zu den Kaufleuten' offered the following:

1. Viking Eggeling : Über abstrakte Kunst
2. Susanne Perrottet : Kompositionen von
 - a) Cyril Scott, Pavot [sic]

b) Arnold Schoenberg

c) Erik Satie

3. Kathe Wulff : Gedichte von R.Huelsenbeck und W.Kandinsky
4. Tristan Tzara: La Fièvre du mâle
(simultaneistisches Gedicht unter Mitwirkung von 20 Personen.)(41)

It seems odd to find Scott, Schoenberg, and Kandinsky sharing programme-space in a soirée organised by a faction whose anti-art creed must surely have been anathema! Perhaps it was the irrational, albeit spiritual element in their work which recommended its inclusion. Hugo Ball had published some of Kandinsky's poems in the Dada review Cabaret Voltaire (1916), and projected, but never realized, a staging of Der Gelbe Klang.(42) In the 1919 review Dada, nos 4/5, two of Eggeling's lithographs were published, both closely related to the style and technique of his later film-experiment graphics, and indeed in the last Zurich Dada publication Der Zeltweg, issued later in the same year, is found a pencil study for the Symphonie Diagonale scroll.

A member of the Zurich Dada group and of another group joined by Eggeling, Das Neue Leben, was Marcel Janco, who tells how, about 1918, Eggeling

parlait sur les bases nouvelles du "contrepoint plastique" auquel il voulait tout son travail apres avoir interviewé le grand compositeur Ferruccio Busoni sur les lois et le parallélisme qu'on peut tracer entre la composition musicale et l'art plastique. C'est probablement dans ce temps que lui vint l'idée de la nouvelle dimension du temps qu'il introduisait dans l'art abstrait avec ses compositions en évolution.(43)

O'Konor hazards that Ferruccio Busoni's influence may have been especially important in inspiring Eggeling to embark upon scroll-presentation of his ideas. Eggeling could hardly have been unaware of Busoni's presence in Zurich, for the latter was already a celebrity, moreover one who soon acquired a Lisztian 'court' of admirers.(44) O'Konor is convinced that 'music had great importance for Eggeling, and all his later, abstract works were created as he was studying musical problems; they are conceived in analogy with music.'(44) Eggeling loosely quotes Busoni in his notes, drawing from the Entwurf einer neuen Ästhetik der Tonkunst the following passage, which Busoni wrote in March 1913* under the heading "The Future of Opera":

The opera should take possession of the supernatural or unnatural as its only proper sphere of representation and feeling and should create a pretence world in such a way that life is reflected in either a magic or a comic mirror, presenting consciously that which is not to be found in real life. [The magic mirror is for grand opera, the comic for light opera. And dances and masks and apparitions should be interwoven], so that the onlooker never loses sight of the charms of pretence or gives himself up to it as an actual experience.(46)

Eggeling comments on this passage: 'Also wie in der Malerei - von der drückenden Schwere des Gegenständlichen dem Zwange des dreidimensional.'(47) (Similarly in painting; away from the oppressive weight of the objective with its compulsive three-dimensionality.) [my translation] Mondrian likewise felt that 'natural roundness, in a word, corporeality, gives a purely materialist vision of objects, while the flat aspect of things makes them appear much more

* This was only a few months before Schoenberg was to demand the 'utmost unreality' in the staging and filming of his opera Die Glückliche Hand.

inward.' (48)

Eggeling worked long night hours on the constituent phrases of his symphonic graphics, and it was on an evening in 1919, as Janco remembers, that he excitedly demonstrated the breakthrough from the 'frozen' sequential presentation of developing scroll-form, to the 'real' movement of cinematic presentation:

en sortant de sa poche un cahier épais d'environ 8 x 20 cm, il se plaça devant une vitrine où la lumière était plus forte, et avec un geste glorieux il fit tourner 40-60 pages dans une suite rapide: le carnet de papier plus gros formait "arc" et avec un geste habile du gros doigt il faisait courir chaque dessin sur l'autre dans un mouvement de vitesse. Il me regarde et il put lire mon admiration et ma surprise. J'ai eu l'illusion d'une course d'images qui se superposait dans un mouvement d'ensemble miraculeux comme au cinéma.(49)*

Richter, also a member of the Zurich Dada group, was introduced to Eggeling by Tristan Tzara early in 1918, and in the following year when the War ended and Switzerland's role as an international haven-metropolis could cease, the Dada group dispersed, with Eggeling accepting Richter's invitation to stay at his parents' estate at Klein-Kölzig, south-east of Berlin, where they might together pursue their researches. Eggeling now met the Berlin Dadaists, including Raoul Hausmann, who shared his opinion that

ni le constructivisme de Malevitch et de Mondrian, ni les formes "libres" de Kandinsky n'étaient capables d'expliquer les questions et contradictions élémentaires d'une optique universelle.(50)

* This recalls the scene preceding the animation sequence in Winsor McKay's Little Nemo (1911, Vitagraph Co.), where an early form of mutoscope is shown; the rotating cylinder was designed for flipping through animation line-tests at a regular rate, to assess the fluidity of the action prior to filming. Little Nemo is technically more sophisticated than Cohl's earlier animations, although both exploit to the full the fantastic metamorphosis of shape available through single-frame animation. The live-action fantasy-world of Georges Méliès can be seen as a precursor.

He became a member of the radical artists' Novembergruppe, later attended the first Berlin Constructivist congress, and published with Hausmann a 'présentiste' manifesto in the Hungarian journal MA (Today), a journal with strong Constructivist bias. Above all, Eggeling was in search of a universal language of absolute signs, an incorruptible paradigm of elemental archetypal forms unencumbered by figurative resonances. In "Easel - Scroll - Film" Richter articulates the unease which prompted the search for such simple artistic truths:

The upheaval of World War I, I am sure, had something to do with this urge for "order". I myself felt the need to establish an Archimedean standpoint, to penetrate the chaos which threatened from every direction. It appeared a physical necessity to articulate the multi-coloured darkness with a definite simplicity.(51)

Herbert Read similarly, in quoting from Worringer's Form in Gothic, accounts for the 'geometric, abstract nature of various types of art':

[Primitive man's] artistic will did not arise from the enjoyment of the direct, sensuous perception of the object; instead he created precisely in order to subdue the torment of perception, in order to obtain fixed conceptual images in the place of casual perceptual images. Consequently his art bore a positive, almost scientific character; it was the product of a direct impulse for self-preservation, not the unrestrained luxury product of a humanity delivered from all elemental world fears.(52)

Much earlier, in 1907, Worringer had affirmed that 'art must not satisfy the instinct of imitation but a psychic need, and that the instinct of abstraction was primary.'(53)*

* Eggeling quotes from Wilhelm Worringer's Abstraktion und Einfühlung. Ein Beitrag zur Stilpsychologie, 1908.(54)

Richter has often described his years of collaboration with Eggeling, and their common endeavour to establish new formal principles of diachronic organisation according to the laws of natural growth, of 'l'évolution créatrice' (Bergson).

In these years, 1918-1919, we searched together for the elements upon which visual expression might be built. Eggeling "orchestrated" the line in an elaborated, quasi-scientific system of relationships, his "Generalbass der Malerei" [general syntax of painting] which he had already formulated in 1917.* I experimented with the positive and negative relationships of planes and surfaces on a more intuitive level. For both of us, music became the model. In musical counterpoint we found a principle which fitted our philosophy: every action produces a corresponding reaction. Thus, in the contrapuntal fugue, we found the appropriate system, a dynamic and polar arrangement of opposing energies, and in this model we saw an image of life itself: one thing growing, another declining, in a creative marriage of contrast and analogy. Month after month, we studied and compared our analytical drawings made on hundreds of little sheets of paper, until eventually we came to look at them as living beings which grew, declined, changed, disappeared - and then were reborn. We finally could operate them like instruments (and that is exactly what we called them). A vertical line was made meaningful by the horizontal, a strong line grew stronger by a weak one, a single unit became more important against many, a defined one was clear against an undefined one, and so forth. All of these discoveries became meaningful in the light of our belief that a precise polar interrelationship of opposites was the key to an order, and once we understood this order we knew we could control this new freedom.(56)

* Elsewhere, Richter notes that the concept of 'orchestration' was first used by Gauguin in speaking of colour.(55)

It may not be out of place to sound a cautionary note here. For musical analogies come all too readily to the lips of abstract artists in search of a vocabulary, and too often the metaphors are strained, terminology being used very loosely. Much of the talk is superficial, the same tired references to 'orchestration', and 'counterpoint' cropping up repeatedly. Richter, who wrote much the same article time and again for various publications throughout his long life, is particularly culpable in this regard. Bearing in mind this proviso regarding musical metaphor, we may investigate the origins of Eggeling's and Richter's film experiments. These have been exhaustively documented by Richter, who is really the only primary source of information, preliminary experiment having been carried out independent of any artistic circle which might have contributed disinterested report.

Whilst at Klein-Kölzig the two artists made hundreds of experiments on separate sheets of paper, sifting through these and rearranging them to create 'rhythmic' sequences of opposition and affinity. In their continuing search for a 'universal language' - a kind of visual syntax - they were led to consider 'fixing' the more satisfactory of these continuities in the form of scrolls, suggested to them by a superficial acquaintance with the ideographic lettering of Chinese calligraphy.* (According to Werner Haftmann, (58) Delaunay anticipated them in this technique.) Richter's first scroll design was Preludium** of 1919, and later scrolls (like those of Eggeling), also bore musical titles: for example, Fugue, 1920. [Slides 37, 38]

The successive stages, the key-points, of a developing form, were thus inscribed within a complex dialectic of collision-values. But both Eggeling and Richter grew profoundly dissatisfied with this compromised presentation of mobility, ultimately resolving to approach the medium of cine-film, of which they had no previous experience. Their first attempts to 'animate' abstract figures had been of a remarkable naïvete, for before approaching the medium of film - entirely foreign to both of them in 1919 - they painted

...a number of figures, we called them "instruments" as in music, on a number of very thin sheets of rubber. These were then pulled

* Jean Charlot instances 'a chinese ink scroll of geese which are also, when read from right to left, a goose in flight, its wings passing by transition from their upright to their downward posture.' Thus 'a procession of beings, each illustrating statically an instant of motion is equivalent to one single being in actual motion.' (57)

** 'My work with gestures grew out of my early scrolls. The first gesture motif appeared in Preludium, 1919, in the seventh drawing. (Eggeling called it an assembly of music of different instruments, an accord - we always heard the music.) In the seventh accord, the seventh drawing, the vertical lines shoot up to their maximum. In the eighth, the following one, they shoot down. In these two gestures is a meaning.' (59) The phrase 'hearing the music' argues their subscription to Kandinsky's theories.

either horizontally or vertically...and, in that way, the drawings, extended, really moved a little; but they didn't move us. Our form-orchestra was a flop. We were forced to take the next step...film.(60)

It could only be a matter of time before Eggeling found the means to fix on celluloid the movements he had flicked over for Marcel Janco's benefit in Zurich. The largest Berlin film-company, Universum-Film-Aktiengesellschaft, or UFA for short, was enlisted* to support their proposed film experiments, with Eggeling's first major scroll drawings Horizontal-Vertical Orchestra I-III acting as guinea-pig. [Slide 39] The artists' gross ignorance of animation techniques and inability to communicate their intentions antagonised their UFA technician, who resented their inept and desperate efforts at improvising a sequence lasting a minute at most. Both went away to improve on their first attempts, Richter rejecting his scroll designs in favour of an orchestration of rhythm using simple rectangles in movement, and Eggeling further striving to render the real movement of his scroll figures adaptable to the requirements of film-animation.

* * *

Using film techniques in the painting of pure form gives the art a new ability: the artistic solution of the dichotomy of static and dynamic, of spatial and temporal elements, a fitting solution to the artistic needs of our time.

Theo van Doesburg(62)

* Lawder reveals how the generosity of a 'wealthy banker neighbour' enabled them, through the publication and dissemination of their pamphlet Universelle Sprache, to solicit testimonials from various influential figures, including Albert Einstein, thus convincing UFA of the value of their work.(61)

Just over a year later, the Dutch co-founder of the De Stijl group, Theo van Doesburg, visited them, subsequently describing their recent experiments in an issue of the magazine:

The drawings needed for the mechanical production of a composition consist of long scrolls serving as a score in which the development of the composition is set down in a consecutive arrangement, but so that the intervening gaps are developed mechanically.* These precisely executed drawings, in black, white, and grey, in spite of their careful execution, were still found to lack in precision....(63)

It seems odd that, if we are to believe this account, Eggeling should have attempted somehow to animate from a scroll after having clearly understood the principles of stop-frame animation on the occasion of his nocturnal meeting with Janco.

In 1921 Eggeling again contributed to the Hungarian magazine MA, this time with an article entitled "Theoretical presentations of the art of movement" wherein he clarifies the nature of the visual language employed in his scrolls and developed in his films, in which latter one observes

gestaltende Evolutionen und Revolutionen in der Sphäre des rein künstlerischen (abstrakte Formen) analog etwa den unserem Ohr geläufigen Geschehnissen der Musik....Die "Sprache" (Form-Sprache), die da "gesprochen" wird, beruht auf einem "Alphabet", entstanden aus einem elementaren Prinzip der Anschauung: Polarität. Polarität als generelles Lebensprinzip = Kompositions-methode jeder formalen Äusserung. Proportion, Rhythmus, Zahl, Intensität, Lage, Klang, Zeitmass....(64)

creative evolutions and revolutions in the realm of the purely artistic (abstract forms); roughly analogous to the sounds of music in our ears....The "language" (language of form) 'spoken'

* This is reminiscent of Surriage's Le Rythme coloré, where in-betweening of key images was to have been carried out by animation technicians.

here is based on an 'alphabet' which arises from an elementary principle of observation: polarity. Polarity as a general principle = compositional method of every expression of form. Proportion, rhythm, number, intensity, position, sound, tempo....

[my translation]

Eggeling's work on the Horizontal-Vertical Orchestra film had clearly progressed a stage further (to a fragment lasting some four or five minutes) when the art historian Adolf Behne saw it and described the deep impression it made on him in an article "Der Film als Kunstwerk":

Hier ist die Aufgabe eines Films als eines selbständigen Kunstwerks in aller Klarheit erkannt....Es ist charakteristisch, dass der Film,... den Wunsch nach einer musikalischen Begleitung nicht nur nicht aufkommen lässt sondern glatt abweist. Denn dieser Film, eine logische Abwicklung abstrakter Formen von geometrischer Präzision, ist eben zum erstemal Film, als auf sich selbst gestelltes, keiner Ergänzung bedürftiges Kunstwerk. Das Gesetz künstlerischer Bewegungsvorgänge erscheint in völliger Klarheit und tektonischer Strenge, der sich ein künstlerisch empfindender Mensch nicht entziehen kann.(65)

Here is a pure lesson in film as an independent art....It is characteristic that the film...not only exists without musical accompaniment but quite rejects the need for one. A logical unfolding of abstract forms of geometric precision, this film is quite certainly an original work, one which is formed fully complete within itself. The artistic law of its movements appears in fullest clarity and tectonic strength, obvious to anyone of artistic sensitivity.(66)

For obscure reasons, hotly debated by O'Konor and Richter, Eggeling left Klein-Kölzig in late 1921, returning to Berlin where he found lodgings in another inhospitable studio. Borrowing money from his sister Sara in the following summer, he bought a manually-operated

camera and projector, devising for himself a crude animation-rostrum and continuing work on the film Horizontal-Vertical Orchestra, whilst not neglecting to keep abreast of the lively artistic life in the city.

By the spring of 1923, when a Swedish journalist, Birger Brinck-E:son saw Horizontal-Vertical Orchestra it had reached a duration of about ten minutes, and was still incomplete. Whether Eggeling ever finished it to his satisfaction seems unlikely; there is at any event no known copy of the film, nor evidence that it was ever shown publicly. The method of realization is described by the architect and art-critic Ludwig Hilbersheimer in an article of 1923 entitled "Bewegungskunst", appearing in the Hungarian Constructivist journal MA :

Die Aufnahmen werden nach einer Partiturschrift gemacht, die ein besonderes Kompositionssystem darstellt. Die Aufnahmen erfolgen mittelst Tricktisches: Ein photographischer Apparat über einem Tisch, auf den die den Motiven entsprechenden Figuren aufgelegt, ausgewechselt gezeichnet werden oder indem die Figuren durch Widerstand oder Veränderung der Linsen variiert werden....(67)

Filming is undertaken in accordance with a score which represents a special compositional system. An animation rostrum is used, on which the drawn figures that correspond to the motives are laid out, and replaced or modified through lens changes.

[my translation]

Hausmann saw Eggeling at work on his first abstract film (presumably the same as that described above) stating that 'il se servait de grandes feuilles d'étain'.(68) Quite how tin-foil could be satisfactorily used in animation is puzzling; Louise O'Konor does not elucidate in her book, nor in response to my written request for

information.(69)*

O'Konor dates commencement of work on the filming of Symphonie Diagonale from Summer, 1923. As was the case with the film Horizontal-Vertical Orchestra, Eggeling built it upon the sequence of metamorphosis shown in the scrolls also titled Symphonie Diagonale. He now received some professional equipment and assistance for this enterprise, enjoying also continued help from his girl-friend Erna Niemeyer (Eggeling having separated from his wife around 1920). The realisation-method, according to O'Konor (who drew her information direct from Erna Niemeyer), became the same as that used for Horizontal-Vertical Orchestra**

After three attempts at realization (according to Hans Richter),(71) and just over a year after beginning work on Symphonie Diagonale, Eggeling completed the film in Autumn 1924, and screened it for a private gathering of friends on 5 November. In a laudatory review of this performance, the critic Paul F. Schmidt pointed the musical analogies in the film:

Die Wirkung seines abstrakten Films ist ganz ausserordentlich, am ehesten mit der modernen Musik oder des Schlemmerschen Ballets zu vergleichen. Für heutige Augen noch ungewohnt ist der ruckartige Wechsel im Rhythmus, die überfülle

* Perhaps the rostrum table was underlit, resulting in opaque tinfoil characters on a luminous ground. In that case, the prints now distributed must be negative versions, white on black, as is the case with Richter's Rhythm 21.

** Eggeling apparently made only two absolute animated films, first Horizontal-Vertical Orchestra and then Symphonie Diagonale. There is a glimmer of doubt as to whether two further films were attempted or even completed; in The Underground Film Sheldon Renan refers to films Parallele and Horizontale of 1924(70) - and Brockhaus Enzyklopädie (1968) confirms this. But it seems likely that Renan has drawn upon secondary sources for his information, and one can hardly believe that O'Konor has overlooked such important items.)

der sich ablösenden Formfolgen, deren Sinn man nur musikalisch erfassen kann, aber nicht durch das Ohr, sondern durch das Auge erfassen muss: eine zwangsläufige Synästhesie, an die unsere Sinne sich erst noch gewöhnen müssen....(72)

The effect of his abstract film is extraordinary: it can be closely compared with modern music or Schlemmer's ballets. A spectator today is unused to the jerking alternation in rhythm, the profusion of forms replacing one another; the content here can be experienced only in a musical way, though with the eye and not with the ear; we must first become accustomed to this enforced analogy of sense impressions.(73)

The first public screening of Symphonie Diagonale was on 3rd May, 1925, at a matinee performance organised by the Novembergruppe and the UFA Palast on the Kurfurstendamm in Berlin. The programme, under the title Der absolute Film, (thus crediting these films with a spurious corporate identity) included Dreiteilige Farbensonatine, Reflektorische Farbenspiele by Hirschfeld-Mack, Film ist Rhythmus by Richter, Opera II, III, and IV by Ruttmann, Ballet Mécanique by Léger, and Entr'acte by Clair. (The early distinction between a French avant-garde preference for abstraction - as in the films of Man Ray, Fernand Léger, and Henri Chomette - and a German attraction towards the non-objective, anticipates the parallel opposition between Parisian 'musique concrète' and the electronic music of the Cologne group around 1950.) Richter's brief film resulted in a furore, primarily on account of the atonal piano accompaniment played by Stephen Volpe.(74)

Eggeling's film received some unfavourable critical comment on this occasion, being roundly condemned as monotonous, unsymphonic and unrhythmic.(75)* By this time, though, Eggeling was in no position to attend the performance, for he was mortally sick in hospital, dying on 19th May, of septic angina.

Amongst several obituary notices that of Laszlo Moholy-Nagy made particular reference to the musical nature of Eggeling's work:

Seine Versuchen lehnten sich zunächst stark an die Problematik der Musik, an ihre Zeiteinleitung, Temporegelung und ihren ganzen Aufbau an. Aber langsam setzte sich bei ihm die Erkenntnis des Optisch-Zeitlichen durch und so wurde seine erst auf eine Formdramatik aufgebaute Arbeit zu einem ABC der Bewegungsphänomene in Hell-Dunkel und Richtungs-varianten. Bei Eggeling wird aus dem ursprünglichen Farbenklavier ein neues Instrument, das nicht in erster Linie Farbenzusammenhänge, sondern die Gliederung eines Bewegungsraumes gibt.(79)

His experiment was based largely on problems to be found in music: dividing up of time, regulation of tempo, construction of the whole. Slowly, his insight into optical-temporal matters grew stronger; his work at first built on dramatic form became an ABC of movemented phenomena of light and shadow and varied direction.(80) Eggeling drew from the original colour-keyboard a new instrument, one which effected primarily not colour-relationships but the organization of kinetic space.

[my translation]

* Later, in 1930, Freddy Chevalley, writing for Close Up, found that its graphic novelty could not compensate for its dryness, in the didactic presentation of figures brusquely ('à-coups') succeeding one another on an unvarying ground.(76) Chevalley had earlier responded warmly to the Ruttmann 'opuscules', relishing the deftness of their fluent animation technique and their brevity and lack of pretension.(77) Richter's Rhythmus singularly failed to attract Ivor Montagu in 1927, when he declared flatly: 'Rhythm is essentially the quality which, as a whole, the film lacks.'(78)

The life of the artist Eggeling and the animation-experiments he undertook late in his life have been most fully documented by Louise O'Konor in her major study of 1971, and until access is given to further material on the filmmaker, hers remains the best source, thoroughly documenting every known aspect of his life. She is highly critical of Hans Richter's handling of the Eggeling artistic legacy:

...Richter's management of the works Eggeling left behind has been marked by a total lack of respect for his fellow man's personal integrity....The price for retaining part of Eggeling's posthumous collection has been its unscrupulous exploitation by Hans Richter.(81)

She is in an awkward position, though, as she acknowledges, in so far as - suspect as Richter's statements and actions may at times appear to have been - were it not for his persistent efforts over forty years, Eggeling's name and oeuvre would have fallen into far greater obscurity. It is no concern of this present study to debate the rights and wrongs of the case, but two important points regarding Symphonie Diagonale must be made. These points both concern the structure and presentation of the film as we now know it. On Eggeling's death, Erna Niemeyer, his girl-friend assistant, came into possession of his effects, including studies and sketches, drawings, paintings, scrolls, the film Symphonie Diagonale as well as its negative. This material, or the larger part of it, subsequently went to Richter (briefly married to Niemeyer after Eggeling's death), who has given several accounts of the loss of large amounts of it on the occasion of a Nazi raid on his Berlin apartment in 1933.(82)

Even to the sympathetic eye, the succession of events in Symphonie Diagonale appears somewhat arbitrary, as if sections had been cut out and re-edited.(83) Whilst the feeling of organic growth

apparent in the scrolls themselves is lacking, this may of course be accounted for by Eggeling's unfamiliarity with the medium of film-animation, as may the rather undefined rhythms of the visual movement. But O'Konor admits the likelihood that the print now circulated of Symphonie Diagonale (derived from Hans Richter's print) differs from the film made by Eggeling in 1924.* To make matters worse, 'the original negative and the original print are probably lost'.(85) She considers it possible that the film may have been re-edited by Richter, judging by visible splice-marks. Strangely, though, she at no stage questions whether the print projected nowadays (white figures on a black ground) may not in fact be the negative of the version we are meant to see.

It seems reasonable to enquire why (if he did) Eggeling should have chosen to reverse the white-black polarities in transfer from the medium of scroll to film. Perhaps, as in the case of Richter's early study (1921) it was simply a problem of the developed print being 'covered with finger prints. But the negative looked clean when projected, and the negative became Rhythmus 21 (1921).'(Renan)(86) Alternatively, it can be conjectured that both Richter and Eggeling took into account the very different viewing conditions of film and paper-drawings, and screened negatives to avoid glare and the constant irritation of visible dirt-flecks on the large expanse of white background. Most puzzling of all is Standish D.Lawder's reference to the film in his The Cubist Cinema, where he seems to be saying that both negative and positive versions of the material are incorporated: 'The spatial complexities and ambiguities of Richter's film are almost

* William Moritz, the authority on Fischinger, reports that Re Soupault 'believes that Richter's print of Symphonie Diagonale is re-edited from the original...'(84)

non-existent here [in Symphonie Diagonale], even when, as in Rhythm 21, pieces of negative film are inserted for contrapuntal effect.'(87) (In correspondence Miss O'Konor had reiterated that the prints presently in circulation are positive.)(88) Whatever the truth, it seems likely that Eggeling filmed black figures on a white ground, subsequently treating a copy of the developed negative as his projection-print.

* * *

O'Konor presents a considerable body of information on Eggeling's theory, reproducing and deciphering all those extant notes made by the filmmaker which were available to her research. His quotations from, and indebtedness to, Busoni, Bergson, and Worringer have already been noted. O'Konor comments interestingly on the Generalbass der Malerei, relating its dialogue of opposites to Eggeling the man:

Eggeling's personality hints at a profound dualism: the restlessness and desire for redemption typical of a man tending towards a transcendental view of life, and, possibly, in conflict with this, the intellectual urge to establish a code of laws regulating this world. It is these two poles which define the scope of Eggeling's artistic development.

A basic theme in Eggeling's through-bass is his antithetic ordering of terms: horizontal and vertical axes are placed in contrast to each other. Empty, filled, assembled, extended, open, closed, small, large - these are some of the polar contrasts Eggeling uses. They serve as formulas, invariable units - Eggeling applies them to geometrical figures which he calls volumes - which in rhythmical order change their positions in the picture.(89)

She thinks that Kandinsky and Klee probably both had some influence on Eggeling's development;(90) for Kandinsky's Über das Geistige in der Kunst (pub.1912) had pointed analogies between painting and music,

similarly seeking a 'thoroughbass' for non-objective visuals which might function (within a theory of harmony) as does a musical thoroughbass.* And both artists believed (as did Malevich) that a perception of the inner realities of life came only to the visionary mind attuned to the spiritual and metaphysical.

However, Richter rather plays down the relevance of Kandinsky's earlier painting to his and Eggeling's theoretical preoccupations; for 'as much as we both loved the early work of Kandinsky, we still thought that such free improvisations as his would have to come "later," after a general principle had been established.'(92)

The possibility of some reciprocal influence has not before been suggested, but a comparison of Ruhe (At Rest) by Kandinsky, dated 1928, and the very similar Horizontal-Vertical Orchestra III of Eggeling, dated 1921, persuades one that Kandinsky must have seen Eggeling's scrolls either at first hand or in the form of reproduction. [Slides 40, 41] (Horizontal-Vertical Orchestra I - III were published in Vienna and Berlin in 1922.(93)) A similar aesthetic intent unites them; both are explicitly concerned with the counterbalancing of polarities. Note - once the overall similarity has been observed - the scroll-like horizontal format; also the polyphonic phrases of the half-discs in the upper region, the 'steps',

* This concept of 'thoroughbass' can only very loosely be related to musical 'thoroughbass' writing. As understood by artists in the First World War and post-war years it embodied their aspirations towards an art freed from subjective excess; in this term we find a resolution of the stress between individualist artistic endeavour and the increasing dominance of technological advance. In Kandinsky's words:

The true form arises from the combination of feeling and science.... A great characteristic of our time is the rise of knowledge: Kunstwissenschaft is gradually taking its proper place. That is the coming "thoroughbass," for which an infinite path of change and development is naturally in store.(91)

and the inclusion of curvilinear features - wave-forms in Eggeling, and the 'rainbow' in Kandinsky. A close similarity may also be found if one compares Kandinsky's Untitled (1930) and Standing (1930), with elements from the Horizontal-Vertical Orchestra set of scrolls (no.III). [Slides 42, 43] Perhaps Ré Soupault-Niemeyer (Eggeling's girl-friend and assistant) was the intermediary, for she was a student of Kandinsky at the Bauhaus.

* * *

Even if Viking Eggeling's film Symphonie Diagonale is not the first extant animated abstract film (that primacy is owed to Ruttmann's Opus I, assumed lost until recently), certainly it is this film which has inspired and motivated later generations of artists to attempt control of this intractable medium. It is an ultra-cool, ascetic, elegant graphic study, imparting and encouraging intellectual detachment; the revealing and obscuring of comb-like shapes, mobilised strictly on the surface of the screen, builds to no climax, and ends inconsequentially. O'Konor presents a detailed written commentary on Symphonie Diagonale, (which lasts nearly eight minutes), dividing it into forty parts of varying duration, each part itself further divided into sequences. This breakdown is followed by a series of stills showing characteristic moments from each of the parts.(94) [Slides 31 - 36] One notes that sections 1 and 2 are recapitulated in sections 29 and 30, but without apparent structural significance, for what follows does not form a coda to the work. Perhaps, as it stands, Symphonie Diagonale should be seen as an 'open-form' composition, as earlier suggested (Chapter 1) with regard to Monet's canvas-series. If Eggeling truly subscribed to Bergson's belief in a seamless continuum, his film should properly present only a glimpse of the totality, which

has no beginning, no end, no past, no future, ...only now.

Symphonie Diagonale makes no attempt to exploit the medium other than the latter's ability to juxtapose moments of the scrolls in fixed succession; there is no use of 'editing', panning, tracking, dissolves, or any of the other devices available to animators then and now. Le Grice has remarked how, in this denial of a Futurist-inspired kinetic dynamism, Eggeling utilizes but does not really explore the medium. Furthermore, far from attaining an organic flow, Symphonie Diagonale is organizational, 'a treatise in visual logic, or a formal visual poem where the lines rhyme.' (95) Le Grice denies that any simulated three-dimensionality results from the contraction and expansion of linear figures, all such transformations being 'as far as possible isolated within a neutral frame.' (96) Ivor Montagu first distinguished Eggeling's film from Richter's dynamic Rhythmus (both shown in England at the Film Society's 17th Programme) in stating: 'The screen is a blackboard to Eggeling and a window to Richter and Ruttmann'. (97) (Only Sitney disagrees, seeing figures 'move in depth from the surface of the screen to an imaginary, receding point at its center.' (98)) Rudolf Arnheim has clarified the aesthetic virtues of 'flatness' in his comparison of conventional projection with the innovative stereoscopic film. His distinction can be applied to Symphonie Diagonale and Ruttmann's early Opera, the former a constructivist affirmation, the latter more an impressionist diorama.

If the picture becomes strongly three-dimensional, the screen loses its character of cogent limitation. It becomes no more than a chance and variable incision - a square peephole through which part of a large space can be looked at. What was previously seen within the margins of the screen achieved the purposefulness of conscious composition through the very flatness of the picture. These margins were not an obstructive limitation preventing a free view, but they very

definitely enclosed a section, and this directed the attention of the spectator to the compositional intention of a particular grouping within the limited rectangular plane. If the picture becomes stereoscopic, it is no longer contained within the plane of the screen but is behind it; no longer stands in any optical connection with it, but appears simply as a segment - while the screen is accidental, obstructive, no longer positively formative. Moreover, the decorative distribution of the black-and-white masses can only appear convincing and intentional if the picture is definitely limited in size.(99)

These distinctions also confirm Richter's analysis of the essential dissimilarity between his and Eggeling's transition from scroll to film; Richter ultimately orchestrating time itself (as he termed it), and Eggeling remaining faithful to an intensified exploration of line.

Symphonie Diagonale impresses above all by its restraint, the restraint not of a masochistic self-denial, but of a noumenal awareness, a benign contemplation of transcendental concord. Just as in the self-contained world of musical serialism, Eggeling's material is largely self-referential. As the proliferating dialects of an inebriate tonality were being de-toxified by Schoenberg's emancipation of the dissonance through dodecaphony, so did Eggeling's (and other Constructivists') strivings after a universal grammar segregate the image, releasing it from any restrictive, localised representation, absolving it from any contextual responsibility beyond its specific terms of reference. A formal canon of flatness, and a strict observance of the frame-boundary as a delimiter of movement, then further underlined the privileged hermeticism of Eggeling's graphics, shunning the ungovernable indiscipline of an anarchic off-screen space.

Through attentive study Symphonie Diagonale must be coaxed into revealing the richness of its reciprocating figures. It requires of the beholder that total dedication once reserved in musical circles for the works of Eggeling's contemporary, Webern. Webern's introspective and finely-honed serial formulations similarly seek to exclude non-essentials, mirroring only themselves, and discarding the cultural baggage of a more prolix age. This analogy can be pursued some way to good advantage. Schoenberg's concept of a continuously evolving variation form - which was to underpin the structural cohesion of his dodecaphonic works - was embraced by Webern, whose musicological studies in the contrapuntal intricacies of the Netherlands School had already led him quite naturally to think in a like manner: mirror-forms, canons, inversions, - these devices form the nucleus of his compositional technique. Not that they are the music. Webern was, after all, a child of Expressionism, hyper-sensitive, distilling from the heady raptures of the post-Romantics a pure draught from which emotion was not absent, but in which the inner essence was isolated.

One has to realize what restraint it needs to express oneself with such brevity. Every glance can be expanded into a poem, every sigh into a novel. But to express a novel in a single gesture, joy in a single breath: such concentration can only be found where self-pity is lacking in equal measure.(100)

Arnold Schoenberg

In his undeviating, uncompromising determination to realize Symphonie Diagonale, Eggeling's path runs parallel with that of Webern. How close in mood are, for example, those instrumental compositions of Webern contemporary with Eggeling's singular

masterpiece...the String Trio Op.20 (1927), and the Symphony Op.21 (1928), after which Webern wrote to Hildegard Jone ...'By 'art' I mean the capacity of presenting an idea in the clearest, simplest, that means 'most comprehensible' form.'(101)

The germinal idea, the basic cell - from which evolved the scroll Symphonie Diagonale, and thence the film - this cell is likened by Webern to

Goethe's primeval plant: the root is no different from the stalk, the stalk no different from the leaf, the leaf again no different from the flower: variations of the same idea....The same law applies to all living things: "variations on a Theme". 'Always different and yet always the same! Wherever we cut into the piece we can always find the course of the series. This ensures unity.'(102)

Perhaps of all his works, the 1936 Variations Op.27, for piano solo, most nearly furnish us with an aural complement to the austere monochromatic linearity of Symphonie Diagonale. [Appendix 1.9] The same limpid reflections and mutations of 'the idea' facet the serial potential in a complex but crystalline polyphony.

Such comparisons between the works of contemporary creative artists can appear contrived, the similarities of mood, even of structuring, coincidental, at best no more than individual manifestations of something 'in the air' at the time. But in this particular case the parallel finds further justification. It may be remembered that Eggeling was familiar with the theoretical and poetical writings of Kandinsky, and would surely have read the Blaue Reiter, edited by Kandinsky and Marc. In 1912 Webern's song 'Ihr tratet zu dem Herde', the last of his five Stefan George settings,

Op.4, was published in the Blaue Reiter, together with songs by Schoenberg and Berg. With his musical background Eggeling must have taken some interest in contemporary composition; he does, after all, quote Busoni in his notes. So if Eggeling may have gleaned something from Webern's pre-dodecaphonic serial thinking, is it also possible that Webern knew of Eggeling's scroll-drawings and the film Symphonie Diagonale? This seems unlikely, although not impossible, for Webern was a widely-cultured man who may well have kept abreast of contemporary art theory.* What does appear wholly remarkable though is Webern's apparent withdrawal from literally sounding composition to a form of graphic music in his last months. For on the testimony of Cesar Bresgen:

It is highly improbable that Webern worked at any piece of music on paper in those last months of his life at Mittersill: in any case there is no one to whom he spoke about it. On the other hand one could often see Webern in most stimulating work, which consisted of drawing with pencil and compasses on a poor quality table or on a wooden board. I well remember his system of lines, in which could be seen geometrical figures or fixed points with markings. Once - it was the middle of August 1945 - Webern said on one of my visits that he had just finished some work which had occupied him a great deal. He had completely organized a piece, i.e. he had fixed all the notes in it in respect of their pitch (sound) and also their duration in time. I cannot remember the series, but I remember Webern's remark about "time fulfilled". With this graphic plan on the table Webern regarded the real work as completed....He said that the work "sounds by itself" - he himself could "hear it right through" - it was enough for him that the piece was now finished in itself: "the sound is always there" - "a performance would not bring it out as perfectly as it had already become sound in himself". (104)

* Furthermore, Lockspeiser mentions that Webern 'made voluminous notes on Goethe's Farbenlehre, presumably with the aim of finding a musical reflection of Goethe's theories.' (103)

Was this then a meta-music, a silent sounding of graphic elements? How close we are to Kandinsky's sounding cosmos of non-objective graphics, and how much closer to the literal temporality of Eggeling's Symphonie Diagonale.

Richter : the Orchestration of Time and the Rhythmus films

Like Eggeling, Richter (1888-1976) was obsessed by 'polarity' from 1918-21.* From an earlier phase of painting the Jawlensky-influenced Visionary-Portraits - brilliant-hued, explosive, spontaneously improvised expressionist canvases, - Richter reacted by radically simplifying his style, painting Dada-heads in black and white, and savouring the figure-ground confusions which resulted. [Slides 44, 45]

Whilst in Zurich, Richter met the composer-pianist Busoni, who showed interest in the painter's recent work, advising him that a study of contrapuntal practice might enlighten him in his search for a 'language' of contrast. The Anna-Magdalena Bach collection of preludes and fugues was specifically recommended for study. Richter took up Busoni's proposal, delighting in the analogies which he felt between the linear intertwining of motive and the play of tensions in Bach, and his own painterly and lino-cut experiments in negative-positive relationships. Coming from a musical background and receiving this new stimulus, Richter was subsequently quick to recognize Eggeling's shared concern for a contrapuntal organization of

* Mondrian also: 'The premature union of opposites causes the tragic. Yet only the continual and repeated union of opposites can bring about the new progress; for new form arises from opposites dissolving into each other.'(105)

visual activity. He always allowed that Eggeling had proceeded much further along the road to a thorough understanding of polarities than he had at this stage; the Generalbass der Malerei syntax had been formulated, and this orchestration of line had already resulted in the creation of moments from the scroll Horizontal-Vertical Orchestra, one of which Eggeling presented to Richter on the occasion of their first meeting. Although Richter was sympathetic to Eggeling's researches to the extent that very close collaboration was possible over two years, he never subscribed so wholly to any one doctrine, as his career - from Dadaist through Constructivist to Surrealist - attests. He was intrigued by the operation of chance within organization, preserving an almost 'automatic' spontaneity whilst never fully relinquishing conscious control of the end product.

Summarising their dialectical logic at this period, Richter has written:

We were no longer interested in "form" but in a principle governing relationships. Form could be placed in context only by its opposite, and could be brought to life only by the establishment of a relationship between the two opposites. This was the only way to create a unity, that is to say, an artistic whole.(106)

This statement (evocative of Eisenstein's attention to 'collision' factors, to interconnected shocks), whilst acceptable as a definition of Eggeling's goal, also permitted Richter to remain true to his Dada leanings, for 'the realization that reason and anti-reason, sense and nonsense, design and chance, consciousness and unconsciousness, belong together as necessary parts of a whole - this was the central message of Dada.'(107)

Richter's decision to abandon attempts at filming figures based on his own scrolls, once preliminary tests had proved so disastrous, was a cause of bitter resentment from Eggeling (who stoically persevered with Symphonie Diagonale, despite the fact that he had abandoned Horizontal-Vertical Orchestra to obscurity, never having presented it for a public screening). Richter obviously appreciated the gulf between viewing successive stages of a metamorphosing form in a scroll - where the eye may, in reading either left-to-right or right-to-left, pause, glance ahead, recapitulate, and follow entirely its own tempo and trajectory* - and film, which like music, requires a more passive acceptance of the succession of events, for sound overlays sound, transforming its meaning and function in the process. To Richter, therefore, his rejection of the scroll-designs at this point must have appeared as no more than the recognition that the two media were only tenuously connected on technical grounds, and that perceptually they were markedly different.

In Rhythm 21 (which is today no longer in its original form; Richter possibly re-edited this and Rhythm 23 for his compilation 40 Years of Experiment in Film) Richter has often stressed that his selection of the rectangle and square as his agents for orchestrating time was determined by his awareness of the rectangular format of the cine-screen. [Slides 46, 47] However, a linocut (1917) by the Hungarian Vilmos Huszár (1884-1960) shows a quite striking similarity to the visuals of Rhythm 21, and it is possible that his work constitutes an as yet unacknowledged direct influence on Richter's choice of imagery. [Slide 48] (Huszár, Mondrian, Bart van der Leck and Theo van Doesburg were were co-founders of De Stijl in 1917. See

* Richter, on scrolls: 'The eye was stimulated to a special kind of participation by the necessity of comparing and meditating.' (108)

also Huszár's design for the De Stijl cover from 1917-1921; [Slide 49].) Richter felt that by selecting rectangular shapes of weak static articulation within this format (being merely echoic), their potential for articulation in time would be enhanced. By deriving all material from the screen-format - compressing and expanding it, he composed a counterpoint not of forms, but of movements; hence he was articulating, or orchestrating time.* He retained and refined his earlier principles of contrast and relationship - polarity - but the new sensation was essentially rhythmic.

The first shot was just the dark film screen, then it was pressed together from the sides so that in the end it was completely white. When it opened again, it was from the top and bottom, and it became completely black again, then from one side diagonally and so on. Now, after this introduction I had established a kind of "no-form" movement, and I allowed myself to take parts of the screen, and that means rectangles as the screen is rectangular, or squares, moving parts of the screen against each other....These rectangles are not forms, they are parts of movement. The definition of form refers to one's perception of the formal quality of a single object, or several single objects; but, when you repeat this same form over and over again in different positions, then the relationships between the positions becomes [sic] the thing to be perceived not the single or individual form. One doesn't see the form or object anymore but rather the relationship. In this way you see a kind of rhythm.(110)

It must be said that, seen today, the technical crudities within Rhythm 21 and 23 (which latter borrows imagery from Rhythm 21 and

* It is interesting to note that, before meeting Eggeling, and as part of the first Dada exhibition in January 1917, Richter had exhibited an oil-painting, Music (1916) which, in the painter's words 'show[s] the first clear indication of the rectangles and squares which later played a role in my early scrolls... and in my early films, such as Rhythm 21, Rhythm 23 and Rhythm 25...' (109) This is incontrovertible evidence of the logic of Richter's line of development towards his first film, and should dispel any suggestion that Richter's relation with Eggeling was parasitic.

appropriates the comb-like shapes of Symphonie Diagonale) severely diminish their effectiveness, and one is obliged to recognise the historical importance of these films despite their amateurish animation. Eggeling's Symphonie Diagonale by contrast, although less exploratory of the medium, is a highly-polished work, requiring no such apology. Richter's rough-and-ready approach - probably infected by a Dadaist impatience with the 'art-object' - is betrayed in the unsteady movement of his cut-out rectangles and squares (for he avoided the difficult fluid animation technique of Symphonie Diagonale; but the kinetic energy of these shapes, ever advancing, receding, overlapping, in a convincingly simulated three-dimensional space, is sufficient to hold the attention, and to convey a temporal orchestration. The minimal, absolute subject-matter, devoid as it is of anthropomorphic or other symbolic function, does encourage the viewer to read the flux of activity in musically-analogous terms. Quite unlike the underplayed, cerebral antiphonies of Eggeling's film, where a Socratic dialogue of formal argument is calmly exposed for rational deliberation, Richter's Rhythm 21 and 23 invite a visceral response, pre-empting by their kinetic vitality any immediate attempt at objective assessment.

During the filming of Symphonie Diagonale Eggeling had visions of projecting coloured lights into the sky, formulating a theory of 'Eidodynamik' (visual dynamics);(111) but whilst for him at best a dream (since he never made a colour film), it was Richter who, in the year of Eggeling's death, realised a hand-coloured film, Rhythm 25. Prior to this he had continued with scroll-experimentation, now in colour, in the oil-painting Orchestration of Colour (1923), where contrapuntal organisation is effected 'by using complementary colors

to stress contrasts and related colors to bring them together again.'(112) (After a long interval Richter took up scroll-painting again in the 1940's.) The Museum of Modern Art in Tokyo possesses this scroll, which Richter used as a model for the colour scheme of Rhythm 25. This differs from the original coloured pencil studies, although similar in design. Because of the high cost of frame-by-frame hand-colouring, the film existed in only the one print, now lost. Extant sketches, copied in 1969 in coloured inks, form a descriptive score of the visual activity. [Slides 50 - 52] There was also a detailed prescriptive score:

In my film Rhythm 25, I was more in control of the limited scale of the means of expression, so that I could write a score on graph paper. Each square meant one time unit - of three or four or six frames. A movement that grew from zero up to maximum size, up to the border of the movie-canvas, was expressed by a line going from top to bottom of the score. Weak lines meant dark grey figures, medium strong lines meant light grey ones and strong lines meant white ones. Broken lines equaled interrupted growing; uninterrupted lines equaled continuous growth. Working only with three "instruments", the square and horizontal and vertical rectangles, I needed only three lines of notation on the score. Diagonal movement was shown on a special score, a rectangle of the same proportion as the canvas on which the displacement was marked by numbers.(113)

Rudolf Kurtz has described the film as a two-movement absolute composition, wherein colour - appearing as a new dimension of light - is used as a language element, not merely decoratively or symbolically. Thus the dialectic tension-relationships of Richter's earlier films are preserved.(114) (As in the case of Rhythm 21, it seems possible that Richter was influenced by Huszár's work, this time through the dynamic colour rectangles in Stilleven Komposition, published in De Stijl I/4 in January 1918.)

The basic shape, an extreme form of artistic reduction, had already constituted the metaphysical matter of canvases by Malevich and Mondrian, the Constructivists and De Stijl, all of whom, after the initial desperate negations of Dada, were courageously attempting to build art as from new, despising those feverishly over-heated artistic manifestations of fin-de-siècle decadence - Fauvism, Expressionism, Futurism - which preceded the First World War. But Richter, isolated in his experimentation after the premature death of Eggeling, lost impetus, starved of that creative empathy which has, in times of need, nourished the radical artist working within the more established and supportive cultural movements of this century, and helped maintain his integrity. Only after a long period of Surrealist film-making was Richter to return to a search for the ultimate, the absolute, the uncorruptible, in his struggle Towards a perfect Painting - the title indeed of a canvas of 1943.

Graeff : Filmpartitur I and II

The work of Werner Graeff (1901-) should be mentioned in passing. Graeff joined the Bauhaus in 1921, and in the next two years, through his admiration for Van Doesburg, became a member of the De Stijl group. With Richter and Mies van der Rohe he co-founded the review 'G' (Gestaltung, or Form).

After meeting Eggeling and Richter, Graeff was to draft abstract Filmpartituren (I and II) as early as 1922. Considering the former's work too complex to be satisfactorily reproduced in film terms, he opted for a far more simple graphic style than is to be found in either Eggeling's or Richter's scrolls. Van Doesburg was sufficiently

impressed by this approach to illustrate Filmpartitur II/1922 on five pages of De Stijl No.5 of 1923, together with Graeff's account of his intentions. Graeff defines his primary objective as attempting, through simple filmic means, to stimulate and surprise his audience through a forceful interplay of dynamic imagery.(115) In this concentration on shock-value, on a montage of conflicts, Graeff anticipates Eisenstein's published pronouncements on 'A dialectic approach to film form' (1929) by seven years.(116) The film was apparently intended for screening without musical accompaniment. In the 'score' a simple transformational sequence of square and rectangle is mapped out in time. [Appendix 1.10] The third dimension is immediately suggested through a succession of swiftly diminishing white squares (remarkably akin to the opening sequence of Richter Rhythm 21). Graeff's prescriptive notation is imprecise in detail (for example, the exact duration of the 'pop-ons' in sections VI and VII is not stated) but succeeds in defining the general tempo of activity. Interestingly, he equates black screen (no imagery) with tension, not as a mere cessation of activity. This tension accrues through the cumulative stimuli of the preceding image-flow. For financial reasons, Filmpartitur II/1922 was not actually realized until after World War Two (in Essen, 1958). A description of Filmpartitur I/1922 was not even published for, as a colour-film, reproduction of the 'score' was prohibitively expensive. Nor was this film realized - 'Es was Inflationszeit!' - until 1977.

From Graeff's embittered account of his later association with Richter, it would appear that the latter appropriated some of his film-ideas. Graeff's 1928 filmscript Die Rebellion der Handfeuerwaffen became transformed into Richter's Vormittagspuk (music

by Paul Hindemith) without due acknowledgement, as did Alles dreht sich, alles bewegt sich.(117) If Graeff had seen the squares and rectangles of Richter's Rhythm 21 - supposedly made in 1921, but first publicly screened in 1925 - he could scarcely have felt the need for the simpler graphics mentioned above. Consequently one wonders whether Richter to some extent also profited from Graeff's published ideas for Filmpartitur II, securing the means - denied to Graeff - to realize his films.

Ruttmann : the Film Opera

When we saw the first screening of Ruttmann's Opera at Marmorhaus in Berlin some time later (end of 1921 or beginning of 1922) we felt deeply depressed. Our forms and rhythms had 'meaning', Ruttmann's had none. What we saw were improvisations with forms united by an accidental rhythm. There was nothing of an articulate language...It seemed to us 'Vieux Jeu', pure impressionism! Yes! But on the other hand, we had to admit that Ruttmann's films were technically better than ours, that he understood more of the camera and used it. With appropriate synchronized music they would have made 'quite nice' films, when ours were only (better) experiments.(118)

Hans Richter

While Richter and Eggeling were ensconced seventy miles away from Berlin at Klein-Kölzig, Ruttmann was working independently in Munich. His abstract film experiments, the Opera of 1921-25, were probably the first to be shown publicly in Germany, making 'quite a sensation in Berlin'.(119) Indeed with the exception of a screening of Richter's possibly fragmentary Film ist Rhythmus (alias Rhythm 21) in 1921 at the Théâtre Michel, Paris (but only according to Richter himself(120)) Ruttmann's work could claim to be the first completely realized

abstract animated film; and what is more, it was the first to enjoy a specially composed musical accompaniment. Richter's memory may have been at fault here, judging from the score of Opus I, since its composer, the Swede Max Butting, states on the title-page that the first performance was given in the Marmorhaus on 27 April, 1921, several months earlier than Richter recalled.(121) Richter and Eggeling are unlikely to have missed this screening of a film - despite basic differences - so superficially close to their own work, and it is surprising that the music, closely synchronised with the film, could have slipped Richter's memory.

Ruttman (1887-1941) was trained as an architect, but became known first for his engravings and lithographs. A self-taught painter, he was a good cellist. He thus joins Survage, Eggeling and Richter in having acquired musical literacy before exploring abstract film. Like Eggeling and Richter, he was drawn to the medium of film by a conviction that the canvases he was painting immediately post-World War One required real movement fully to realize their kinetic potential. His Composition, (1918), like Richter's Cubo-Futurist Cello Player (1914), and like earlier Futurist works recalls the chronographs of Marey - fragments of circles and rectangles are repeatedly echoed, free-floating, labile elements deliquescent within a cloudscape. [Slides 53, 54] In Ruttman's later Design for an Abstract Film reproduced in R.Kurtz, Expressionismus und Film, Berlin 1926, we find a marked departure from this style, hard-edged figures stressing the vertical and horizontal as a foil to the curved shape entering from the right. [Slide 55] (This design shares a surprising similarity with the later work of Oskar Fischinger, notably his Colored Rhythm fragment, and Radio Dynamics of

1942.)

Information on the technique of Opus I is conflicting. Lawder thinks that Ruttmann 'constructed some sort of animation table in which designs were painted on sheets of glass, then distorted and made to move by mirrors. Color, probably applied by stencil, was an important expressive ingredient of the film.'(122)* However he also cites a contemporary review which states that the film was hand painted entirely, not photographed.(123) Richter though, (but possibly referring to another film?) speaks of 'a small structure with turning, horizontal sticks on which plasticine forms were easily changed during the shooting.'(124) O'Konor, the most thorough of researchers, suspects that 'painted' might only imply the use of colour, without the connotation of frame-by-frame hand application. (125) From a letter of Max Butting it appears that Ruttmann worked on animation equipment he had constructed, drawing each 'phase' of the film,(126) and in a review of the first, private Frankfurt performance, Bernhard Diebold confirms this, numbering the phases, (frames, or cels?) at 10,000, painted over a nine-month period.(127) Opus I was lost until very recently (1981), when a colour negative was located in Russia. (At the time of writing, prints are being taken, and should be available for distribution in the near future. It is to be hoped that a sound print will eventually be made, marrying Ruttmann's images and Butting's synchronised score.) Since the film is yet unavailable for viewing, we are, as in the case of Ginna and Corra's work, dependent upon descriptions of the visual action, of which the following, by

* Other methods of 'colouring' films at this date were tinting, whereby the transparent areas were aniline dyed; and toning, whereby the black silver image was chemically changed into blue, red, sepia, etc. Both methods could be combined. Coloured nitrate base-stock was also frequently used.

Hermann G. Scheffauer, recalls Bernhard Diebold's of 1916 (see above)

in its exuberance:

This visible symphony was recently performed in Berlin before a small group of artists, musicians, and film adepts. Expectancy and skepticism were in the air.

The room faded away. Darkness. A few moments' impressive pause, as though to wash away the last clinging contacts with the external world. The machine began to purr, letters and titles flickered for a moment phosphorescently. Then - the opening notes of the symphony - iridescent atmospheres surcharged with an intense and vibrant light, burned and dissolved upon the screen. These served as backgrounds, melting and flowing into one another - dawnlight and sunburst and twilight, infinite reaches of space, and the caroling blue of morning or the dark saturated stillness of the night sky with a grey terror vacui.

The separate notes and cadences of the symphony darted and floated into these luminous fields, as though the notes of the composition had shaken off their schematic disguises of black dots and lines and broken through the bars of the score and the sound waves of the instruments, and converted themselves into a river of flamboyant colour...

Some of the forms these colors assumed were already familiar to us in the restless paintings of the Cubists and expressionists - triangles, trapezoids, cubes, circles, spirals, squares, disks, crescents, ellipses - all the usual fragmentary and activist geometry. But here the writhing, shifting, interlacing, interlocking, intersecting elements were fluent and alive, moving to the laws of a definite rhythm and harmony, obedient to an inherent will and impulse...

Bubbles and foams of color danced and wallowed across the screen, fountains and jets of light and shadow shot into infinity, waves - great thundering beachcombers of brilliant sound - came galloping on, heaving, palpitating, rising to a crescendo, throwing off a serpentine of pearls or a thin glittering spray that floated away like some high note, piercing, sustained, ecstatic. Globes and disks of harmonious colors came rolling into the field, some cannoning furiously against others, some buoyant as toy balloons, some kissing or repulsing or merging with one another like

white or red blood corpuscles. Triangles sharp as splinters darted across the rushing torrent of forms. Clouds rolled up, spread, dissolved, vanished. Serpents of flame blazed through this pictured music, a colored echo, no doubt, of some dominating note.

From time to time, flickering and wavering in and out, over and under this revel of Klangfarbe, or sounding color, the Leitmotif appeared in playful, undulant lines, like lightning over a landscape or a golden thread through a tapestry. Then the color equivalents of the strong, clear finale poured themselves like a cataract upon the scene - masses of oblongs and squares fell crashingly, shower upon shower. The silent symphony was over.(128)

In an article "The Filmed Symphony" from the April 21, 1921 issue of the Berliner Tagblatt, Leonhard Adelt records that the main title read: 'Opus 1, Symphony in Three Movements.' It is not clear from available documentation whether Butting's music was the inspiration for Ruttmann's Opus I, or vice versa. One suspects the latter, since Butting would surely have revealed that the music existed prior to the film if that had been the case. It is tantalizing to find Butting mentioning in a letter (9 May 1949) to Filmhistoriska Samlingarna how the audience after the first Berlin performance divided into two camps - those with a visual bias preferring to believe that Butting had exactly translated the images into sound, and those with an aural bias, that Ruttmann had caught the likeness of the music.(129)

The entire score of Lichtspiel Opus 1, as it was fully titled, was given to the Filmhistoriska Samlingarna (now Svenska Filminstitutets dokumentationsavdelning, Stockholm) by Butting in 1949. The chamber ensemble comprises two violins, viola, cello and double-bass. A piano reduction is given, complete only to page forty-one of seventy-six pages, seven bars after cue twenty-four.

Between the double-bass line and the piano-reduction staves are coloured crayon sketches indicating the synchronous visual movement.(130) Some passages from the score are reproduced in Appendix 1.11 - 1.14.

Whilst it is always unfair to discuss film-music divorced from the images which it should complement, here we have - as yet - no choice. As film-music, heard in a context of contemporary compilation-manuals, it is remarkable, but remaining true to Butting's concert-music style* - an awkward juxtaposition of trite diatonicism (score, p.23), impressionist wash (p.19), and - the best music in the score - Expressionist chromaticism (p.4; compare Berg's harmony in the Piano Sonata Opus 1). Not until Edmund Meisel's music for Potemkin (1925), is a comparably modern German film-score known to this writer.

Of course the music was played live to screenings of Opus I, since optical soundtracks and other recorded synchronous systems were not then generally available; the crayonned sketches in the score would thus have served as only rough indications of the nature of movement on the screen, their function simply being to aid synchronization. From this score we can note the durations, given in seconds, of most of the early sections, but in the later stages the pianoforte reduction is omitted, durations are no longer given, and visual cues are almost entirely absent. Perhaps this was to have been a fair copy, somehow left incomplete.

* Butting (1888-) was a prolific composer, numbering an opera, ten symphonies (by 1959), chamber music and vocal music amongst his oeuvre. 'In der von Berliner Künstlern nach dem ersten Weltkrieg gegründeten Novembergruppe fand er einen praktischen Wirkungskreis.'(131)

Although, from the sketches of visuals in this score, and from Butting's comments about audience reaction, one might anticipate that in all Ruttmann's later Opera we have a simple case of 'visualized' music where the media are homorhythmic (in the manner of Oskar Fischinger), this is apparently not so - at least according to one source. In a note to Delacommune's The Valse Mephistophilis of Liszt, 1925, the Film Society Programme for January 17th, 1926, stated that 'the patterns are not beautiful in themselves but the experiment forms an interesting contrast with the Absolute films of Mr. Ruttmann in which an endeavour is made to make a visual rhythm quite independent of the music.' The films here referred to are Opera II, III, and IV, made between 1923 and 1925; these were widely screened and reported, and are all extant, albeit edited. For their matinee screening on 25th October, 1925, at the First Performance of The Film Society (London) they were accompanied by a (presumably live?) drum.(132) If in these Opera (and in Opus I likewise) image and sound operate 'independently', then Ruttmann was not creating a 'visualized music' but had already anticipated the Whitney brothers' concept of two interactive - not fused - media. It would then be untrue to state, as does Lawder, that 'Ruttmann was more interested in translating the emotional overtones of music into moving colored images'.(133)

The extant fragmentary coloured prints of the Ruttmann Opera, minus their tailored musical accompaniments, still excite to an extent denied Eggeling's and Richter's less technically sophisticated animations. Indeed, their indebtedness to a Futurist dynamism is apparent. In an extended passage contrasting the scientific/mathematical substructure of Richter's and Eggeling's films with Ruttmann's 'almost journalistic temperament', Rudolf Kurtz waxes

lyrical on the splendours of Ruttmann's rich colour-palette, on the variety and organic nature of forms, and on the flexibility of tempo. He remarks on the anthropomorphic interaction of shapes, adding that Ruttmann's technique is so expressive that it has already been successful in an advertising film for industry. Ruttmann stands apart from the Constructivist fraternity; 'his dynamic is not developed but is experienced' with such effect that the viewer is inescapably caught up in the abstract drama.(134) Whilst not articulating any overt art-theoretical basis to his work, Ruttmann clearly understood the potential of the film medium, and went a long way towards realizing it in the accomplished fluid animations of the Opera. There is indeed a residual anthropomorphism in the earlier Opera; the interaction of forms provokes a vaguely symbolic interpretation in terms of 'aggression' or 'submission' - much as was later to be encountered in the Studies of Fischinger, who knew Ruttmann's work well, and may indeed have collaborated on the films (see Chapter Four below). The 'musicality' - that much-vaunted and abused concept - of his visual compositions is more conventionally displayed here than in Symphonie Diagonale. Le Grice suggests that, through working with Max Butting, Ruttmann's rhythmic sensibility was developed; the transformation of forms and the sequencing of visual phrase both find analogy in musical composition.(135)

As Eggeling and Richter slowly progressed towards purified 'universal' graphics, so Ruttmann in his extant Opera gradually weaned himself from a fluidly expressive anthropomorphism (Opus II), through a Léger-related mechanism (Opus III), towards a non-objective 'op-art' manner (Opus IV), occasionally reminiscent of Tony and Beverley Conrad's hallucinatory Straight and Narrow (1970). [Slides 56 -58]

The Lichtspiel Opera II, III, and IV survive in fragmentary edited form in faded colour prints at the Danish Filmmuseum in Copenhagen. These prints have been copied for release by other institutions: in Great Britain by the Arts Council. Le Grice, in discussing them, suspects that they were printed on to lengths of coloured nitrate base;(136) this lends credence to O'Konor's hypothesis concerning the use of colour in the lost Opus I, although in all cases further hand-painting may have been carried out. Opera II, III, and IV were probably first screened in Berlin, on 10th May 1925,(137) but were not - as Le Grice suggests - again all in collaboration with Butting. Opus III was in fact accompanied by the music of Hanns Eisler (1898-1962) - historically a tantalising union, in view of Eisler's later dismissal of abstract film.(138) (Eisler's career in films was long, dating from Opus III (his first venture) to 1962, and including Kuhle Wampe of 1932, and music for films by Ivens, Fritz Lang, Douglas Sirk, Cavalcanti, and Resnais.) His music for Opus III* was adapted by him into Suite No I, Etude 1 and 2, from the Deutsche Sinfonie.(140) [Appendix 1.15 - 1.18] Many of his later film-scores were similarly reworked into concert-versions.

* * *

After these film Opera Ruttmann made no more absolute films, but found a demand for his expertise in special effects work and documentary editing.

* This was quite possibly composed after the film's completion.(139)

To the musician, one of the most fascinating of Ruttmann's later experiments was his venture into 'musique concrète' in 1930 (eighteen years before Schaeffer composed 'Étude aux chemins de fer'). This film-less film music predates even Pudovkin's Deserter, referred to in Chapter Two. Richter, despite his disquiet over Ruttmann's film-Opera, voiced strong approval of this highly original work:

When Vogt, Massoll and Engel, the three inventors of the 'Triergon' sound patents (on which the big Tobis company was based), decided they were ready to have their invention used, Ruttmann was the first to have access to it. He recorded a sound-montage of about 300 feet, Wochenende, ('Week-End'), which is, in my opinion, among the outstanding experiments in sound ever made, and showed Ruttmann as a true lyric poet. There was no picture, just sound (which was broadcast). It was the story of a week-end, from the moment the train leaves the city until the whispering lovers are separated by the approaching, home-struggling crowd. It was a symphony of sound, speech-fragments and silence woven into a poem....It recreated with perfect ease in sound the principles of picture poetry which was the characteristic of the 'absolute film'.(141)

Weekend lasted fifteen minutes, and was recorded on sound-film, thus permitting close editing impossible on disc. Signal-mixing was probably not undertaken, fragments of quotation, music, and German vernacular being juxtaposed so as to give the impression of concurrence. (However, Arnheim tells us that Ruttmann's 'score' for Weekend included such directions as 'the organ of the village church dissolves into a barrel organ'; and 'cowbells dissolve into the ringing of the village bells').(142) It can be regarded as a sounding analogy to Ruttmann's film-editing method in the impressionistic, abstracted city-scapes of Berlin, Symphonie, einer Grosstadt (for which, though, Meisel actually composed a remarkably modernistic score), and relates back interestingly to Futurist noise-music, and

perhaps also to Dadaist sound-poetry and Joycean narrative techniques.

Ruttmann's later career as film-maker and editor was shadowed by his involvement with the Nazis, for whom he made several propagandist documentaries, including a collaboration with Leni Riefenstahl in Olympiade (1936-37). He died in Berlin in June 1941, suffering heart-failure after a leg-amputation.

Malevich : Suprematist aspirations

To conclude this survey of absolute film experiment before 1930, passing mention may be made of the Russian Suprematist painter, Kasimir Malevich.

It is relatively little known that, in his Essays on Art 1915 - 1933, (143) he included two chapters on the cinema: "And Images Triumph on the Screens"; and "The Artist and the Cinema", both articles being written shortly after he had met Eisenstein. From his obscure, highly-coloured, metaphor-laden style, polemical to a degree, one can abstract the following. The first article, "And Images..." inveighs against the retention of object-imagery in cinema; in other words, the author demands a non-objective, or absolute imagery. The contemporary cinema, he feels, is no better than the canvas of the old-fashioned portrait-painter, where 'instead of art "as such", life's ugly mug shows itself.' (144) Cinema, to the producers, is just a new tool of production, 'with which they can unfold a picture in time and take a phenomenon in a cinema frame by means of light, as earlier they used to paint little studies by means of light.' (145) In Malevich's opinion, Eisenstein is moving in the right direction in his

'certain understanding and ability to make use of the law of contrasts, the depth of which should eventually bring him a complete victory over content, through contrasting construction.'(146) However, 'he should bear in mind that his contrasts can create a setting from which the idea gains importance, but in that case contrasts as such lose their special acuteness and do not reveal contrasts as such. If he comprehends the law of contrasts, and it can only be comprehended through Cubism which is the only school concerned with the laws of contrast, then he will attain the summit on which the new art of future culture stands.'(147) Here, Malevich seems to be enjoining Eisenstein to abjure film's social mission, and to devote himself to composing within a dynamic space-time continuum released from such ideological bonds. Since Eisenstein prized this 'conflict between natural existence and creative tendency. Between organic inertia and purposeful initiative' it is hardly surprising that he remained deaf to Malevich's injunction. 'Hypertrophy of the purposive initiative - the principles of rational logic - ossifies art into mathematic technicalism....Hypertrophy of organic naturalness - of organic logic - dilutes art into formlessness.'(148)

The following chapter, "The Artist and the Cinema", furthers the contention that 'film, which is the development of a photographic picture, is constructed according to the compositional law of the painterly schools.'(149) Malevich looks forward to the day 'when abstractionists with their new flash of consciousness get into the cinema'(150)...but at present 'if any one dared to show the screen without kisses, he would be declared by society to be a crazy utopian, abstract thinker and black sheep of our concretely thinking society....Only through the new arts and pure abstraction can the

cinema reach the new form for the dynamic-kinetic construction films'...(151)

Whilst the Russian studios were unsympathetic to the entry of non-objective painters into film, Malevich found some consolation in that 'in the West important artist-painters are little by little beginning to work in cinema, and, in beginning their work with a purely abstract element, they are beginning with our future source of new forms. This entry of the contemporary artist-painter into the cinema should bring us, and him, to a new essence and significance for the screen, as a new means of showing the masses the art of our new life.'(152)

In 1970 The Arts Council of Great Britain 'reconstructed' from a 1924 script, a proposed absolute animated film by Malevich. Titled

Malevich Suprematism the credits read:

animation : Mike Swain
research : Rodney Wilson
visual effects: Bryan Loftus
design : Michael Graham-Smith
director : Lutz Becker
A PLUS INTERNATIONAL PRODUCTION

* * *

The absolute films of Eggeling, Richter, and Ruttmann - all made between 1920 and 1925, - brought to fruition those contemporary aspirations for a musicalization of evolving visuals. The patent superiority of film-animation to all other forms of temporal image-play - its precision and finesse - allied with the prospect of reaching a relatively wide audience through the distribution of multiple prints, tempted many later artists to experiment in the medium. Foremost amongst these was the technically superlative Oskar

Fischinger, whose time-worn aesthetic of 'visualized music' (one shunned by his immediate predecessors) so dominated film-abstraction in the following two decades. His influence, together with other American and European experiment, are reviewed in the next Chapter; here, an overview of the entire field of absolute animation is not essayed; only those film-makers are discussed whose work directly influenced the present author, or who took a stance for or against the inclusion of music.

* * *

CHAPTER FOUR

ABSOLUTE ANIMATION FROM 1930

There are two conceivable types of the new creative artist. Those who create only visually in motion, and those who also create their own acoustical or musical sound-track. The trouble here is that to develop either faculty to a great height asks for complete dedication and excludes everything else. A great painter, a great master in his field, has never been a great musical genius and vice versa. It may turn out to be too difficult to develop both faculties in one man so that he can create a complete work of his own. But it might be done.

Oskar Fischinger
Statement accompanying a Retrospective
Exhibition at the Pasadena Art Museum.(1)

Oskar Fischinger : Visualized Music

Eggeling's death in 1925, and Richter's and Ruttmann's abandonment of absolute animation for more commercial work, might have closed the doors on the medium were it not for the endeavours of Ruttmann's younger friend, Oskar Fischinger (1900-1967), whose name to the average film-buff is now, with that of Norman McLaren, synonymous with 'abstract film'. Fischinger clearly felt very sympathetic towards Ruttmann's Lichtspiel Opera, and following his viewing of Opus I in Frankfurt in 1921, when he was introduced to Ruttmann by the critic Diebold, the two film-makers corresponded, Fischinger even constructing a special piece of animation equipment (a prototype wax-slicing machine) for Ruttmann.* In 1923, in Munich, he began animating for a commercial cartoon company and experimented with his own independent abstract studies. His professional grounding in the animation business and his technical training in engineering set him apart from his predecessors, and indeed from the majority of later absolute film makers. This ability, together with an attractively fluid graphic style and a penchant for 'visualizing' light-classic music, earned him considerable popular success, far outstripping that of Eggeling, Richter and Ruttmann. Even the Bauhaus became aware of Fischinger films through Moholy-Nagy's 'enthusiastic lectures...and later through Karl Nierendorf who showed the color films to Kandinsky, et al.'(3) Before 1930, Fischinger made many abstract experiments - of which much footage survives. Of these early studies the most impressive are the Orgelstäbe sequences (1923-27) (literally

* Scheugel and Schmidt actually state that Fischinger assisted Ruttmann on Opera I, II, and IV, but provide no supportive evidence for this assertion.(2)

'organ-pipes', but translated by Fischinger as Staffs; Fischinger had been apprentice in an organ-building firm in 1914). William Moritz, who has documented Fischinger's life and work, has been responsible for the recent release (on 16mm) of many previously unseen films. From the extensive extant footage of Staffs, which shows 'hard-edged parallel bars moving up and down in rhythmic patterns', he has chosen two selections for general distribution. 'One of these is a three-minute reel showing the very simplest, basic staffs: white painted bars (like a picket fence) moving up and down in an even row of waves against a plain black background...It exudes a classical simplicity (like Eggeling's Diagonal Symphony) which is very satisfying.'(4) [Slide 59] The second Staffs reel presents extremely complex superimpositions of similar material overlaid upon rotating rainbow-shaped backgrounds. This is a tour de force in silent absolute-film montage.

That Fischinger for a long time intended his publicly-screened film Studies as visualizations of another temporal medium, rather than as visual symphonies autonomously structured, is not only clearly apparent on viewing, but is acknowledged by his own testimony:

When I was 19 years old I had to talk about a certain work by William Shakespeare [this was Twelfth Night] in our Literary club. In preparing for this speech I began to analyze the work in a graphic way. On large sheets of drawing paper, along a horizontal line, I put down all the feelings and happenings, scene by scene, in graphic lines and curves. The lines and curves showed the dramatic development of the whole work and the emotional moods very clearly.(5)

Like Richter and Eggeling, Fischinger felt the need for real movement in order to define the reading-speed of these interpretative graphics; cine-film was likewise to provide the answer for him. In 1923 he met,

at the Munich University Music School, the composer Alexander Laszlo - who was already experimenting with colour-organs and the correlation of music and visuals - collaborating with him in an elaborate projected coloured-light performance which, with slides and light-projections, included some Fischinger film. Laszlo's music complemented the visual display. With the coming of sound

the flood of feeling created through music intensified the feeling and effectiveness of this graphic expression, and helped to make understandable the absolute film. Under the guidance of music, which was already highly developed there came the speedy discovery of new laws - the application of acoustical laws to optical expression was possible. As in the dance, new motions and rhythms sprang out of the music - and the rhythms became more and more important.(6)

Oskar Fischinger

Fischinger thus conceived of his visuals in the early Studies as the equivalent of dance, an abstract two-dimensional choreography whose rhythmic vitality was derived from, and was wholly dependent upon, the accompanying musical organization of sequence, repetition, dynamic rise and fall, and articulation.

Many of Fischinger's later films are now freely available for study in England through the British Film Institute and the Arts Council. These range from an early group of black and white Studies (Nos 5,1928 to 12,1932) set to jazz and to popular or light-classic accompaniments, to his last German productions, - the entertaining Gasparcolor films Circles and Composition in Blue of 1933, which latter won him from Paramount an invitation to Hollywood. After arriving in America Fischinger produced the popular Allegretto (1936), Optical Poem (1937-8), An American March (1940), and two independent

works, Motion Painting No.1 (1947) set to Bach's third Brandenburg Concerto, and Radio Dynamics (1941), a silent study in 'colour rhythms'. Subsequently he experimented with abstract films in 3-D, and took a renewed interest in synthetic sound.

The early Studies were animated by the standard practice of stop-frame photography. Their curvilinear gyrations, the little flurries of crescent-moons, the shoals of fish-shapes darting about with infinite balletic grace and precision in obedience to the slightest tremor in the music, were created as charcoal drawings on white paper, which being left in the negative stage in subsequent processing of the film appeared as white figures swirling within black space. By eliminating defined backgrounds and allowing cycling and repetitions of movement to similar recurrences in the music, Fischinger was able to reduce the labour of stop-frame drawn animation to a minimum. Even so, assistants were required once a popular demand grew for more Studies. [Slide 60]

Despite Fischinger's protestations, and William Moritz's recent assertion that the Studies are visually autonomous, it is impossible not to experience these and the later sound films as 'visualized music', pretty but arbitrary and limiting 'illustrations' of a medium which cannot be paraphrased. Although Fischinger disclaimed that his works were in any sense parasitic upon music, this is the inescapable truth of the matter. The music inspired him to the graphics which are sustained by a support system of musical, not visual, logic...for seen silent, the fluid play of figures is divested of the larger part of its energy, dulling the sense with its endless swirling and easy anthropomorphism. In a note to Fischinger's Musical Abstracts (1931), the Film Society Programme of 10th January, 1932 offered the following

rather jaded view:

Following in the wake of Walther Ruttmann and other makers of abstract silent films, Herr Fischinger has adapted their methods to the simple task of illustrating music by arbitrary symbols whose synchronization gives the illusion of a special relationship between sound and image.

Seen silent, what remains of a 'musical' structuring is a gloss as impoverished as would have been the Shakespeare-graphics unrelated to their model. It becomes a gestural mime, the nicely choreographed variations, climaxes and recurrences, all dumbly in search of sound made manifest; for here there is as yet no 'inner essence' resounding from the interplay of light-forms on the screen; to talk of their self-sufficiency is self-deception. When the Studies are screened with their intended sound-tracks, the music undergoes a peculiar debasement, its former autonomy ransacked to serve as a vehicle for an idiosyncratic 'interpretation'. Siegfried Kracauer has observed a peculiar confusion of ascendancy in this form of audio-visual marriage, for

even though music fathers the images, it is invariably overpowered by them; and instead of seeming to set the tune, as it actually does, it affects us as an accompaniment in the usual sense of the word. It is as if the medium could not assimilate music in a major role and therefore automatically rejects its priority claims....So a puzzling situation arises. According to premise, the visuals, whatever their own appeal, seem to externalize or at least parallel the synchronized musical work. Yet the music responsible for their appearance and arrangement is relegated to the background so that the images implement something that is well-nigh nonexistent.(7)

Fischinger clearly enjoyed the success of his Studies and was loth to lose the appeal of their popular sound-tracks, despite the willingness of contemporary avant-garde composers to work with him.

In the case of Study 6, following music-copyright difficulties over the popular music originally selected, Paul Hindemith was called upon to write a chamber-music accompaniment, 'but Fischinger apparently felt that the switch from charming jazz to modernistic serious music might not after all be advantageous, albeit he personally liked Hindemith's score...' (8) It seems perverse of Fischinger not to have fostered such a liaison in the interests of a more profound audio-visual polyphony, and in the interest moreover of escaping the aesthetic limitations of a nineteenth-century musical language replete with melodic recurrence, simple tonal cadence, traditional instrumentation, and periodic rhythmic gestures. (However, Moritz does reproduce a Fischinger text of 29 March 1927 describing the activity in a film R-2, an abstract (albeit anthropomorphic) play of staff-like forms. The typewritten passage concludes: 'The music for this will be composed of "noises" which will be produced by all kinds of percussion instruments.' (9)

Anthropomorphic association infected all the black and white Studies, only being outgrown with Circles (1933), synchronized to the Venusberg ballet music in Wagner's Tannhäuser, and to the end of Grieg's 'Huldin's March' from Sigurd Jorsalfar. This was Fischinger's first colour-film, and in it he revelled in the vibrant brilliance of colour afforded by the then new Gasparcolor process of colour separation. Here too the technique changed from drawings to the use of paper cut-outs, and in Composition in Blue (1935) to pixillation - that is, animation of three-dimensional models. Composition in Blue was synchronised to Nicolai's Merry Wives of Windsor overture.

The later American shorts - Allegretto, An American March, and Radio Dynamics - are of greatest interest in the context of the present study, being wholly non-objective and without anthropomorphic connotations. An exclusively geometric style is employed. Le Grice draws stylistic parallels between Mondrian's last 'optical' jazz-inspired canvases (for example, the uncharacteristically expansive Broadway Boogie-Woogie of 1942-43 and Victory Boogie-Woogie of 1943-44) and Fischinger's Allegretto and the designedly music-less Radio Dynamics of 1941; all bespeak the neon vivacity of New York city life.(10) [Slides 61, 62] Eisenstein, in The Film Sense, has cited René Guilleré's article "Il n'y a plus de perspective" which distinguishes the angularities and rigid structure of jazz from the perspectival hierarchies of classical melody and accompaniment. 'Jazz seeks volume of sound, volume of phrase. Classical music was based on planes...'(11) In jazz therefore, according to Guilleré, there is no distinction between figure and ground. Whilst Eisenstein proceeds to draw analogies with Cubist painting, a stronger bond can surely be made with Mondrian's and Fischinger's visuals. 'True Boogie-Woogie I [Mondrian] conceive as homogenous in intention with mine in painting: destruction of melody which is the equivalent of destruction of natural appearance; and construction through continuous opposition of pure means - dynamic rhythm.'(12)

Despite having been invited to Hollywood, Fischinger found it hard to make a decent living, and was supported in his experimental work not by the studios but - over a seven-year period - by the recently established Solomon R. Guggenheim Foundation which, under the ideological guidance of Baroness Hilla Rebay (its de facto curator), had purchased and just introduced to the American public a

representative collection of Kandinsky's paintings. Fischinger's contribution to Disney's Fantasia (1940) in the form of visuals to Bach's Tocatta and Fugue in D minor would have brought his name before a wider public, but was ultimately rejected on account of its very abstraction. The cel-animated Allegretto (1936), to a post-Gershwinian concert-jazz score by the film composer Ralph Rainger (a former pupil of Schoenberg!), is an entrancing, technically brilliant display in vivid Gasparcolor which retains its fascination on repeated viewings, so swift and complex is the movement. In Moritz's words, 'it is a celebration, pure and simple, of the American life style, seen fresh and clean through the exuberant eyes of an immigrant.'(13) A most successful technical device is the rapid lightening or darkening hue of moving pieces; this is effected by subtly modifying the colour frame by frame.

An American March (1941), again cel-animated, and set to John Philip Sousa's The Stars and Stripes Forever, was shot in Technicolor. Other than maintaining close synchronization with the music throughout, Fischinger's only deference to his title is a full-screen image of the American flag at the the beginning and end of the film. As in Allegretto the visual activity is frenetic, - expanding concentric rings, spattering rectangles, globular shapes, with some Disneyesque 'lip-synching' of piccolo and trombone passages. Fittingly enough, Fischinger has selected a brash, loud colour-palette dominated by yellow and orange.

Whereas the background to An American March was black, in Radio Dynamics (1942) there is an elaborate intersection of horizontal and vertical bands in front of which a highly disciplined choreography of movements is enacted. Much of Radio Dynamics reads like a didactic

presentation of some colour theory; to the uninitiated it demands more of an intellectual than visceral response in its colour-permutations within an ostinato shape-sequence, and in its extensive use of discs slowly expanding through the colour spectrum from red through orange to blue and violet. Moritz sees it as a 'poem and meditation on relativity and perception', relating it to Fischinger's interest in Tibetan tantric mysticism.(14) In the knowledge of these inclinations it becomes apparent that what might superficially be read as mere colour-play should be understood to project aspects of the transcendental...the expanding 'third eye' which represents 'inner, cosmic, spiritual vision/consciousness in oriental iconography' set between the two human eyes which 'expanding and expanding, are also the infinite vortex into which all flies, and the source of the rhythms and pulsations that become the vibrations that were the light that caused the expansion.'(15)* Moritz remarks upon Fischinger's mystical leanings, observing that these had - at some stage - been focussed on Theosophy, through the writings of Steiner.(16) Perhaps it can be accounted uncanny coincidence, but comparison of Besant and Leadbeater's Sudden Fright (17) [Slide 26] shows it in every respect to be indistinguishable from the charcoal Studies which Fischinger made around 1930. The diagonal crescent moons of Sudden Fright, exploding diagonally across the screen might have been taken from a frame enlargement of a Study!

* It is puzzling to note that, although the sources assert that this film was not conceived as a musical visualization (and indeed, in a brief trailer to the B.F.I.'s print of Radio Dynamics, a fragment titled Experiment in Color Rhythm is preceded by the legend 'Please! No Music') the credits of the B.F.I. print of Radio Dynamics give: Radio Dynamics / A Color Music / Composition / By Oskar Fischinger / Music by Ralph Rainger / Copyright 1936.[sic] The Rainger credit has been edited down to two frames only, and thus escapes observation other than on an editing viewer.

The ten-minute Motion Painting No.1 (1947) employs an oil-on-plexiglass technique, and although set to Bach's Brandenburg Concerto No.3, now rejects any mimicry of musical gesturing, such as had appeared de rigueur in the earlier Studies. In Fischinger's own words:

This music, concerto by Bach, is like a smooth river, flowing on the side of open fields - And what you see - is not translated music, because music doesn't need to be translated on the screen...but the optical part is like we walk on the side of the river - sometimes we go a little bit farther off (away) but we come back and go along this river, the concerto by Bach.

The optical part is no perfect synchronization of every wave of the river - it is a very free walk, nothing is forced, nothing is synchronized except in great steps.

The film is in some parts perfectly synchronized with the music, but in other parts it runs free...(18)

Whilst we must applaud Fischinger's determination to break free from a slavish dependence on music, we may regret that he should have married so well-known a composition to his magnum opus. For the musician, sensitive to the refined gestural dynamics of Bach's writing, the redundancy of any imposed visual complement is obvious. It is cause for lasting regret that Fischinger found neither the opportunity nor the incentive to collaborate with a contemporary composer in the making of a truly integrated absolute sound-film.

* * *

Hans Fischinger : Tanz der Farben

The one extant work of Oskar Fischinger's younger brother, Hans (1909-44), is Tanz der Farben (Dance of the Colours), of 1935-38, a five-minute Gasparcolor short interpreting the 'Tanz der Stunden' from Ponchielli's La Gioconda. Hans assisted Oskar in his Studies (one should consider Study 12 as Hans' work, albeit under Oskar's supervision) and superficially shares very much the same visual imagery and technique. The revolving backgrounds in Tanz der Farben are not found in Oskar's work, and the scintillating graphic style is unsurpassed. But the same shoals of 'fish' dart and swirl, arrow-heads wing past, worm-shapes cavort in combination - all within a tight Mickey-Mousing to the music. I cannot recognise the marked stylistic distinction that Moritz discerns.(19)

Animated sound-track experiments

Despite his willingness to appropriate popular musics for the purposes of visualization, Oskar Fischinger, with other contemporaries, did investigate the potential of making his own soundtracks. Intent upon inventing a music unique to the film medium he experimented with synthetic optical soundtracks, photographing geometric figures frame by frame on the soundtrack in the instant of registering its accompanying image. Experiments in Hand Drawn Sound was made in 1931. [Slide 63] Fischinger's work received wide publicity in the years 1932-34, but ultimately no finance was forthcoming to support the further necessary years of research. Fischinger himself was too diffident to engage in original synthetic-sound composition,

considering it beyond his powers, which had been devoted over a decade to the refinement of a purely visual 'music'. He returned to optical synthetic sound in 1948 and 1955 only to arrange sections of the Khachaturian Sabre Dance and other melodies.(20) It is difficult to establish who was the first to realize that the process of microphone-recording could be by-passed by drawing directly on to film-stock, or by photographing black-and-white patterns on to the optical track. McLaren is clearly incorrect when he states that in the USA there was no early interest in animated sound. For example, Dave Fleischer, director of many Popeye and Betty Boop cartoons, 'had begun already in 1929 to draw directly on the film...noises and traditional-style music to accompany his and his brother Max's cartoon films.'(21) Similarly, one learns from the Film Society Programme of 8th February, 1931, that Ub Iwerks, formerly chief animator for Disney, had hand-drawn percussive sound effects on film-stock for The Village Barber 'Flip the Frog' cartoon (1930), several years before Norman McLaren's 'experimental' use of the technique in such films as Dots, Loops, and Neighbours, and it would seem that it has often been the practice of film-editors and sound mixers to save expense and time by making crashing and other 'noise' effects by directly marking the film.*

McLaren has researched the methods for creating artificial sound, presenting a brief account of their history; the following material draws primarily upon this information.(22)

* In both Dots and Loops McLaren remains content with a Mickey-Mousing rhythmic identity between sound and visual. Dots is fast-moving and skittish, a delightful divertimento with the customary hint of anthropomorphism in the meeting and interaction of the dots. Loops is very similar in mood, here setting a loop and a line in anthropomorphic conflict. The visuals are, however, less vivacious, as befits their sinuosity.

As early as 1922 (some five to seven years before the commercial promotion of sound-films), Laszlo Moholy-Nagy remarked on the potential of animated sound; the composer Ernest Toch (1887-1964) also later recommended the technique. Moholy-Nagy experimented with lettering, finger-prints, and profiles to generate sound. His Tönendes ABC, or ABC of Sound (1933), presented these shapes as both synthetic sound and visual simultaneously. At the Scientific Experimental Film Institute in Leningrad, A.M. Avraamov and others worked on 'ornamental animation in sound', and their research was subsequently followed up at the Leningrad Conservatory. Geometric figures were photographed frame-by-frame, with pitch controlled either by tracking the rostrum camera, or by making separate drawings. 'Volume was controlled by varying the exposure; harmony or counterpoint by multiple exposures, or by subdividing the sound-track lengthwise into sections, or by very rapid alternation of several tones...' (23) Avraamov - a music theorist - was intent on escaping the twelve-tone tempered octave, drawing upon Eastern scales in his creation of new pitch systems. Apparently he was less interested in exploring the gamut of newly-available timbres, settling for the small number of new tone qualities generated by geometric shapes. Later in the thirties, in Moscow, B.A. Yankovsky abandoned frame-by-frame shooting 'in favour of continuously moving patterns...', (24) and one of Avraamov's co-workers, the animator N. Voinov, prepared a library of eighty-seven drawings 'graded in semitones covering slightly over seven octaves of the twelve-tone equal-tempered chromatic scale, with a fixed tone quality of great purity. With this he produced an interpretation of Rachmaninoff's Prelude in C sharp minor, and Schubert's Moment Musical.' (25) (This may be regarded as an early debasement of the classics, on a par with later 'popularizations' via

the Moog synthesizer.) Jay Leyda, who had first-hand knowledge of the Russian scene, reports a screening of Arseni Avraamov's Symphony of the World in January 1933 - 'an experiment in real and artificial sound, animation and colour. This gave encouragement to the 'Ivoston' group of artists (Ivanov, Voinov, Sazonov) working on drawn sound-tracks, but after a few startling small achievements they found themselves in a dead end.'(26)

At the same time, around 1930, the Swiss electrical engineer Rudolf Pfenninger was similarly working from a library of card-drawings, here selecting variable-area sine curves and saw-tooth forms as his elementary graphic sound material. A documentary film of the early thirties, Tönende Handschrift, demonstrated his methods, which in about 1932 led to an 'interpretation' of Handel's Largo and other ventures.

McLaren himself later refined the Voinov and Pfenninger systems, improving on the 'contouring of tones' and on the general mode of operation.(27) In addition to the three films of McLaren noted above, animated sound is also used in his 3-D Now is the Time, in Two Bagatelles, Twirligig, and Phantasy. In Pen Point Percussion he provides an informal introduction to the technique of hand-drawn sounds. [Slide 64]

In more recent years the composer Daphne Oram has experimented in the same area, coining the term Oramics to identify her work.(28) Her drawn-sound Compositions include Brociliande; and Sardonica (pianoforte and Oramics tape), 1972.

The Whitney brothers' idiosyncratic method of generating synthetic sound, described fully below, relates both to that of Avraamov - in that it exploited 'foreign' scales - and to that of Pfenninger - in that it created sound from the sine-wave; the mode of sound production was, however, unique, and bore no relation to any earlier hand-drawn experiments. With the advances in electronically-synthesized sound in the early fifties, though, all such laborious sound-generating devices became outmoded, and their main interest must today reside in the fact that they very early offered a medium for non-instrumental, non-acoustic sound which, had it sooner been introduced to the right composer - as it was to Varese and Cage only in 1940 by Fischinger - could have required a radical rewriting of the pre-history of electronic music.

* * *

In cineplastics, the expressive media are: the over-all picture plane itself, light, form, color, pattern, space, depth, time, pace, interval, movement-types (continuity, opposition or multiple), sequential durations, and over-all length. The motion painter seeks, according to his capacities and equipment, to organize all his elements in expressive motion-plastic terms for a primarily visual impact upon the more or less developed aesthetic senses of the viewer. In cineplastics composition, as in nonprogrammatic statements in music, the directly visual [takes] precedence, preferably, over programmatic, narrative, or representative elements.

"Cineplastics: The Fine Art of Motion Painting"
Robert Bruce Rogers (29) *

Post-Fischinger

Because Richter and Eggeling worked so independently of Ruttmann, and with absolute animated film regarded as a freakish curiosity by the cinema industry and as a forbiddingly technical medium by most artists, no sense of community had developed amongst these innovators, although after 1925 (the year of the first international avant-garde film show in Berlin) the larger group of live-action film-makers did briefly feel that a 'movement' was forming. 'At the first International Congress of the Avant-garde Film in 1929 at La Sarraz, the Internationale of the independent film was founded. In December 1930, at the second Congress in Brussels, it was dissolved after the

* Robert Bruce Rogers, film-maker, made the ten-minute Appassionata Fantasy which like Disney's Fantasia (the Bach sequence) starts with a concert performance of Beethoven's Sonata, with the screen subsequently filling with swirling shapes synchronised to the music.

members of all fourteen participating countries (except Italy...Mussolini; and Spain...De Rivera) explained their desire to use the film more as a weapon in the fight against fascism.'(30) Richter continues: 'The original artistic direction which gave the avant-garde its meaning had evaporated. In exchange a human and social angle had come to the surface, which could certainly be found neither in Eggeling's nor in my earlier films.'(31)

By 1930, excepting the work of Oskar Fischinger, experimentation in absolute animated film seemed to have withered. Based, as we have seen, in Germany, it was immediate prey to the rising tide of Nazism. Indeed, Fischinger himself only briefly survived by categorizing his films as innocuously 'ornamental', all abstract art being 'verboten'. Avant-garde arts were paraded as degenerate, and suspect material seized. The coming of sound to films was a further blow, for it radically increased the expense of film-making, rendering this inaccessible to all but those few who could combine independent ventures with commercial work. Little further was heard of absolute animated film until after World War Two (a fallow period lasting some twenty years), when the Art in Cinema programme of the San Francisco Museum of Art organized by Frank Stauffacher brought to light some of the experiments from the 1920's, and thus acted as a catalyst on younger American artists. By that time, cine equipment and stock, although not cheap, were becoming available on the 16 millimetre gauge, thus bringing them within the budget of the self-financing independent worker.

Lye and McLaren

Untroubled by political repressions abroad were two younger film-makers, who set about absolute animation in ignorance of 1920's experimentation. These were the New Zealander Len Lye (1901-1980) and the Scotsman Norman McLaren (1914-). Lye experimented with hand-made films as early as 1921, and after an unsuccessful attempt to visit the Meyerhold Art Theatre in Moscow, came to England in 1927, where through the assistance of the London Film Society (and, interestingly, the author Robert Graves), he was able to complete his animated film Tusalava in 1929; in this year he also met and worked alongside Hans Richter on the latter's 'social' film Everyday (only completed in 1968).(32) Oswell Blakeston has observed of Tusalava: 'One is reminded, from time to time, of the work of Kandinsky....During the greater part of the picture the screen is divided into two parts. In the left hand panel is a self shape, which develops into a primitive totem. There is the attacking element which attempts to assimilate the shape, but in so doing, is itself annihilated. The symbolism is concerned with external influences corrupting the true spirit of the artist. The attacking element can be taken to be romanticism, eroticism, etcetera.'(33) The extreme labour involved in this animation of aboriginal shapes deterred him for six years from embarking upon further film-experiments, but by 1935 he was developing a technique of hand-drawing on film, a far less time-consuming and infinitely more economical process than cel-animation, and one in which the artist dispenses with any photographic apparatus, simply painting and inking directly on 35 millimetre clear celluloid strips, either frame-by-frame, or along the length of the film, ignoring the

frame divisions. The music was already registered on an optical sound-track. John Grierson, the great promoter of 'documentary' cinema in the 1930's and the director of the G.P.O. film unit, was intrigued by Lye's preliminary experiments in painting, stencilling and scratching on film, glimpsed the potential of the technique, and screened his abstract Colour Box (1935) as a promotional film. Thus the technique of Corra and Ginna was unwittingly revived, in Lye's hands combining great rhythmic drive and vivacity with a keen eye for the exploitation of the Gasparcolor process which Fischinger had helped refine.

The close synchronization to a popular sound-track here, as in the later Rainbow Dance (1936) and Trade Tattoo (1937) with music by the Lecuona Band, captivated audiences, ensuring the films' wide distribution. Lye combined hand-applied film graphics with abstracted photographed imagery, creating 'a brilliant interweaving of live action shots, special photographic effects such as photomontage, solarization and silhouette, and lettering, drawing, stencilling, stippling, painting, all done in direct technique.' (34) Throughout his career he periodically returned to hand-made films - in Free Radicals (1958) for example, where lines are scratched on black stock - but without recourse to similar commercial channels.

Norman McLaren's work is far better known today, having been fulsomely promoted by the National Film Board of Canada over some thirty years.

McLaren has ranged wide in the field of experimental animation techniques, breaking new ground in hand-drawn film, pixillation, animated sound, and stereographic animation.* Nearly all his films (around fifty) are very brief, five minutes or less, appealing very directly to popular taste. McLaren espoused no art movement, his films never having been influenced by canvas art. His position within a fully-equipped national film industry put at his disposal the whole range of cine-materials, and ever a major stimulus in his experimentation was the urge to exploit some new aspect of film technology.

Even as a teenager, he was given to visualizing music, and actually built himself a colour-organ. At eighteen he enrolled at the Glasgow School of Art where a year later, in 1933, he made some hand-drawn, but not abstract, films. He became a close friend of Len Lye when both worked in the G.P.O. film unit. Curtis reports that they were present at London Film Society evenings when Oskar Fischinger's and Laszlo Moholy-Nagy's experiments in synthetic sound-tracks were shown in 1934.(35) A hitherto unremarked - and possibly indirect - influence on McLaren and Lye in the technique of hand-painting on film may derive from a London Film Society screening late in 1932. The programme for 11th December includes a Colour Abstract (Germany, 1932), directed by Jen, and the following note is given:

* Stereo animation is a fascinating technique within which McLaren completed two films in the 1950's: Around is Around, where the sound was also stereophonic, and where a cathode-ray oscillograph generated mobile patterns; and Now is the Time (...to put on the polarized glasses), partly made with a cameraless technique, and with drawn sound-effects.

'Mr Jen is one of the more interesting younger German painters whose work still lies in the direction of expressive abstraction. The present film explores the possibilities of abstract treatment by direct hand-painting on the film, thereby obtaining exact control from frame to frame. He also makes use, to a very small extent, of photographic material interspersed with the hand-coloured remainder.'

McLaren later made several abstract hand-painted films in New York, sponsored by the astute Guggenheim Foundation, but was soon working again for Grierson, who had now joined the N.F.B.C. Unlike Fischinger (see his Motion Painting No.1), McLaren eschewed the use of classical music (which was 'too good to mess up'), preferring to animate to folk, jazz, dance music, and to synthetic sound.(36) Whilst he has always been technically innovative, his eclectic style has prevented him from contributing significantly to an aesthetic of audio-visual correlation. His popularization of the medium of abstract animation has thus been a mixed blessing, encouraging an anthropomorphic or decorative reading of the genre. The enchanting caprices of his best work (for example, Begone Dull Care (1949), accompanying the Oscar Peterson Trio) are only occasionally relieved by a more studied exploration of absolute imagery. His most significant essays in this field are Lines Vertical (1960; accompanied by composer Maurice Blackburn on electronic piano), Lines Horizontal (1962; accompanied by the folk-singer Pete Seeger on wind and string instruments), and the op-art Mosaic (1965), which approach the world of Eggeling and Richter in their attention to the orchestration of graphics, but which again neglect exploration of any counterpointed rhythmic interplay between image and sound.- More impressive is the NFBC production Opus 3 (b and w; '6'56";ca.1965?) by Pierre Hebert, a student of McLaren. A single screening of this film suggests that, in its handling of

absolute imagery - a select repertoire of squares, circles, lines and ellipses - it is directly indebted to Richter. The percussive electronic sound-track is not synchronized to graphic action. In Around Perception (1969), Hebert embarked upon computer-animation of geometric forms.

Bute and Schillinger : a Mathematical Basis

Preceding the remarkable film experiments of John and James Whitney, several less radical investigations were undertaken, one of the more striking being that of the composer, ethnomusicologist and writer Joseph Schillinger (1895-1943), author of The Mathematical Basis of the Arts (1948), and The Schillinger System of Musical Composition (1941), both of which enjoyed considerable esteem and gave to the fifties that concept of intervallic permutation as a compositional procedure which the integral serialists retrospectively structured into Webern's later works, thus supporting their own predilection for total parametric control. Schillinger was a great classifier, ever seeking the rational base for the inherently irrational. His scorn for the 'unsound, insane, feverishly dreamy and distorted hallucinations' of Klee, Picasso and Kandinsky was boundless.(37) His mathematical and artistic learning were of a forbidding eclecticism and depth, and one senses that his impact on creative artists of the time now requires some re-assessment, for his researches are - in England at least - little known. Interestingly, he devotes several pages of The Mathematical Basis of the Arts to an exhaustive permutation of possible correlations between visual and auditory forms in film, apparently regardless of any qualitative

assessment of the psychological efficacy of such interrelationships.

His taxonomy reads thus:

1. ELEMENTS OF VISUAL KINETIC COMPOSITION

1. Linear, plane and solid trajectories
(distance, dimension, direction, form).
2. Illumination
(forms and intensity of light).
3. Texture
(density of matter, quality of surface).
4. General component: time.

2. ELEMENTS OF MUSIC

1. Frequency
(Pitch)
2. Intensity
(relative dynamics).
3. Quality
(harmonic composition).
4. Density
(quantitative aggregation of sound).
5. General component: time.(38)

Schillinger attempts to relate cinematic time and space proportionally, such that, for example, one incremental move on the screen (which is divided into a grid 24 x 24) might be equivalent to one second temporally (sound film being projected at the rate of twenty-four frames per second). In this way, the two 'rhythms', spatial and temporal, are coordinated.(39)

The correlation of the general component [time] in both art forms may be assigned to different proportionate relations, such as harmonic ratios, distributive powers, series of growths, etc. The entire manifold of synchronized components must be based on a standard space-time unit expressed through a single motion picture frame (1/24th of a second) and the common denominator of musical time.(40)

It seems that Schillinger envisages only a one-to-one relationship between musical and visual gesture, judging by the single illustration given, where rhythmic unison binds the two, and with the visual very much ghosting the melodic movement of the music.* [Slide 65] Perhaps this is a gross oversimplification, but judging from the practical applications of Schillinger's theories by Mary Ellen Bute, one suspects not. These theories were clearly long in gestation, for as early as 1934 (at a time when, surprisingly, George Gershwin was composing his opera Porgy and Bess under Schillinger's supervision, and according to the Schillinger system(41)) Bute had undertaken the graphics for the (uncompleted?) film Synchronization which Schillinger made with Lewis Jacobs.(42) Bute later made several abstract films ('visual symphonies' and 'seeing-sound synchronies') with her husband Ted Nemeth, including Evening Star (1937) (Wagner's Evening Star, sung by Reinald Werrenrath) and Parabola (1938) in collaboration also with Rutherford Boyd. Three colour-films followed: Toccata and Fugue (1940), Tarantella (1941), and Sport Spooks (1941). Bute made considerable use of real 3-D objects in her later films, exploiting special shooting techniques involving the use of prisms and distorting

* Perhaps the graphic scores of Morton Feldman (e.g. Projection II, 1951) and of Earle Brown (e.g. December 1952) owe a little to Schillinger's theory and related graphics. (Brown worked in the Schillinger Institute in his youth.)

mirrors.

Having early explored the potential of colour organs, and become dissatisfied with the amorphous quality of their imagery, she worked with Leon Theremin* on audio-visual synchronization, demonstrating their work early in 1932. Theremin's departure from the USA prevented further development along these lines, and her involvement with hand-drawn imagery (as in Synchronization) was also to prove short-lived, for Ralph K. Potter (of Bell Telephone Labs) became interested in her investigations, and designed an oscilloscope upon which it was possible to 'draw' with light, exploiting the potential of Lissajous curves (curves resulting from the combination of two harmonic motions, named after the French scientist Jules A. Lissajous (1822-80)). Rhythm in Light was made by photographing such oscilloscope images, taking Grieg's Anitra's Dance as a sound-track to furnish a numerical basis which could be translated into pictorial abstract movement. Bute called her new art form Abstronics, a neologism derived from Abstractions and Electronics.(43)

Harry Smith : from Batiked Animation to No.7

Harry Smith, born in 1923 in Portland, Oregon, is at once painter, film-maker, alchemist and ethnomusicologist. His first absolute films, none of them conventionally cel-animated, recreated a

* The exiled Russian, Leon Theremin (1896-) was an important precursor of electronic music. His electrical sound-generator, the 'theremin' was prescribed in Varèse's Equatorial (1934); and for Henry Cowell (1897-1965) he designed a keyboard percussion instrument, the 'rhythmicon'. In 1929, Schillinger himself composed the First Airphonic Suite for the 'theremin', which the film composer Miklos Rozsa later used in his score for Hitchcock's Spellbound (1945) to convey psychological trauma.

technique first invented by Corra and Ginna, and then again by Len Lye, that of direct painting on film. Later Smith worked on batiked designs and animated collages, eventually turning to live-action film-making. It is with the early films - those made between 1939 and 1946, if one can accept Smith's own possibly unreliable datings - and the optically printed non-objective works of around 1950 that we are here concerned. Disappointingly, none of Smith's films are closely synchronized to their accompanying sound-track. A 'Beatles' compilation is heard concurrently, but has been applied so arbitrarily as to ignore even the breaks between films. Clearly the sound-track is a late addition injurious to the imagery, which is best screened silent.*

No.1 (1939) is painted free-hand, exploiting those properties virtually inherent in this process - swift metamorphosis, colour and placement variations - a scurrying abstract-expressionist flux in which instability and unpredictability of imagery prevail.

No.2 (1940-42) exploits the 'batik' process whereby hard-edge shapes can be achieved through first spraying over sticky paper dots applied to the film, then greasing the surface before removing the dots and re-spraying. A final cleansing of the grease reveals hard-edge shapes set in a coloured base. This method can begin to approach the stability of shape only too readily available in cel-animation. Living, vibrant line is sacrificed for precision of placement, and consequently more controlled metamorphosis. The method encourages the use of simple geometric figures denied to No.1. The

* The film-numbering given by Sitney and Le Grice may not accord with the sequence of films distributed by the Arts Council of Great Britain; hence the following notes may confuse, should other compilations adopt a different ordering.

discs are subject to many variations in size, number and movement. Increased control is also manifest in the constancy of tempo, although there is no evidence that the material has been consciously paced.

No.3 (1942-47) is considerably more complex than either No.1 or No.2. 'Batiked animation made of dead squares' as Smith described it in notes on his work for the Film-Makers Cooperative catalogue,(44) it is a tripartite piece, beginning with a grid of bars which metamorphoses into squares; then a changing group of diamonds; and finally an expanding circle. In addition to the complexity of colour-change, Sitney recognizes 'different rhythmic structures which mesh with a complexity equal to the most elaborate achievements of the entire graphic film tradition.'(45) This complexity is such as to preclude any conventional musical analogy in terms of phrase-structure or cadence.

No.4 opens with a long hand-held panning shot of one of Smith's paintings (Miro-influenced; a 'translation' of Dizzy Gillespie's Manteca), and continues with equally shaky (white on black) superimpositions of lighted windows. (The film was apparently made in a single night.) The imagery relates to the batiked shapes of No.3.

No.5 shows something of Fischinger's influence, and is indeed dedicated to Fischinger. It is actually entitled III Circular Tensions. Material from No.4 is included, now in coloured form. Activity is loose and unorganized. No.6, apparently an experiment in 3-D, is lost.

Reviewing these films, Le Grice has remarked on the development from anthropomorphism, through a primarily non-objective, geometric mode of expression, to a concern for optical kineticism; this relates

the evolution of Smith's abstractions to those of Ruttmann and Fischinger.(46)

No.7 was supported by a Guggenheim Foundation* grant in 1951. Hilla Rebay's enthusiasm for non-objective art (especially that of Kandinsky) had already led her to finance Fischinger's absolute film experiments; Smith's film shows the dominant influence of Kandinsky's hard-edged geometricism of the 1920's. Le Grice has remarked how, in his use of phased repetition and transformation, Kandinsky's canvases herald absolute animation on film; and that indeed his aesthetics, if not his metaphysics, influence all absolute experimentation after World War 2.(48)

In No.7, Smith's most complex absolute animated film, lasting about fifteen minutes, he emulates the Whitneys in shooting black and white originals through colour filters. The optical superimpositions are dazzling, often denying the individual hierarchic identities of figure and ground in a rapid planar interchange, where surface and depth become intermeshed. The scintillating imagery and technique of this magnificent film proved a spur towards completion of my own Opus I, which approaches Kandinsky very much through Smith's No.7.

Douglass Crockwell

Like Thomas Wilfred, the film-maker and magazine illustrator Douglass Crockwell (1904-68) took a stand in favour of the autonomy of silent motion-graphics. Despite having approached Disney in 1945 with

* In 1948 the Foundation funded the American abstract painter and film-maker Dwinell Grant (1912-) for research into a theory of abstract film composition analogous to musical composition-theory. (It is not known what was the outcome of this undertaking.)(47)

a patented system for illustrating music with animated abstractions, he neglected music in his own films, finding it superfluous. He expressed a preference for working from 'uncharted point to uncharted point', where free association conditions shape-metamorphosis as an alternative to the laborious cel-animation methods used commercially. He followed no set themes, did not pre-plan sequences, or admit to any esoteric symbolism, but gradually modified an easel painting 'by adding to it or taking away from it.'(49) In 1949 Crockwell made some abstract Mutoscope reels. His films include Fantasmagoria I (1938), II (1939), and III (1940); The Long Bodies (1946-7), and Glen Falls Sequence (1946) where, using single-frame photography he animated painted imaginary landscapes on multiple levels of glass.

Breer : Microrhythms

The American painter and film-maker Robert Breer (1926-) was early influenced by the Bauhaus school, by the neo-plasticism of Mondrian, and by Kandinsky and Herbin, aligning himself with the post-war abstraction froide movement. He has acknowledged a more direct debt to the films of Richter, Eggeling, Leger, Man Ray, Vigo, and Len Lye. In his early film Form Phases IV (1952) he activated elements from his canvas painting, creating, as Noel Burch observes, a 'continuously animated flow of vaguely geometrical, clearly defined shapes evolving on a flat surface according to extremely complex rhythmical patterns...' (50) Burch regards Eggeling's Symphonie Diagonale as a precursor to Breer's employment of 'a form of ellipsis by which fixed images underwent series of sudden, partial transformations.' (51) Although Burch can relate the visuals from a

later, equally complex, film Image by Images (1956) to contemporary serial composition by Stockhausen and Boulez in its 'use of parallel, independent rhythms...some...perceived only unconsciously...' it appears that in his films the added sound-tracks themselves are ill-considered appendages: 'their rather haphazard clumsiness is a shocking contrast to the refined, studied complexity of the images themselves.'(52) In Image by Images these sounds constitute an intermittent mid-to-low sustained rasping, and a higher motor-whine (perhaps an electric shaver); they do not synchronise in any appreciable way with the visuals, which give a very strong impression of swift tempi changes, where sudden breaks from presto to andante tranquillo movement are visually most effective. The image-succession is generally quite fast, but with slower fluidly-animated passages interspersed. Whilst most of the action employs abstract animated geometric figures and lines drawn on paper, there is some cut-out work. Occasionally 'found' material appears, for example part of a photograph of a man's head, a typed letter, etc.

The non-hierarchical 'equivalences' found in Breer's animated films do indeed compare interestingly with contemporary total serialization of musical parameters. The formulation of an integral serial aesthetic clearly underlies work where, according to Mancina and van Dyke, 'each frame, although fixed and different from the one preceding and following it, is - in the total duration of the film itself - equivalent in value to every other frame: structure, therefore, in the usual sense, is deliberately lacking.'(53)

Breer's refusal to acknowledge the rhythmic counter-accent of his sound-track is disquieting, for he offers no coherent argument (nor does Harry Smith) in defence of this practice, which appears

somewhat confused. Whilst asserting that 'rhythmically it [sound] tends to obliterate image,' and... 'I never think of sound before, or make an image for sound' he does himself 'make the sound, but I always make it afterwards.' (54) Thus sound is perhaps only credited with the capacity to provide a sympathetic ambience, and its rhythmic potential for a creative interaction with visual 'gesture' is ignored.

In Blazes (1961) and 66 (1966) notions of continuity are abandoned, unity residing in diversity rather than vice-versa. For Blazes (accompanied by a frenetically percussive sound-track) a hundred pictures were repeatedly shot in random ordering, microrhythmically rasping against each other as if resisting the temporal flux, demanding fixation as discrete images; this technique was extended in 66 where 900 picture-cards were shot, without any repetition. Such work 'is at all times its total self.' ... 'I try to present the total image right away, and the images following are merely other aspects of and equivalent to the first and final image.' (55)

Breer is one of several independent film-makers (including the prolific and influential Stan Brakhage) who intends his work as much for home-projection as for the ritual of cinema-screening. (The capacity for cyclic (Mutoscope-like) recurrence offered by the 8mm-gauge table-top projector cassette is exploited in Blazes and 66. Breer has actually used hand-cranked Mutoscope machines, both to involve the viewer in determining projection-speed (hence strengthening or weakening the illusion of continuity), and to avoid the disorientating theatricality of cinema-presentation.

Kubelka : Towards the Minimal

Although Peter Kubelka (born Vienna, 1934) is not considered an animator as such, he himself might not disavow the appellation, for like Breer, he has an acute awareness of the weighting of each individual film frame. To date he has completed five films, of which three, Adebar (1957; 1.5 mins), Schwechater (1958; 1 min), and Arnulf Rainer (1960; 6.5 mins) - in their formal complexity and 'musicality' - are of prime interest. Kubelka received a musical education - he was a Viennese choirboy - and becoming dissatisfied with the loose composition of films sought to bring to the cinema 'the standards that had been set by Bach and Piero della Francesca.' (56) Although the two earlier films both edit live-action material, so swift is the rhythmic pacing, and so aggressively anti-narrative the structure, that the actual image-content becomes of secondary importance, granting primacy to considerations of montage rhythm. Both films were commissioned by breweries, nominally - one would imagine - as promotional trailers. Kubelka, however, so radically simplifies the imagery to abstracted negative or high-contrast positive shapes that only a kinetic energy is communicated. 'Metric' and 'rhythmic' montaging - successive shot-pacing and internal shot-dynamics - coalesce with the sound, which in both cases is composed into the formal structure, and is no haphazard addition.

In Adebar, Kubelka remains faithful to the following structural principles:

1. each shot is 13, 26, or 52 frames long;
2. the first and last frame of every shot has been frozen at 13, 26, or 52 frames;

3. there is a change from positive to negative or the opposite at each splice;
4. the sound is a loop of music made by Pigmies, with four phrases each 26 frames long; and
5. when every possible combination of shots has been exhausted, the film ends.(57)

Sitney has likened Adebar to Webern's mature compositional practice in so far as it 'gives the impression of a strictly rational genesis'.(58) But the codified monotony of Adebar is far removed in expressive intent from the rarefied gestural expressionism of Webern.

In Schwechater, which celebrates the collision element generated by frame juxtaposition, a more complex organizational approach is adopted, albeit sharing the same aesthetic of exhaustive permutation. To this extent it can recall Eggeling's Symphonie Diagonale which similarly musicalized visual gesturing in terms of repetition and variation; but the arch insignificance of Kubelka's imagery (beer-drinking) clearly sets Schwechater outside the high-art graphic tradition of Constructivism. In the film only two different sounds are heard, one low, one high, accenting the briefly interjected red passages. Sitney has elaborated on the intricacies of this film's structure (and that of Arnulf Rainer) in his Visionary Film.(59)

Yet more structurally involved and perceptually opaque is Arnulf Rainer, a ne plus ultra in cinematic minimalism, eliminating as it does all imagery and all but white noise. Black and white frames, white noise and silence, are intercut according to a common strict rhythmic scheme which impassively rehearses the available permutational capacity of the material before coming to an abrupt halt. Here there is little concern for retinal excitement - unlike Tony and Beverley Conrad's later hallucinatory stroboscopic films The

Flicker (1965) and Straight and Narrow (1970), where the rapid interchange of black and white frames, and gridlines, respectively, generates illusory colours. Rather does it 'orchestrate' time with a relentless aridity wholly foreign to Richter's constructivist Rhythm 21. It proclaims most forcibly the distinction between painterly and cinematic absolutism, but in so doing finds itself in a cul-de-sac more deadening than that of Mondrian's rectilinear black and white canvases.

John and James Whitney : Serial Composition of the Film Exercises

The first film experiments of John and James Whitney (1917-;1922-) in the early 1940's are of particular interest from an electronic-music viewpoint. This work dated from a time before the Whitneys knew of Fischinger, and can be traced to John's introduction, through his friendship with the conductor René Leibowitz, to the music and theories of Arnold Schoenberg. John Whitney relates that at this time he got to know recordings of Pierrot Lunaire, the Opus 19 pianoforte pieces, the Opus 37 string quartet, Berg's Lyric Suite and his Violin Concerto. John's brother James was a painter, and together they also became 'acquainted with the spirit and essence of modernity in the plastic arts, including the Bauhaus.' (60)

In a brief article printed in Art in Cinema (1947), the brothers explained their attitude towards film-sound:

It is a commonplace to note that film and sound today have become a permanent unity. We are attracted by the prospects of an idiom as unified, bi sensorially, as the sound film can be. Naturally, we have wanted to avoid weakening that

unity, which would be the very essence of an abstract film medium.

It occurred to us that an audience could bring with it its own disunifying distractions in the form of numerous past associations and preconceptions were we to use previously composed music in relation to our own abstract image compositions.* We, therefore, tried the simplest, least common, primitive music we could find.** But another source of disunity became apparent. In this case, the dominant source of distraction was a contradiction between the origins (the players, instruments, time, place, etc.) of this kind of music and our animated image.

Thereafter, little thought was given to any other consideration than to search for a method of creating our own sound by some means near as possible to the image animation process, technically and in spirit.(62)

Elsewhere, John Whitney confirmed his belief in the superiority of a synthetic sound which might 'occupy a spatial vacuum, whose dimensions would be determined by the graphic element.'(63)

The Whitney brothers' solution to this problem was remarkable, particularly at a time when what little progress had been made elsewhere in the enregistering of 'pure' sound for musical purposes must have remained unknown to them. Whilst the earliest sine-wave compositions are commonly regarded as having originated in Cologne in 1952 when magnetic tape-recorders were being introduced, the Whitneys were earlier shaping sound by means of the simple harmonic motion of pendulums. By mixing the oscillations of several pendulums, fundamental and partials could be synthesized, creating various timbres. Like most sound-recording within the film industry before and during this period, the optical track of cine-film was used, but whereas the normal technique was to convert magnetic energy from

* Mantle Hood has noted that, in the Bach D minor Tocatta and Fugue section of Disney's Fantasia, where imagery was largely abstract, integration of visual and sound was weakened by such associations.(61)

** One recalls the drum accompaniments to the Ruttmann Opera on the occasion of their London Film Society screenings, 25 October 1925. (See Chapter Three.)

microphones via a sensitive light source into variable area or density patterns of exposure on the film-stock, here pendulum movements controlled the emission of light on to the moving band of film. Norman McLaren has described the technique in greater detail:

The sound-track is made by linking together mechanically twelve pendulums* of various lengths by means of a fine steel wire attached to an optical wedge. This optical wedge is caused to oscillate over a light slit by the motion of the pendulums, producing a variable-area type of sound-track. The pendulums can be operated together in any combination, or separately. The frequency of each can be adjusted or tuned to conform to any kind of scale by moving a sliding weight. Through the choice of pendulum lengths and driven speeds the full range of audio frequencies can be recorded. No actual sound is involved in recording the wave patterns generated by the pendulums. Only when the resultant film is projected at regular sound-projection speed is sound produced.(65)

Despite its limitations, the device - obviously time-consuming to a degree - not only enabled the Whitneys to realize their aesthetic of a non-instrumental music, but was valued for permitting sound-recording at all, for 'sound recording of original music even at the 16mm. scale is prohibitively expensive and presents enormous difficulties for the amateur.'(66) [Slide 66]

The Whitneys were alive to the potential offered by their technique for one individual to create an entire film, visuals and sound. By this means, the de-personalizing effect of factory film-production methods could be avoided. Moreover they took full advantage of the intimate synchronization available:

Since both image and sound can be time scored to fractions of a single motion picture frame, there

* The Whitneys themselves have stated 'thirty'.(64)

is opened a new field of audio-visual rhythmic possibilities. The quality of the sound evokes no strong image distraction such as was observed in other music. Consequently, the sound is easily integrated with the image. The scale of the instrument is adjustable to any intervals we may choose including quarter tones and smaller. This permits use of graduated ascending or descending tonal series. They correspond in quality of feeling or variability to certain types of image series, such as, for example, an enlarging or diminishing shape, an ascending or descending shape, or a color series.(67)

This newly-invented apparatus conditioned the Whitney's approach to audio-visual composition in film, for 'certain formal ideas emerged directly from the application of infrasonics...'(68) through the use of pendulums, which brought about the discovery 'that rhythm and pitch form a continuum.'(69) Prior to their studies in sound-film, the Whitney brothers had first approached the problem of a silent 'orchestration' of visual elements in a film which 'consisted of twenty-four variations on a graphic matrix', serially fragmented. The movement of forms - in both positive and complementary negative - was photographed on black and white film, and this material subsequently re-shot through colour filters - forward, backward, upright, reversed - in a specially designed optical printer. 'This provided a graphic parallel with the transpositions, inversions and retrogrades of the twelve-note technique.'(70)

The concept of a static matrix was - in the following sound films - supplanted by an exploitation of multiply-superimposed cinematic 'wipe' patterns which it was found would generate free-floating abstract mobile-shapes. A structural use of colour was introduced through optically-printing black and white originals through colour-filters on to colour-sensitive emulsions. Throughout this

work, an attempt was made 'to integrate common compositional fields, e.g. the basic time-units of sound and picture: in the single picture.'(71) (In view of this concern, it seems surprising that no reference is made to Schillinger's theories, or to the derived filmic applications of Mary Ellen Bute.) Lewis Jacobs early appreciated the Whitneys' achievement in their Film Exercises, offering this description:

All are non-representational, made up of geometric shapes flat and contrasting in colour, posturesque in pattern, moving on the surface of the screen and in depth by shifting, interlacing, interlocking and intersecting, fluent and live in changing waves of colour, the sound rising and falling, advancing and receding in beats and tones with the images, all moving to the command of a definite formal basis. Cold and formal in structure, the Whitney exercises are warm and diverting in effects....(72)

On the central issue of whether sound is necessary to complement abstract visuals - or indeed, vice versa - and whether any meaningful synthesis can be accomplished, Whitney draws on a statement by Boulez in the first issue of the periodical Die Reihe (1955). Here Boulez remarks that in electronic music playback an audience misses the conventional association of gesture with sound, and asks whether some 'visual double' may be required to satisfy the psychological need to locate and define specific generators of such sound. Whitney, painfully aware of the inadequacy of silent-film screenings,* where

* As recently as 1979, at the National Film Theatre's 23rd London Film Festival screening of The Best of British Animation (24.IX.1979), Alan P. Andrews' silent 'Fischingereque' 4 Moving Pictures (1976-79) made at the University College, London, were received by an audience which became increasingly fidgety, whilst some became hilarious through the embarrassed 'silence'. Diagonal close-set strips of colour-bands, each divided into blocks of increasing colour saturation were, in each of the films, shifted diagonally in relation to one another so as to effect various patterns. (Reminiscent of Fischinger's Orgelstäbe/Staffs.)

one's attention to the visual rhythms is disturbed by any chance auditorium noises, suggests that 'it looks as if the two fields have common problems, even if only in this business of the particular difficulties of the audience's reaction.'(73)

But furthermore, he describes an inner relationship, wherein 'the ear can be 'guided' by a sound in the same way that the eye follows the route of an object. We found these two routes could run parallel, or in contrary motion, or canonically....Finally we began to compose graphic movement and sound structures along an escape-route in the depths of space.'(74)

Drawing inspiration from Mondrian's concept of a 'dynamic equilibrium' of vertical and horizontal intersections, the Whitneys elaborated a theory of symmetries around a central axis; dynamic wipe-movements would assume retrograde or mirror images around this point, and when angled at the horizontal or vertical, 'would be the same as a resolution in a maximum state of tranquillity, or a stable equilibrium. Structures of tension in terms of movement, size, tone, and color were ordered around these axes in symmetry or double symmetry on the basis of a graded dynamism of balance and tension.'(75) The Whitneys published the following notes on these films:

FIRST SOUND FILM; COMPLETED FALL 1943:

Begins with a three beat announcement, drawn out in time, which thereafter serves as an imageless transition figure dividing the sections of the film. Each new return of this figure is condensed more and more in time. Finally it is used in reverse to conclude the film. There are four sections constructed from the same three thematic ideas. They depend upon subtle alterations of color and juxtaposition of these three distinct themes for contrast.

This film was produced entirely by manipulation

of paper cut-outs and shot at regular motion picture camera speed instead of hand animating one frame at a time. The entire film, two hundred feet in length, was constructed from an economical twelve feet of original image material.

FRAGMENTS; SPRING 1944:

These two very short fragments were also made from paper cut-outs. At this time we were developing a means of controlling this procedure with the use of pantographs. While we were satisfied with the correlation of sound and image, progress with the material had begun to lag far behind our ideas. These two were left unfinished in order to begin the films which follow.

FOURTH FILM; COMPLETED SPRING 1944:

Entire film divided into four consecutive chosen approaches, the fourth being a section partially devoted to a reiteration and extension of the material of the first and second sections.

SECTION ONE: Movement used primarily to achieve spatial depth. An attempt is made to delay sound in a proportional relationship to the depth or distance of its corresponding image in the screen space. That is a near image is heard sooner than one in the distance. Having determined the distant and near extremes of the visual image, this screen space is assigned a tonal interval. The sound then moves along a melodic line in continuous glissando back and forth slowing down as it approaches its point of alteration in direction. The line would resemble slightly a diminishing spiral as viewed on a flat plain from the side. This section concludes with a frontal assault of all imagery with an interacting tonal accent.

SECTION TWO: Consists of four short subjects in natural sequence. They are treated to a development in terms alternately of contraction and expansion or halving and doubling of their rhythm. Sound and visual elements held in strict synchronization. Color is directed through a blue to green dynamic organization.

SECTION THREE: A fifteen second visual sequence is begun every five seconds after the fashion of canon form in music. This constitutes the leading idea, a development of which is extended into three different repetitions. This section is built upon the establishment of complex tonal masses which oppose complex image masses. The durations of each are progressively shortened. The image masses are progressively simplified and

their spatial movement increasingly rapid.

SECTION FOUR: Begins with a statement in sound and image which at its conclusion is inverted and retrogresses to its beginning. An enlarged repetition of this leads to the reiterative conclusion of the film.

FIFTH FILM; COMPLETED SPRING 1944:

Opens with a short canonical statement of a theme upon which the entire film is constructed. Followed by a rhythmical treatment of the beginning and ending images of this theme in alternation. This passage progresses by a quickening of rhythm, increasing in complexity and color fluctuation. After a complete repeat of this, there follows a deliberate use of the original theme in a canon form, slow and with a sound counterpart also in canon. The sound thereafter is entirely constructed upon the material derived from this section. The canon is repeated in contrasting variation by means of color and leads into a further development of the early rhythmical ideas in beginning and ending images.

A second section begins after a brief pause. Here an attempt is made to pose the same image theme of the first section in deep film screen space. As the ending image recedes after an accented frontal flash onto the screen it unfolds itself repeatedly leaving the receding image to continue on smaller and smaller. The entire section consists of variations on this idea and further development of the rhythmical ending image ideas which recur in the first section.(74)

A study of the Film Exercises reveals the extent to which the Whitneys' ambitions were fulfilled. Unfortunately, many of the artificial sound-visual correlations which they construct fail to communicate, and because of the comparative sobriety of image transformation and pitch material, the overall impression is one of an emotional sterility.

There is an inscrutability about these films which persists through repeated viewings. None of the films is as simply organised as might be supposed from their description above. Hence many

audio-visual relationships resist identification even with 'crib' in hand. For example, the structure of Section 1 in the fourth film, utilizing sound delay, is so artificial and so removed from our everyday experience, that its communicative opacity is assured; and the 'canonical' statements of a - presumably visual - theme at the opening of the fifth film similarly escape detection. The frequent use of sound without image (black screen) is a striking device, however, seeming to function in a motet-like 'isorhythmic' fashion where the sounds may stand as 'color' (melodic pattern) and the visuals as overlapping 'talea' (rhythmic pattern), ringing the changes by permutating the possible range of sound-image juxtapositions.

Regrettably, the Whitneys did not rigorously pursue their goal of a universalized machine-art, permutating both visuals and sound. Following the silent Variations (1941-43) and their synthetic sound Five Abstract Film Exercises, Studies in Motion (1943-44), John Whitney began creating visuals to existing music, as in Permutations (1967), a computer-graphics film with a South-Indian sound-track. His technical bent has led him to pursue further the computer-generation of images, whilst his younger brother, working now separately, undertook just two films, Yantra (1950-57), and Lapis (1963-66), the latter realized using a mechanical analogue computer.

Whilst the use of digital computer image-generation has become a fascinating recent addition to animation technology, the fact that the Whitneys have apparently abandoned their exploration of polyrhythmic interrelationship of sound and visual places their later work outside the scope of this study.

Computer Arts, etc.

The 1960's and 1970's witnessed a resurgence of interest in absolute animated film, notably on the West Coast of America where it was inspired and sustained by an enthusiasm for the work of the twenties avant-garde, and for that of Oskar Fischinger who was, of course, resident in Hollywood. Against a vitalizing background of radical experimentation in live-action 'psychological' films by such major figures as Kenneth Anger and Stan Brakhage, the Whitney brothers, together with John's sons, John Jnr, Michael and Mark, persevered with computer-generated film animation.

Using the computer visual-display, John Stehura made Cybernetik 5.3 in 1969 to an unsynchronized music-track, Tod Dockstadter's Quatermass, where ostinato, nasal sonic events bear no clear relationship to the programmed, 'random' metamorphosis of the vibrantly-coloured visuals (superimposed bundles of lines, freely floating in space), being merely concurrent. (In 'cybernetic' film machine-characteristics are exploited to generate imagery, as opposed to using the machine to record 'exterior' imagery. Music is often used to stabilise the film visuals, to furnish a 'sympathetic mood' by means of association. Hence the common practice of resorting to 'weird' electronic music to accompany cosmic, other-worldly fantasies.) Doris Chase's Circles of 1971, another computer-generated film, to an electronic track by Morton Subotnick, exhibits slowly-spinning superimposed coils, white, then coloured. The action - as so often in computer animation of this date - is screen-centred, symmetrically balanced around a central axis, and conveys an impersonal, bland image-play of the most languid, liquid kind. No

thought is given to audio-visual synchronization, any relationship being secured only through the sympathetic 'tempi' of image and sound metamorphosis.

Whilst much American abstract animation is fascinating in its optical virtuosity - notably Jordan Belson's exquisite transcendental cosmic fantasies* (for example, Phenomena (1965), and Samadhi (1967)), and Pat O'Neill's optically-printed work (for example, his 7362 of 1967) - little of it attempts any kind of creative inter-relationship with sound, which invariably gives the impression of having been tacked on as an afterthought, being deemed preferable to silence, and offering some assumedly appropriate 'ambience'. The non-dialectic nature of the imagery - often presented as a seamless continuum, a procession of ideas rather than a progression - is aptly complemented by static, oriental sound-tracks, which enhance the meditative atmosphere generated by the visuals. Typical examples are James Whitney's Lapis (1963-66) and John Whitney's Permutations (1968), mentioned above.

Fischinger's mystical bent, which became increasingly apparent in his later work - notably in Radio Dynamics - thus found sympathetic resonance amongst the West Coast film-makers, whose work can be seen as a manifestation of that 'flower-power' drug-induced quietism which

* Interestingly, in his early career, around 1950, Belson worked on scrolls, and had been inspired to emulate Richter and Eggeling's move to film through attending the 1947 San Francisco Art in Cinema programmes organised by Frank Stauffacher. His collaboration with Henry Jacobs from 1957-59 on the Vortex concerts at the Morrison Planetarium in San Francisco recalls Eggeling's aspirations for an 'Eidodynamik' of coloured light projections in the sky.

imbued American youth of the 1960's. As was earlier apparent in the Theosophists' resentment of an intrusive technology at the turn of the century, this search after an inward reality uncontaminated by the West's over-weening materialism often resulted in a fetishising of the outer trappings of Eastern mysticism - the desperate attempt of a Godless society to secure spiritual peace and succour from an alien culture. The metaphysical aspirations of Scriabin and Kandinsky are thus echoed in Karlheinz Stockhausen and Harry Smith, who remain convinced that intimations of the 'ultimate' can be divined by the sensitised ear and eye. As this 'inner space' is plumbed, the individual is transported beyond the boundaries of self.

* * *

This overview of experiment in absolute animated film since 1930 might suitably culminate in an intensive study of computer animation over the last decade, but even the most recent work (1981-82), whilst rapidly extending technical boundaries in the metamorphosis and - where appropriate - the textural 'realism' of synthetic imagery, fails to secure fresh perspectives on audio-visual correlation. It would seem that Fischinger's diffidence over collaborating with a 'modern' composer, or in hazarding composition of his own film-sound, is still echoed by subsequent film- and computer- artists, who to date have concentrated their energies within the visual medium, sparing no thought for those fruitful bi-media 'interferences' with which the spectator is inevitably confronted when witnessing a sound film.

Consequently, discussion of technological advance beyond the film medium itself is omitted, the next Chapter rather pausing to reflect on a number of audio-visual interrelationships passed over, or afforded only limited consideration, throughout the previous Chapters.

CHAPTER FIVE

INTERRELATIONSHIPS OF ABSOLUTE IMAGE AND SOUND IN FILM

There is no way of notating the exact kinetic effects of a fine art film concept other than in film itself.

Len Lye (1)

Counterpoint; Notation

The term 'audio-visual counterpoint' (meaning some form of asynchronism) is much bandied about in film-music aesthetics, the assumption somehow seeming to be that it is of itself a good thing, and that other, more conventional uses of sound in films are correspondingly weak, mindless and uncreative. Whilst it may have been necessary at one time - during the emergence of sound-film in 1929-30 - to argue vehemently against the restriction of musical accompaniment to a psychologically supportive role, today the question of the function of sound, and more particularly music in film, can be less polemical, and need not arouse such passion. For it must be acknowledged that in commercial, narrative-dominated film this use of music feels as natural to us as it did to the first generation of silent-film pianists. One cannot after all deny the unity of text and tune in solo song; why then, deny the similarly conditioned unity of text (i.e. narrative image-sequence with or without spoken words) and musical accompaniment in films? Now that the musical battles fought by Eisler have, in some measure, been won - the use of small ensembles in a modern idiom, the closer, more respectful collaboration with the composer (one thinks of, for example, Peter Maxwell Davies' score for Ken Russell's The Devils) (1971) - one either leaves commercial film-music alone or embarks upon an explicitly political endeavour, challenging fundamental axioms of film-making, and rebuilding the whole structure of the cinema-industry, encumbered as it still is by the entrenched attitudes of big business capitalism.

But this is not a battle waged in this thesis, and indeed the likelihood of any thoroughgoing complexity of absolute audio-visual argument ever attracting a mass-audience is, to say the least, remote, since it demands a preparedness on the part of the viewer to relinquish the familiar security of personality-identification endemic in western, and western-influenced films (always excepting those polemical sallies of the political far left, e.g. the Godard of Vent d'Est and British Sounds, - and the entire genre of non-narrative independent films).

What then can a normative interrelationship between sound and visual be in absolute animated film? It would seem perverse deliberately to reject the fundamental relationship found in narrative film - that of psychological reinforcement. Whether the dominant mood-message is conveyed by aural or visual means is immaterial here; it is a question of intuitive supplementation of the one by the other, either running both media continuously or requiring the one to act in a supportive, but also commentative role at selected points. For the contention that a mere embellishment, or extraneous duplication, results from the running together of sound and visual in harness, as it were, is not defensible. Raymond Spottiswoode properly argues that audio-visual parallelism is actually an impossibility, repeating Clive Bell's opinion 'that two artistic media cannot convey exactly the same impressions; and if this be true, the limit will be approached asymptotically and never reached.'(2) Conversely, Spottiswoode observes how 'sound and sight are said to contrast when they convey different impressions. Here also the limit is difficult to determine; for though the visual film might convey the concept 'Force' and the sound factor 'Lethargy', the inevitable penumbra of peculiarities

attaching to the use of a particular medium would blur the opposition until it had lost its precision.'(3) Admittedly one wearies of the clichéd conventions of chase-music, horror-music, love-music, but this nausea is not evoked by the relationship itself; rather by the outworn nature of the musico/dramatic entity. Eisler's successful scoring to 14 Ways of Describing Rain is a case in point; he is providing an unusual form, but still a form, of instrumental onomatopoeia to the visuals, the while providing a musical ambience conducive to a fuller concentration on the screen. To use Milano's terminology, the music is serving at once a neutral, rhythmic, illustrative, and limited psychological function.

So in absolute animated films it would be foolish to work from a 'contrapuntal' basis, where one would conceive of intermedia relationships primarily in terms of asynchronous collisions; such collisions, the very spice of the film medium as dissonances are within a broadly consonant context, can only function at full strength within a field in which sound and visual are otherwise in closely sympathetic relation. This enhancement and heightening of audio or visual 'dissonance' by its incorporation within a generally 'consonant' context is overlooked in Spottiswoode's otherwise valuable observations.

* * *

Firstly, we may consider those synchronous relationships which commonly occur in nature. Whilst they are few, they must be accounted the strongest of all binding forces, and all can be translated into absolute terms, as shall be seen.

1. Synchronous 'attack' of image and sound: as in the 'snap' of finger against thumb.
2. Visual rise and fall equated with pitch rise and fall; owing primarily to vocal-cord sensation.
3. Speed of movement equated with pitch-level: as in the whirring of a swung rope.
4. Distant (small) image equated with distant (soft) sound; near (large) image equated with near (loud) sound. Size is related to amplitude.*
5. Large image equated with low-pitched sound: as with the diameter of drum-heads; hence small image equated with high-pitched sound.

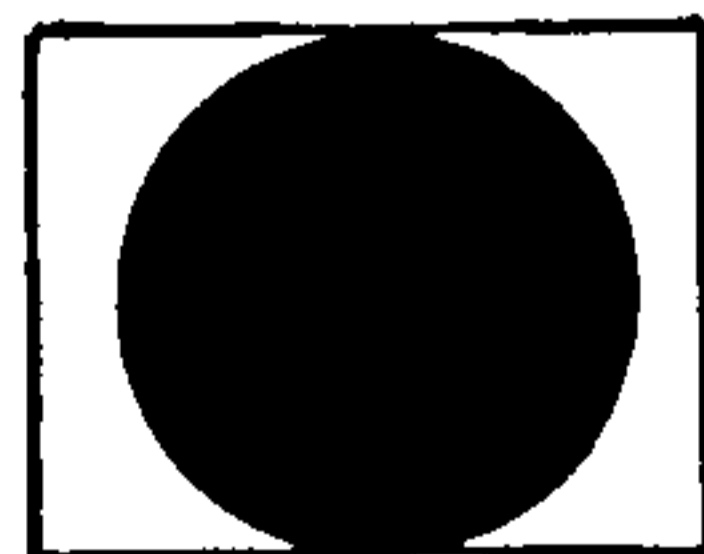
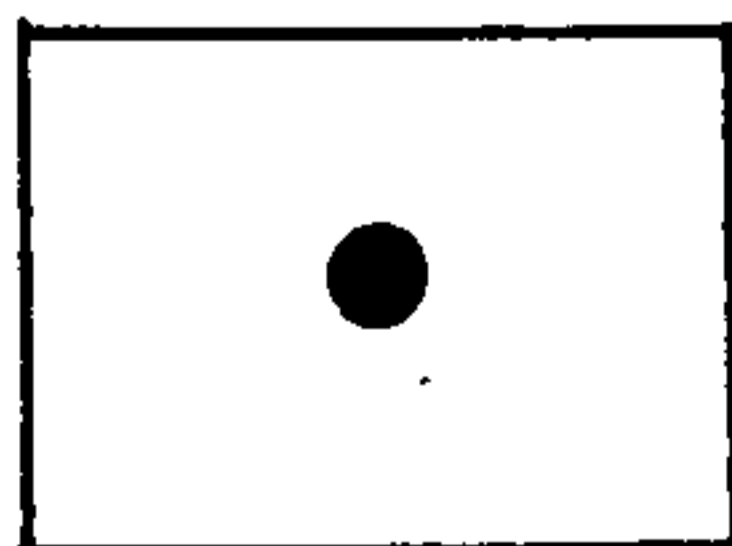
In addition to these, there are two isolated, rather more rare natural phenomena which, although of occasional use, perhaps evoke too strongly their realistic source to be of much use in absolute animation:

1. The Doppler effect: as a sounding image, moving at constant speed past the spectator, appears to drop in pitch.
2. Time lag : as when distance is sufficient to render the difference in transmission of sound and light apparent. (The Whitneys' incorporation of this phenomenon as a structural determinant in their fourth film, section 1, actually fails to evoke its naturalistic origin, and hence resists comprehension.)

Whilst these are all observable phenomena, there is another field of learnt audio-visual inter-connection which cannot be neglected. This

 * A play upon this equation can imply interesting figure/ground confusion. Imagine, for example, a large disc on a ground:

Let the circle diminish in size to



If the accompanying sound increases in dynamic as this happens, one may surmise that the sound will be identified with the ground which will, as the active agent, then change role and become figure, eventually eliminating the previous figure (now ground) as it presses in on the circle until the point where the latter becomes a dot and disappears.

devolves upon the language of interpersonal relationships, and can be summarized thus:

1. Abrupt, angular gestures are associated with harsh, short words (sounds).
2. Expansive gestures are associated with broad, long-phrased declamation.
3. Easy, fluid gestures are associated with a conversational, or warm tone of voice.
4. Stillness of body and silence both convey introspection, or non-communication.
5. Extreme bodily activity is associated with rapid speech (sounds).

These relationships of course neglect the strong associations of absolute imagery and sound perceived independently. For example, consider how the angular image connotes variously unease (facial distortion), attack (bodily rejection), asceticism (Christian symbolism of thorns, cross), and how falling sounds may connote spent energy, lamentation, and finality. But these are all readily understood, and retain their associative potency to some degree however much abstracted. (It is clear from this that the term 'absolute' is one of convenience; there can, assuming human mediation, be no such thing as an absolute, universal art-form representing incorruptible verities. Pace Kandinsky, absolute imagery is no substitute for transubstantiation, whether it clangs or no! Our glimpse of 'reality' is partial at best, conditioned by age, sex, temperament, and environment.) Absolute animated film can differ so markedly from narrative film in the following areas:

1. Mickey-Mousing (point-by-point synchronization) of music and visual movement is the prime temporal link.

2. The shape of the film may be strongly directed, or even dictated, by 'musical' considerations.
3. Synchronism and asynchronism and every variety of contrapuntal interplay can be shaped in a musical way, encouraging phrase-repetitions, polyphonies, and the whole paraphernalia of tension/resolution, anticipation and gratification associated with musical structuring.

There is no gradual, progressive graph of psychological effect to be plotted when considering audio-visual synchronism and asynchronism. It should first be clarified that in dealing with absolute animated film one is denied access to the most important and valuable weapon in the armoury of the composer for commercial narrative film: that weapon being association. The composer here can, and nearly always does, rely upon the associative capacity of his material to elicit the immediate response demanded by a medium whose products probably receive - for any one consumer - a once-only exposure. The message must be clear and unambiguous, assimilable without conscious effort. Thus whether synchronization of mood, or the less common asynchronization is desired, identification by association is the rule. The old compilation-manuals of the silent film pianists and orchestras are effectively still being plundered, albeit dressed up in a later fashion.

How does animated absolute film stand in relation to this? Unless one 'lifts' music, as did Fischinger, or one is content to write a pastiche-compilation, one is denied the ready associative capacity of known musical styles, and thus the synchronous and asynchronous modes must be conceived in different terms. Since, however, it may be anticipated that a short animated absolute film would be viewed - say on a home video-machine or in an art-film cinema

- several times, the necessity for immediate 'effectiveness' is removed. Consequently, one can approach the structure of the film in much the same way as many a composer would nowadays approach the structuring of a piece of music, namely - in this disintegrative world - from unique premises, individual to his oeuvre, or perhaps even individual to the particular film. That is to say, the shaping of interrelationships in the film would quite possibly be defined for that film alone; forms of synchronism would be established and dissolved in wholly absolute terms. That this lays great stress on the viewer's preparedness more consciously to evaluate the audio-visual complex of activity before him is not denied. However it is not proposed to present him with some arcane cypher for decoding. Given an adequate technique and imaginative capacity, the film-maker should have designed a piece which, like most successful 'high-art', can be experienced at several levels of familiarity and sophistication. An immediate intuitive grasp of structure, of tension-patterns, should be available on first screening; this to be the catalyst for future explorations of deeper meanings within a film.

From its earliest years absolute film has been bedevilled by the unavailability of a workable prescriptive notation, some short-hand mnemonic which might 'fix' the most characteristic attributes of mobile shape prior to full graphic realisation and filming. Such attempts as have been made - notably those of Werner Graeff in his Filmpartituren I and II of 1922 - have only been realised at the expense of any graphic flexibility. Here a timed succession of squares and rectangles, cloned from the screen format itself, constitute the entire subject matter; like Richter's more complex Rhythm 21, a temporal 'orchestration' is sought, independent of

characterful graphic designs. Given that such a gross reduction of means cannot for long satisfy the artist, how is any more liberal handling of visual activity to be approached? And if this problem can be overcome, how then are the visuals to be related to electronic music - which itself similarly wants for a notation?

In commercial cartoon animation, where unambiguous character definition has always been the primary consideration, comparable 'scripting' problems do not arise; for given a troupe of familiars - a Donald Duck, a Goofy, or a Bugs Bunny - their confrontations may be presented in terms of a ludicrously magnified parody of human behaviour; thus personalities are created, stock-responses defined, and whatever the situation, however fancifully 'unrealistic', empathy is assured through the psychological veracity of behaviour. As fear, greed, cunning, anger, the lust for revenge - these and a host of other human or animal emotions - are condensed into the cartoon Lilliput, and so distanced, we can mock at our own emotional frailties. Through the use of a simple graphic storyboard - the name itself points the crucial dominance of narrative in such work - only the key-points in the action are depicted, as in a magazine strip-cartoon, relegating further elaboration of gesture and movement to a secondary role which at all times must contrive to enhance the anthropomorphism of activity.

Denied this easy identification, absolute film-imagery can only operate in terms analogous to those of absolute music; its internal argument, its ability to refresh itself, to regenerate continually, to contemplate its own being, - this is the sphere of endeavour.

The eventual solutions found to the problems of notation will be fully documented in Chapter 7, when the techniques of Opus I are discussed. It will there become apparent that no inclusive, systematized visual or audio-visual notational system can be devised without injury to the composer's spontaneity and freedom to adjust material and ideas as he enters more deeply into his work. It was out of a dissatisfaction both with a wholly improvised and - at the other extreme - with a totally-controlled approach to film-composition that the 'middle way' advocated in Chapter 7 was found. For the present, though, the deliberations of earlier film-makers and aestheticians deserve further note.

* * *

It was the very absence of a specific vocabulary with which to discuss film that obliged the early artist film-makers to glean from musical terminology words such as rhythm, counterpoint, polyphony, orchestration, tone, overtone and cadence, in many instances overworking and overextending these words until their metaphorical vigour became exhausted. In Chapters One to Four we have seen how numerous artists and film-makers strove to promote graphic abstraction as an autonomous language, but also how often animators had recourse not only to the terminology of music but to music itself, in an effort to lend credence to to what might otherwise appear a goalless kaleidoscopic divertissement.

By 1954, Ralph Potter, Director of Transmission Research in Bell Telephone Laboratories, in an excellent article on "Abstract Films" could still observe that 'a written language for the scoring of

abstract color-form compositions is still to be evolved.'(4)* And indeed a major hindrance to any understanding of absolute film composition is the unavailability of a 'score'; the interested viewer, intent upon understanding the compositional detail of such a film, is reliant upon repeated viewings (this in itself not always possible, for such films are either shown publicly once, or are hired to the individual for short-term study only) and on what written clarification may be forthcoming from the film-maker himself. But words cannot substitute for the comparative precision of a film-score any more than they can in the case of a music-score; thus the film-works of Eggeling, Fischinger, and the Whitney brothers for example, can now only be analysed from viewings, and whilst this is by no means inherently unhealthy, it is regrettable that later film-makers cannot profit from an understanding - aesthetic rather than technical - of the criteria which conditioned the spatio-temporal organization of visual activity.

On the question of sound-visual correlation, Potter's approach is quietly realistic; tacitly repudiating the idiosyncratic concoctions of synaesthetists he stolidly avers that 'we can follow two performances only when the two become one. And this means one to the audience - not the artist. The fact that two things may seem related to the artist who combines them is not a reason for them to seem so to others.'(5) The unity, or oneness, of sound and image must be self-evident, incontrovertible. Flying in the face of all those whose effusions on the supposed identity of colour, shape, and sound have swollen the annals of colour-music, he remarks:

* This either overlooks, or chooses to ignore, the notations of Wilfred and Schillinger. Through his association with Mary Ellen Bute, Potter could hardly have remained unaware of Schillinger's theories and film-experiments.

There aren't many things in visual abstractions that have any convincing relationship to music. One possible relationship is the indirect tie between the mood incited by color and the mood incited by the accompanying music. At best it is feeble, and in-itself entirely unconvincing. The forms in visual display bear little relation to the sounds of music.(6)

This summary rejection of the accretions in audio-visual analogy, succinct and dismissive, smacks of common sense, and offers a welcome foil to the confused, perfumed superabundance of Theosophical metaphysics. In conclusion, Potter defines the one vital connecting link between moving image and sound: 'Actually, the only bond of any consequence is MOVEMENT',(7) by which should be understood the dancing rhythm of visual abstraction as it derives from the tempo and rhythmic gestures of the accompanying music. Visual and sound movement fuse best in rapid tempo (note the helter-skelter pace of cartooning) and least well in slow tempo. But fast visual rhythm is a bar to its assimilation; 'the eye cannot perceive detail when the details are in rapid motion.'(8)* Whilst Potter regards this blurring of detail as undesirably confusing, clearly it can equally well be treated as a compositional ploy within a scale of comprehensibility. At its extreme, this 'collision' of imagery can be taken beyond the point of perceptible collision; split-second discrete images (as in Breer's Blazes and 66) whilst not fusing, can subliminally inter-relate.

Only very few correlations, borne out by research into the psychology of perception, are recognised by Potter. Drawing upon evidence in E.D.Adrian's The Physical Background of Perception, Potter can assert that 'a change in the pitch of a tone is the equivalent of

* Thorold Dickinson has remarked, though, how audio-visual unison assists concentration, enabling assimilation of material faster than is normally possible.(9)

visible movement across the field of view. And changes in the loudness of sounds are equivalent to changes in visual movement toward or away from the observer.'(10) Thus a 'rise' in pitch may be equated with a vertical movement of the visual object. Such simple parallels are of course firmly grounded in our everyday experience, as noted above: as the voice rises in pitch so there is a sensation in the throat of upward movement...a 'high pitch' of muscular tension is reached; and as the listener approaches a sound-source, or it approaches him, its intensity increases. Beyond this stating of the obvious, though, Potter is unwilling to venture, and his guarded approach must be applauded, even at the cost of apparently impoverishing the scope for audio-visual unity.

Mantle Hood, drawing on the researches of Theodore F. Karwoski and Henry S. Odert (Dartmouth College, 1936), nominates these and other relationships and associations, a few generally recognised, but most ('d' to 'j' below) actually experienced only by a minority of subjects:

There may be postulated certain general relationships of photisms to special aspects of music:

- a. a rise in pitch is relative to an increase in brightness;
- b. accelerated tempo increases brightness;
- c. pattern in music is related to pattern in the photism, smooth music producing graceful lines, staccato or syncopation producing jagged lines;
- d. variation in pitch sometimes produces a change in position and direction in the visual field;
- e. in some cases the first note or the key of the selection is correlated with background colour;
- f. striking music may produce third dimension;

- g. volume increase may expand the area occupied by the photism;
- h. turns or trills may cause movement round a center mass;
- i. different instruments may be represented by lines [of] different color, rising and falling with changes in pitch;
- j. the mood of pleasantness of the music may evoke fitting colours.(11)

Hood argues that colour and music may, by association, appear unified, but denies any common physical identity. For all but those individuals who enjoy synaesthesia, the link must be through association or analogy. Whereas Potter dismisses other, artificial interconnections such as, for example, relating a pitch rise with a receding visual image, on the grounds that 'education is practically out with non-captive audiences', (12) it can be argued that just such structured correlations, albeit not consciously perceived by the spectator, can make new, fruitful interconnections which, once having been confirmed in any specific work - that is, having been given time to establish their symbiotic nature - may be dislocated by various means, and the degree of disconnectedness 'played-upon' as a melodic Gestalt might be deconstructed to generate separate rhythmic and pitch cels. (But the dangers inherent in such contrivance must always be borne in mind; note the resultant obscurity of the Whitney Exercises.)

So few are the equivalents between in sound and visual, as Potter has suggested, that it becomes incumbent on the composer/film-maker to do just this: to make connections, not in the fond belief that they express some eternal verities, that they grant access to esoteric vibrations which it is the composer's mission to divulge to the less sensitive and well-endowed, but to make connections as any composer of music must when interrelating his materials - extending, curtailing,

expanding, contracting, varying, confirming, contradicting - treating experiential time as something infinitely malleable, which by his intervention, can be shaped into a simulacrum of his sensibility.

Potter does however concede that, after the present exploratory stage in audio-visual composition, it may be possible for the film-artist to depart from unison; but it is necessary first to 'be able to translate freely from one language to the other. We must know equivalents in the two languages, even though there is no intention to employ them in unison.' (13) He seems to suggest that equivalents other than those dependent on a rhythmic identity may be discovered, whereupon an audience will enjoy 'a much more convincing experience than visual motion or audible motion can provide singly.' (14) The suggestion that 'audible motion', alias music, may at some stage be superseded by a 'more convincing' synergistic Gesamtkunstwerk is inflammatory, and patently improper! It is not a question of 'better than' but of 'different from'. That new equivalents may be discovered seems unlikely; invention is the key to the unknown world of audio-visual counterpoint, an invention unhampered by the limited and limiting 'correspondences' erected by the shamans of colour-music.

Whilst sympathising with Potter's unwillingness to compare visual forms with musical sounds, it can however be maintained that although melodic 'shape' can in no direct way be related to visual shape, nor dynamic to spatial volume, it is through the gestural (i.e. rhythm of movement) that the spatial and temporal arts are linked. That is, since any visual cannot but exist in time, and since any music must inhabit some space, the two do share a common temporal-spatial universe, albeit working within it to different ends. In gesture - the physical gesture from which vocal sound originated - the sigh, the

scream, the command, - a common expressive link is found. Whereas in the visual arts it is the spatial characteristic of the gesture which is presented, in music it is the sounding characteristic. This is not to suggest that a translation from one to the other can be made, for these gestures have in both cases become highly-stylized symbols whose very distance from their original physicality renders them the more available as 'artistic' expression. By their use, expressivity is re-presented; the painter/composer 'gestures' whilst creating his art-object, but this gesture is a recollection - personal or communal - of the archetypal instinctual gesturing of primitive man. As Susanne K. Langer confirms, '...if the content [of art] be the life of feeling, impulse, passion, then the symbols which reveal it will not be the sound or actions that normally would express this life; nor associated signs, but symbolic forms must convey it to our understanding.'(15) Langer, drawing upon Jean d'Udine's L'art et le geste (1910), contends that all the arts aspire, not towards music, but towards dance, - in other words, towards the gestural, which by various modes of transformation may become manifest visually or in sound. 'Every feeling contributes, in effect, certain special gestures which reveal to us, bit by bit, the essential characteristic of Life: movement....All living creatures are constantly consummating their own internal rhythm.'(16)

* * *

In passing, one may note David Rothenburg's more recent research (both theoretical and applied) into an intermeshed audio-visual language, where he has advanced certain equivalents in terms of dissonance-level. (He has designed and constructed an image-generating keyboard which took advantage of the latest (1974-75)

computer-graphics display facilities.) Rothenburg asserts that acoustic dissonance may properly be paralleled with the visual 'dissonance' of, for example, Moire patterns and strobe lights, both sound and visual producing sensations of greater or lesser tension.

Acoustic dissonance derives from the receipt of impulses which are in the same order of frequency as the refractory period of the auditory nerves. Similar, and more powerful, visual effects occur when there is an interference pattern with the refractory period of the optic nerves or with the alpha rhythm of the brain...Note that the interfering families of curves forming a Moire pattern need vary very little in order to produce blinding interference patterns. This resembles a musical dissonance in which the frequency of the tones forming a chord vary little, but the total effect is far more than the combination of component tones. Similar analogues to tonality, timbre, etc., exist...(17)

One doubts whether such visual dissonance will ever become as contextually conditioned as is intervallic dissonance in music; for dissonance, unlike discordance, has only relative, not absolute value, seeming now weak, now strong, dependent upon environment. Furthermore, sounding dissonance - as long as its constituent voices can be recognised (thereafter it jells into a noise-band) - is a many-layered phenomenon, implying a multiplicity of entry and exit points suggested by centuries of use in widely differing contexts. Can one expect visual dissonance to convey such a wealth of implication? Attractive as it may appear to equate sound and visual in this manner, the fact remains that acoustic dis-equilibrium (for this is what is meant by dissonance) can be represented visually by many means other than interference patterns. One has only to consider Mondrian's work, where dissonance and consonance, thesis and antithesis, 'sound together', reconciled in delicate balance. Set temporally, visual dis-equilibrium can as well be denoted by spatial

imbalance as by the grosser means of retinal irritation advocated by Rothenburg.

One remains equally unconvinced by John Whitney's extended essay on computer-generated visuals in his recent publication Digital Harmony : On the Complementarity of Music and Visual Art. Here he optimistically hypothesizes that

the attractive and repulsive forces of harmony's consonant/dissonant patterns function outside the dominion of music. Attractions and repulsions abound in visual structures as they become patterned motion. This singular fact becomes the basis for visual harmony with a potential as broad as the historic principles of musical harmony.(18)

In thus positing close analogies between visual and aural harmony Whitney joins company with the numerous colour-music inventors of Scriabin's day; even whilst corroborating his predilections with scientific evidence, his efforts at determining correspondences remain idiosyncratic. Indeed, at one point he makes no claim that the analogies plotted are in any sense absolute: 'whether my efforts constitute a final valid grammar is irrelevant',(19) and he freely admits to being 'neither authoritative nor professional in matters of music.'(20)

Whitney holds that computer graphics provide the long-awaited key to a new audio-visual world unified by a common harmony. Like several earlier film artists he is seeking a complementary grammar, a 'throughbass' of visuals in motion. By 'harmony' he 'refers to the physical fact of orderly ratio in both its horizontal and vertical [linear and simultaneous] meaning.'(21) In translating such harmonic ratio, interference and resonance to the visual plane (using the media of film, video-tape and - ideally - videodisc) he relates sound-wave

'modulation' of the air to modulated light, claiming that 'we can create integral aural/visual compositions in a domain of harmonic continuity.'(22)

Although currently fully occupied with visual organization and generation alone, like Fischinger before him he foresees the day when the artist will compose complementary sound and visual in one; a more sophisticated interactive digital system will facilitate the creative process by permitting instantaneous real-time playback. For the time being though, he is happy to 'settle for whatever music I might find for each new graphic composition'(23) - a disappointing retreat from the radical integrated serialisation of sound and visual in the earlier Film Exercises. In pursuing the musical analogy, Whitney activates graphic elements at speeds proportional to the intervallic ratios of the harmonic series such that, for example,

if one element were set to move at a given rate, the next element might be moved two times that rate. Then the third would move at three times that rate and so on....This is harmonic resonance, and it echoes musical harmony, stated in explicit terms.(24)

Rather than simulate naturalistic perspective, Whitney visualizes a rhythm of pattern, whereby a repertoire of elements could be orchestrated according to a generative harmonic plan. At a later stage of his research, three crucial terms were defined:

differential, resonance and harmony. First, motion becomes pattern if objects move differentially. Second, a resolution to order in patterns of motion occurs at points of resonance. And third, this resolution at resonant events, especially at whole number ratios, characterizes the differential resonant phenomena of visual harmony.(25)

In working towards and beyond such consonant points, Whitney argues an

analogy with the processes of tension accumulation and discharge in tonal music, firmly believing that on the visual plane such structured motion is as potent a begetter of emotion as it is in musical composition.

He ingenuously aspires - as did Eggeling and Richter before him in their quest for 'universality' - to 'a visual world of harmony to which there must be innate human responses.' (26) In this he surely betrays his mishearing of his avowed model, tonal music (twentieth-century non-tonality he mistrusts as an unfortunate, passing aberration) as a steady-state communicative system, an incorruptible and hence non-progressive language which, although undeniably the product of a specific set of social conventions, can now somehow be construed as defying mutability, as valid for all time. His impatience with the bland stasis of computer-graphic 'video-Valium' (which in fairness often operates within the terms of reference of an Oriental, not Occidental philosophy of time) further encourages his pursuit of a tensional expressivity founded upon the inherent force-fields of the harmonic series. Nor does he find the immobile electronic music of the sixties and seventies to his taste, for it also similarly relinquished control of harmonic structure.

Whitney's acknowledgement of music as mentor to his explorations in visual graphics does of course recommend his research for serious consideration; that he is no naive is testified by the densely-argued Film Exercises of the nineteen-forties, although his apparent enduring ignorance of Eggeling's and Richter's fruitless search for a mobile graphic universality does rather diminish the impact of his belated revelations.

In the course of Digital Harmony Whitney details several recently completed 'harmonic' films, devoting an entire chapter to the analysis of his Arabesque of 1975, a seven-minute film accompanied by improvised Santour music performed by the Iranian Manoocheher Sadeghi. Earlier pieces, for example the three Matrix films, were similarly compromised by 'borrowed' music-tracks, namely sonatas by Antonio Soler (Matrix I, 1971), and music from Terry Riley's Rainbow in Curved Air (Matrix II and III). It is revealing that Matrix I and II actually display the same computer graphics, but employ such radically differing sound-tracks. This probably confirms Whitney's insensitivity to audio-visual interrelations, although since the present author has not had the opportunity to view any of his later films it is not altogether impossible that each track does contribute usefully to the visual argument.

Like Rothenburg, Whitney conceives moving visuals in terms of a scale of beat-frequency nodes, and similarly points acoustic parallels with the perceptual interferences aroused by 'dissonant' Moire patterns. His visual dynamic is propelled along its course by a concatenation of gradated collisions between consonance and dissonance, order and disorder, tension and resolution. Unfortunately, there is not space here to undertake further discussion of Whitney's present theorising and related film-oeuvre, nor would it be proper so to do without having witnessed the films. (The stills reproduced [Slides 67, 68] may encourage the reader to investigate Whitney's work further.) Entertaining as Whitney's thesis is, and acknowledging the Chladni-esque beauty of his graphics [Slide 69], the aesthetic limitation of overlooking all but one interpretation of the word 'dissonance' is evident: fluid transformations of stellated and

other geometric graphics can hardly challenge the multi-planar 'corporeality' of music - corporeal in its literal acoustic three-dimensionality, and also in its textural layering, which by establishing hierarchical perspectives incarnates the phenomenon of audition.

As observed above, when rebutting Rothenburg's equations, there is more to 'dissonance' than beat-patterns, aural or visual. Understood as a metaphor for conflict, disorder, disequilibrium, or interference, it may encompass every kind of asymmetry, both temporal and spatial. Whitney's visual translation of musical dissonance is by no means invalid, but it is limiting. That he has still to confront the dilemmas posed by audio-visual interrelation reflects his own insecurity as musician; but until he does grasp the nettle, his researches do not advance our understanding even as far as those of Eggeling and Richter, whose comprehension of visual music appears more generous and mature than Whitney's. For these men both recognised that, in the medium of mobile graphics, dissonance was essentially a function of temporal organization, not of spatial configuration. Hence Symphonie Diagonale and Rhythm 21 create tension-fluctuation by montaging and faceting their material rather than by subjecting it to fluid transformation. By so graphically energising time, periodic and aperiodic rhythmic trajectories were launched, and it is through their cumulative interferences, their curtailment, congestion, prolongation, or rupture, that visual 'dissonance' is generated.

* * *

We must know how to grasp the movement of a given piece of music, locating its path (its line or form) as our foundation for the plastic composition that is to correspond to the music.

Eisenstein(27)

Tempo interrelations

The most important means of macro-structural control resides in the 'orchestration' of tempi. Whether one chooses to term this a control of tempi or of rhythms is immaterial, since at root they are one and the same; for without an implied tempo rhythm cannot be articulated, and without rhythm, tempo is non-existent. Tempo is perhaps the better term since it suggests a steady periodic pulsation, a background throb against which foreground rhythms operate. The plural 'orchestration of tempi' is used advisedly, for whilst the singular 'orchestration of rhythm' may have sufficed for Richter's essentially silent studies, it cannot satisfactorily do so once music is introduced on a par with the visuals. The persistent unity of tempo between sound and visual in the films of Fischinger and McLaren is their gravest limitation; it seems not to have occurred to these film-makers to set off visual against aural tempi. But only by so doing can the 'equality' of the media be maintained, and their individual temporal trajectories preserved. It is vital that each medium be permitted to develop according to its own 'inner necessity', not for ever constrained by the onward flow of the other. It may be imagined how, when the tempi are allowed to act in a controlled inter-dependence, their coming together at moments of maximum synchronism (as they would tend to do) may be construed as the height of tension, both being obliged to regard the developmental needs of

the other, and to accommodate accordingly. This is a far cry from the music-dominated visuals of Fischinger or the image-dominated music effects of a Disney cartoon-short, where such is the imbalance of media that creative inter-media tensions can only fortuitously arise.

The location of tempo is problematic; it resides not in frequency of attacks, but issues - in music - from a complex of harmonic, metric, rhythmic, and no doubt dynamic, registral and timbral considerations. The establishing of a metronome mark is no guarantee that any notated tempo will actually be experienced as such. The tempo of activity - whether it be visual or aural - need not necessarily be equated with the tempo at which the activity is notated. For example, a music notated Presto may actually sound as though the activity were no more dynamic than the blandly changing patterns of a kaleidoscope. Tempo is only meaningfully assessed as it sounds to the ear, or appears to the eye - not as it stands in notation. The intangibility of tempo, however, does not annul the fact that it is the very vehicle of music, within whose flux all else must operate. If quantitatively closed to evaluation, it is qualitatively pellucid for all to hear. Visual tempo in film is yet more fugitive, image erasing image (frame by frame) to a degree unknown to sound succession in music. Here again, though, the pulse of a visual sequence can be felt, despite the difficulty - especially in mapping out sequences of absolute animation - of anticipating the screened result. As in music, visual tempo is the product of a complex of movements, being further conditioned by whatever qualities of virtual rhythm are to be found in the shapes employed. The nature of montage, the mode of movement of shapes, colour-balance, texture - all these will combine in conveying the sense of tempo.

'Interferences' of visual and aural tempi should of course occur, and can probably only be provisionally evaluated empirically at the line-test stage, running the visuals in synchronization with the already completed sound-track. With considerable experience in the new medium it is possible that calculation could play a greater role in this, thus avoiding the time-consuming and depressing need to re-cast whole visual sequences which are found to relate unsatisfactorily with the music. Tempo subsumes all other activity in the composition of absolute animated sound-film. How else can interrelationships be controlled? If one takes exception to Mickey-Mousing of the Fischinger manner, abjures the narcissistic 'structure-is-all' film, and censures as too idiosyncratic any synaesthetic marriage of sound and visual (of the order: blue is C major), then one is indeed hard pressed to find any means other than that of tempo by which to manage the play of activity.

The conventional means of tempo-control in nearly all films (notoriously in the Mickey-Mousing of cartoons) is for sound and visual to follow the same temporal trajectory. That is, if the cat chases the mouse, the music runs fast and furious; if the mouse tiptoes stealthily away, the music matches each step with a stocking-footed aural ghosting. Here there is a simple unity of visual and aural tempo.

Now consider a situation where, in absolute animation, the visual activity pelts along, whilst in complete contrast, the musical activity defines a slow tempo. Conditional upon the exact nature of the activity, the tempi will interact one upon the other in a variety of ways. The visual will not necessarily appear to 'speed' the sounds (as if in forced resonance), nor will the sounds necessarily 'slow'

the visual. Indeed, the comparatively static nature of the sound might even serve to heighten the visual frenzy. Or the sound tempo might, if synchronization of beat occurred not infrequently with the visuals, act as marker-points to the visual activity, defining and enclosing passages of the visual flux. The fact that concurrence of two dissimilar tempi can result in very different psychological effects (being entirely dependent on the precise nature of the material carried by these tempi) does not invalidate the premise that tempo-control is fundamental to solving the problem of simultaneously thinking in terms of the two media, sound and visual. Indeed it is evidence of the wealth of variety obtainable even within the framework of just two contrasted, and relatively 'dissonant' tempi. Not that there need always be only two tempi in operation at a time. Certainly one can conceive of a situation where several tempi might inhabit the same time-span, the level of 'confusion' of superimposed tempi being as controllable by pitch, rhythmic, and timbral differentiation as the tempi themselves. These tempi should not be thought of as audible click-tracks, as necessarily 'pitched'. Indeed it is likely that in many instances the tempi would not 'surface' at all, or need be felt over any extended period, but that - as in the medium of music alone - a tempo may only be ambiguously implied by a foregrounded rhythmic gesture, which might only retroactively acquire a metrical or tempo-ral context.

The virtue of so concentrating on tempo admits the inescapable fact that our perception of visual and aural rhythms is very dissimilar. Just as there is no universal equivalence of hue and pitch, so there is no equivalence of sounding rhythm and seen rhythm. A visual image, even a still image flashed on the screen for just

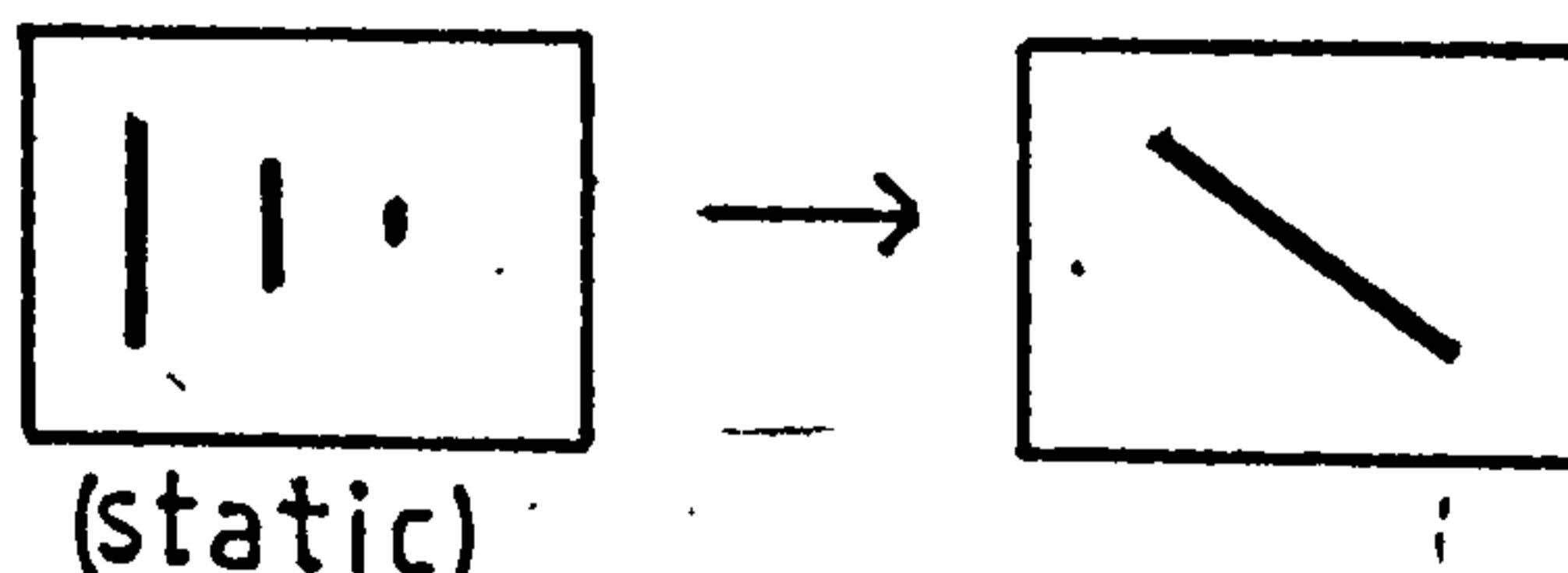
three frames, can carry within it its own viewing-path; the eye is guided along curves, across the frame, up and down. In the sound world there is no equivalent for this. Instead, the process is reversed; for do we not hear (after the event) as a 'moment', the whole melody which in first audition we were obliged to hear as a succession of pitches? In imagery, the literal visual moment is extended temporally by the eye's viewing path; in music, the temporal expanse of a statement is afterwards perceived as a unit, as a moment. Two such incompatible perceptual modes cannot attempt any simplistic one-to-one relationship without the one becoming mere embellishment, a condiment to the other.

Working empirically, one finds that tempi can be articulated by a wide variety of means, some obvious, some subtle. A few are described below:

1. The concurrent presentation of dissimilar tempi articulated by dissimilar activity. In short, two events, apparently unrelated.
2. The concurrent presentation of dissimilar tempi articulated by similar activity. Here, for example, one might find rhythmic augmentations and diminutions, although as already argued, rhythmic imitation of this kind could be no one-to-one process. For example, the pitch-material



might be approximated in visual rhythmic imitation not by three visual bleeps and a long-held image, but by only two shots



This example merely serves to illustrate that consecutive sounds (later recalled as a 'moment') should not necessarily be complemented by rhythmically echoic visuals. The above visual will probably be read left-to-right, and will thus

'feel' the same as the sounds, more so than would three bleeps; for visuals share no common acoustic as do sounds, and since it is their shared acoustic that holds sounds together, visual activity similarly treated would fall apart.

3. Cross-media tempi articulation; deliberately sounding or imaging one by the other. (This may superficially seem to offend against the principle of perceptual distinction argued above; however, such trespass may be sanctioned, for here it is the pulse, not any specific rhythmic gesture, than is being exchanged.) For example, establishing a sounded rhythmic pulse and then switching it over to the visual plane and back to aural, thus:

VISUAL: | | | | | | | |

AURAL: | | | | | | | | | | | |

Against this, other tempi (articulated by rhythms) polyphony could appear, either within the one medium, or again crossing from one to the other. At this level of complexity, the structuring of this section would no longer be perceptible on viewing/audition; not that this matters in the least, there being nothing more limiting than an art-form reliant upon perception of its construction in order for it to communicate.

4. Pulse given by one medium, rhythmic interjections by the other. This would work equally well whichever role were played by sound.
5. A capacity of film - very limited in music - is the fast cross-cutting of two or more scenes, creating the illusion of simultaneous occurrence. The interchange can be far faster (even frame by frame) than in music, to the point where two or more images apparently coalesce. An interchange of such rapidity in music would create difference tones, whilst on the visual plane only an image-echo is generated, created no new material. In certain circumstances, a comparable 'dissonance' might be usefully effected through the exploitation of such tones, in conjunction with 'op-art' imagery. Here the distinction between pitch and pulse is deliberately blurred.
6. The gaining and losing of audio-visual synchronism could be put to use for its temporary disorientating properties.

It remains to note four additional audio-visual correlations independent of tempo, all of which may be assumed to have only local validity:

1. Only a temporary identity may be established between pitch-timbre and a hue. There is no correlation between a particular sound frequency and that of colour.
2. Timbre and saturation. Here there is a possible link. As the accretion of overtones modifies, so the saturation changes; but this remains as artificial as any other arbitrarily chosen matching.
3. Acoustic and dimensionality. One might match two-dimensional imagery with synthesized sound and three-dimensional imagery with concrete sound. But it is questionable how meaningful this would appear.
4. To identify high/low pitch with high/low position on screen would be ludicrously limiting. However, the screen-format does allow for clear visual retrogrades and inversions, thus:

R	Я
В	У

Each of these areas could as well be 'characterized' by aural timbral differences (for example), as by matched aural retrogrades or retrograde-inversions, etc.

5. The still image. Image freeze in the full course of an action or at its natural cadence could have respectively an arresting or a restful effect. Still moments permit the viewer to respond more actively to the imagery which no longer 'holds' him in its flux, but allows him to stand back and assess the past events, the import and balance of the frozen present, and to speculate on which of the many possible future extensions of activity will be adopted. During the image freeze of course, the sound-activity can take on any function, recapitulatory, anticipatory, supportive, disruptive. These points of freeze might last from a half-second up to twenty seconds or longer. (A loose aural equivalent to visual freeze might be the tape-loop.)

To conclude; a prescription for absolute sound-film composition might read: plot the intermedia tempi-concurrences and juxtapositions, articulate them rhythmically, clothe these articulations in shape, colour, pitch, timbre, and dynamic, and trust to intuition to guide the point-to-point activity.

Graph of Concurrence

It is clear that rhythmic unison binds the seen and the heard with such conviction that an audience cannot but identify the sound as somehow emanating from the visual. To be more precise on the rhythmic liaison: it is the synchronous attack which binds. What follows is comparatively immaterial. (As in the case of live-action lip-synchronization, should synchronization not be found, a jarring irritation occurs; the viewer is ever trying to draw the two together again. In terms of absolute film this need not always result in an undesirable situation, for a controlled 'interference', an intentional 'out-of-tuneness' between sound and visual may enhance the eventual slipping into synchronism.) If this synchronous attack is the most unifying device, without which the artificiality of the medium becomes obtrusive, how might it be structured into a film-composition? For non-stop attack-unison throughout a film would become wearisomely simplistic, on the level of a light-show where sound-impulses translate directly into light-patterns. Such invertebrate dependence of visual on sound is quite antipathetic to an art-form, the *raison d'être* of which is to interweave the auditory and the visual whilst each observes its inherent developmental needs. However, the complete absence of synchronous attack gives an equally flaccid impression; visual activity, however frenetic, pales before the acoustic vigour of sounding rhythms; they lack the 'edge' which sound enjoys, for they have no transient bite, nor can they efface or mask ongoing visuals with the overriding force of sound overlaying sound. In short, visual rhythms are comparatively insubstantial; to speak with authority, to command attention, they require aural amplification. Thus enhanced,

they spring forward from the screen with a quite remarkable immediacy, vitalised, dynamic and organic. Absolute graphics - previously drifting mutely and unmotivated - become imbued with intent; they become purposive; it seems that it is not only we, the spectators, who hear them, but they who, sounding, can also necessarily hear. Thus a bond is forged: we see, they 'see', as they interact within a landscape of absolute visuals; we hear, they 'hear', as they emit or respond to sound. So without resorting to gross anthropomorphism, without endowing 'characters' with behavioural attributes, it is possible to promote an empathetic audience response through the simple contrivance of synchronism.

Not all graphics should be so 'sounded'. Stationary elements - inanimate scenery - may be left silent, or may be complemented by a concurrent acoustic ambience - a continuum or an ostinato perhaps. Nor should all mobile shapes be sounded, for this would soon cloy, becoming wearisome. Rather should some form of 'graph of concurrence' be devised which might plot the density of synchronous activity. This could be taken as a preliminary to further elaboration and inflection, preceding consideration of the relative rhythmic emphasis to be bestowed upon such synchronous points. It might be established irrespective of, and preceding, more detailed considerations of the exact timing of these points, or even considerations of their expressive function. The graph would have but little limiting effect on the nature of the music and visuals regarded independently, but would act throughout as a controlling agent upon the potential synchronous interrelationships. Where a high frequency of synchronization was felt desirable, considerable discreteness in note-attack would be required of the music. Of course, the visuals

too would need to be strongly marked, either by 'montage' techniques, or by such means as 'pop-ons' or the clearly articulated movement of figures. At other times, though, the attack-level of the one medium could be the polar opposite of the other; extremely discrete articulations of the one could be complemented by a seamless continuum of the other. Thus, an audio-visual film might be provisionally structured by initially determining the tempi and required density of synchronism within various sections, prior even to the composition of either music or imagery. This radical departure from conventional film-scripting constitutes a most important point, crucial to a successful intermeshing of the media, for only by virtue of such a preliminary balance being struck can there be any hope of a satisfactory resulting 'give and take' between them; by which is meant a shifting of emphasis, so that the audience will now be more aware of the visual, now of the sound activity, - even though such transference of attention will generally only be marginal, operating within an overall receptivity.

This is not equivalent to applying one compositional principle to both image and sound, as has sometimes been done. When abstracting from live-action, such a systematized interpenetration of stimuli may prove valid - for the 'identity' of image and sound need not be questioned. Mauricio Kagel's Antithese, Solo and Match are thus composed. But in absolute film, for example Lignes et Points by Bayle/Kamler, this identity must either be manufactured, or else presumed self-explanatory. Can one really accept that in Lignes et Points both visual and sounding elements are in the form of dots and lines? (28) Are sounding 'dots and lines' to be equated with staccato and tenuto? If so, to what extent - if any - does the composer inform

his compositional programme of the perceptual predominance of the visual over the aural? A shared programme can only ensure compatibility of sound and visual if these perceptual differences are properly understood and taken into account. As Frits Weiland has observed: 'an apparent solution is to restrain the visual impressions in order to allow the ear to register more. However, the reciprocal effect between eye and ear does not permit such a simple shift in the presentation of visual and aural signs.'(29)* Nor is it acceptable to organise visual and auditory rhythm according to the same compositional programme. It might initially appear that such a plan were innocuous, but it fails to account for the precise nature of sound and visual, both of which will require a 'reading-speed' peculiar to their own interior structure and moreover to their contextual significance. The theoretician Noel Burch has argued that, whereas 'cinema dialectics cannot be expressed or written down in purely arithmetical terms...musical structures ultimately can be.'(30) He rightly suggests (and I paraphrase) that one's estimate of shot-duration is virtually a function of its legibility, such that any uncluttered shot will seem longer than a cluttered shot of the same duration. Hence the organization of perceptible durations is a complex and empirical process. 'Any given cinematic rhythmical pattern will never be experienced in the same way as a musical pattern, unless it consists of nothing more than a simple alternation of black and white frames.' (One recalls Kubelka's Arnulf Rainer!) 'If the images involved are at all complex, this rhythmical unit remains

* Weiland's own two films, Filmproject 1 (1969) and Filmproject 2 (1975) seek solutions to some of the problems of audio-visual interrelationship. His use of predominantly concrete imagery and sound create associative connections which are unavailable within absolute film.

little more than a pure abstraction, and is not at all perceptible as a coherent pattern.'(31) Whilst fully concurring with Burch in his circumspect attitude towards visual rhythm, one may likewise caution against a too facile understanding of musical rhythm, the perception of which is also conditioned by its 'legibility'; that is to say, as rhythms are 'voiced' by pitch, and as those pitches succeed one another within (and sometimes without) a metrical scheme, so is a hierarchical system of 'weightings' established, whereby certain rhythmic elements are foregrounded at the expense of others. Agogic accentuation is only one means of lending 'stress' to a note or chord; its metrical placing within the bar, its relative dissimilarity within its surroundings, and its structural role, will all accord it a prominence - and hence a significance - not apparent on the page. Psychological time is in music as unquantifiable as it is in film. Music's notation may pretend to an arithmetical exactitude, but this is mere appearance. In addition, as Heinrich Schenker knew well, it is the fundamental melodic-rhythmic shape (Urlinie) which, with harmonic rhythm (Ursatz), underpins an entire movement, and against which background all surface detail is experienced and subconsciously evaluated. Furthermore, each work, spatial or temporal in design, requires of us both a concurrent (whilst experiencing) and a retrospective comprehension according to its own 'intrinsic time'. This latter is a function of the density of argument, and is independent of the clock-time taken up in perceiving the work. It may explain, for example, Webern's gross over-estimate of the duration of some of his works which, however slight they may appear on paper, actually teem with compressed musical arguments that demand multiple 'scans' before they yield up their beauty.(32) Musical rhythm is thus vastly more complex than Burch allows, and further confirms the

impracticality and futility of attempting any total rhythmic organization (serial or otherwise) of visuals and sounds.

Interestingly, Burch develops his discussion of visual rhythm to propose that a dialectic may be effected between shot-duration and legibility. Snatching a shot away from the viewer before its necessary reading-time is fulfilled creates tension through deprivation; whilst prolonged retention of a relatively empty shot creates tension through boredom, as the eye repeatedly tracks the same limited landscape. 'These constitute the poles (or rather the vectors) of a true dialectic of durations, capable of generating visual rhythms ultimately as complex as those in contemporary music.' (33) The informed listener will not need reminding that such a dialectic has itself been elevated to a self-sufficient compositional practice since 1950, with the polar extremes being explored by integral serialism and process-music. The inordinate discontinuity of the one, and the extravagant continuity of the other, explore the very perimeter of a territory inhabited by more conventional musical languages which seek a richer and subtler dialectic between disjunct and conjunct statements.

All that has been established so far is the frequency of interconnection between sound and visual. It is important to determine this at an early stage, for it conditions to an extent the very nature of the musical and visual material, in so far as - in sequences of exact synchronism - both media must accept considerable constraint on their own natural temporal trajectory, each accommodating to the needs of the other. Conversely, in sections of loose synchronism, the media can exploit the very different tensions arising through their apparent independence of each other, and the

composition of each can proceed less circumspectly, trusting to the 'inner necessity' of each medium's onward thrust to 'charge' the resulting audio-visual confluence.

What is not established by this approach is the degree of rhythmic emphasis given to the selected points of synchronism. It is only the frequency of such points that has been determined. The nature and degree of emphasis is a dimension which can then be overlaid on the chosen points, and in practice it may be found that at times the media will share the emphasis, whilst at others one medium will voice a synch-point strongly whilst the other remains weakly articulated.

* * *

The decision to elevate tempo and synchronism to the role of major structural determinant arose through a refusal to acknowledge that small-scale rhythmic inter-relations could be relied upon to communicate. Whereas in music a high degree of polyrhythmic complexity can be comprehended by a trained ear, the intermingling of two media would require an ability on the part of both film-maker and audience somehow to translate from one to another in coming to terms with an audio-visual nexus; and from the evidence of the Whitney Film Exercises it seems unlikely that this is possible, unless one were so to impoverish one's material that composition became no more than an arid permutational game, with sounds and shapes serving to 'voice' abstract rhythmic articulations. Arbitrary decisions equating such-and-such a shape with such-and-such a sound are too facile, resulting in a cold intellectualism devoid of organic energy. A bolder approach must be adopted, whereby local interactions are as

much the product of intuition as of calculation. Perhaps in time a wider language of audio-visual correspondences might evolve from much experiment in perceptual psychology, but at present the obvious 'felt' connections remain those few noted above.

Beyond the Frame

One of the great aesthetic advances encouraged by the introduction of sound-film at the close of the twenties developed from the ability of sound to suggest to the mind's eye that space surrounding the framed image: 'off-screen space'. Its potential could work against the autonomy of the image in that the hard edge of the projected picture no longer enjoyed the respect formally accorded it as strictly defining and delimiting the visual play of shape (figurative and non-figurative alike) bound within its borders. The aesthetic (as distinct from the economics!) of screen proportion could not long remain a burning issue once it was appreciated how relatively 'accidental' and 'incidental' the framing of a scene must appear when off-screen sound could blur the edges to the extent that - in the spectator's imagination - the sound-activity off-screen might be more 'present' than the image actually offered to his eye.

In virtually all areas of film-making today the ability of sound so to 'push-out' the frame line, or to counterpoint an off-screen location with that screened, is exploited almost unthinkingly; it has become standard practice, and arouses no feelings of disquiet amongst the sophisticated image-literate viewing audience of the 1980's. Sound can vastly enrich the repertoire of on-screen camera angles and editing techniques with an invaluable array of implied visual

manoeuvres off-screen, suggesting the ongoing existence of objects (anticipating their appearance, and persisting after their removal) and even their metamorphosis once they have disappeared from view. It thus aligns cinema more closely with our own forms of mental awareness, as our attention is drawn to activity both seen and heard, both near and far. Sound at all times conveys to us a sense of the spatial context encompassing the limiting frame area of visual activity, for one infers from its acoustic - its reverberation characteristics - the nature of the space occupied. Electronic music offers the facility of infinitely variable acoustic, from the most 'two-dimensional' dryness, to a strongly three-dimensional prolonged reverberation. By varying this reverberation-time, either imperceptibly or to shock effect, the spatial context of the same visuals can be radically altered, and the audience drawn into the action, or encouraged to contemplate it dispassionately. To this latter end the incorporation of 'stills' and action-freeze can contribute; the internal tensions of a figure can be appraised, a potential metamorphosis anticipated by the spectator, and this conjecture confirmed or contradicted by the film-maker. The mechanics of delineating off-screen activity by sound presume, however, a degree of familiarity and identification with the subject-matter which, although universal in the case of narrative live-action materials, is rarely if ever available in the case of absolute graphics.

If one ponders the achievements in absolute animation, it soon becomes apparent that very few films - either silent or sound - have grappled with this problem. A remarkable self-imposed limitation by makers of absolute film has been their ignoring of off-screen space, as evidenced by the ubiquitous use of the 'static' camera-view.

Rarely does the camera become the subjective eye, operating within the filmic environment instead of viewing it dispassionately at a distance. (Movement of the camera, apart from tracking in and out, is actually illusory in animation; it is the art-work which is either physically moved by increments, or which metamorphoses graphically.) Even the strongly rhythmic articulations of classic montage techniques are under-used: the dramatic intensity of cutting from long shot to tight close-up - similarly implying a mobile camera - is unexploited, even though in cartoon animation the gamut of live-action editing formulae is run. An acknowledgement of off-screen space realised by the use of a simulated mobile camera is one immediate means of enriching absolute film. In the silent films of Eggeling and Richter, the camera remains as stationary as Lumière's; in Symphonie Diagonale the action obliges by confining its evolution entirely within the frame-boundary; in the Rhythmus films, expanding shapes do encroach upon off-screen space, but have no independent reality there; one can assume their existence 'out-of-sight' but cannot know for certain that they live, or whether they continue to metamorphose, or remain in 'suspended animation' until called into play again within the screen.

The point is this: unless the viewer can 'characterise' the thing seen, can attribute to it certain constant features, or - in the case of living things - behavioural responses; unless he can comprehend the thing's nature, purpose, or general mode of operation, it will remain foreign, unpredictable, hence unsympathetic. In the field of live-action, or in the derived, parodistic world of the cartoon, visual activity remains largely true to our experience in so far as it operates according to, or with reference to, known laws of cause and effect, extreme and whimsically improbable as it may appear. In

narrative film-making of all kinds, the veracity of psychological response invariably pre-occupies the film-maker and his critics, to the extent of conditioning all other profilmic considerations of tempo, chiaroscuro, temporal manipulation in editing, etc. The treatment of a story-line using film...this is what commercial cinema is all about. People and places are re-presented; however stylized a treatment of a story, certain constants remain, in the absence of which communication can hardly begin. On screen, people behave - 'naturally' enough - rather as people do behave: they are motivated, they interact. Objects behave like objects...they are inanimate, and by association are more or less under the control of people. Such a bald, inconclusive, and colourless statement of the obvious is only proffered to demonstrate the enormous gulf existing between commercial cinema and absolute animation, for the latter boasts no people, nor can one distinguish between animate and inanimate with any certainty. And whereas superficially-similar absolute imagery on canvas (still and framed) is set within a vigorous painterly tradition which has always asserted its commentative purpose...its capacity to draw out of the flux of life a synthesis of elements which there find sanctuary in a temporary reprieve from change, the absolute film is necessarily about change, without which it is nothing, and being about change, it is about life-forms; therefore it concerns us to know the how and the why of their evolution, although we begin wholly ignorant of their raison d'etre.

- Which brings the subject back to off-screen space. Narrative cinema is able so fruitfully to exploit off-screen space precisely because this space is inhabited by the familiar; to the extent that on-screen activity is familiar, to that extent will off-screen

activity be predictable, and this space will become available. Further, if an identity between on-screen visuals and associated sound can be established, clearly the retention of such sound in the absence of 'its' visuals, will encourage an imaginative restoration of the visual complement by the spectator. As an obvious example take the conventional reverse-angle shooting of a conversation between two speakers; it is unnecessary to see-hear each speaker in turn. The common practice is to incorporate 'reaction' shots where the addressee is shown listening to an (unseen) speaker. In absolute animated film, however, no such familiarity can be assumed; indeed the medium precludes it, eschewing as it does the easy bond of anthropomorphism. If familiarity is precluded, how then may off-screen space be used, if at all? Can it expand the screen-format, can off-screen sound here comment meaningfully on the visible? Within an electronic sound-track is it possible to find any equivalents for the several mixed tracks of a narrative film - synch speech, synch effects, unsynched location sound, voice-over, and music-track?

It is perhaps not so remarkable that, in the sound era, absolute animated films have overlooked, or perhaps shied away from, the potential of off-screen audio-visual activity. For it poses thorny problems. Off-screen space has commonly been used as a 'dump' for unwanted imagery; shapes fulfil their on-screen destiny, and if they do not escape by recession, or 'pop-off' unceremoniously, then they make a transverse exit, discreet or precipitate, into a limbo out of sight, out of mind. If they should be identified with sound, this may serve briefly to sustain their imagined presence, but the identity is weak, and will soon sunder. Identities between the seen and the heard must, in absolute animation, be constructed; they are not 'given' as

is the case in narrative film. Such artificial constructs can readily be accepted, but it is less straightforward to attempt meaningful inflections of an identity once established, nor will image and sound necessarily evoke their complement when perceived in isolation. Any liaison is imposed, and prone to rupture. Unless continually forced into a synthetic oneness, the elements re-assert their own identity, their autonomy, resisting symbiosis.

On-screen inter-relationships of shape and, by implication, sound (which will also be read as on-screen) are, then, easily generated and maintained; the point by point evolution of either or both elements can be assimilated without effort. Concurrent activity will commonly be understood as occupying the same time and space, since the alternative of a robust off-screen reality cannot yet be substantiated. Any synchronous activity will confirm the identity of elements; the shape seen is understood to be 'making' the sound heard.

It does appear that absolute animation suffers from this severe limitation, compared with live-action film: what is out of sight is, by and large, lost to the visual argument. Sound will usually be heard as emanating from within the picture-plane, and only with difficulty can be made to stand outside, in a commentative role. Perhaps the limitless malleability of sound and shape in this medium necessarily result in this impoverishment of the off-screen world. For when infinite metamorphosis of both sounding and visual form is possible, individual identity must yield to a celebration of the process of change itself. Arguably the gain is as great, or greater than, the loss.

* * *

In this Chapter a number of recommendations have been set down pertinent to a compositional method in absolute sound-film. These have posited that an overall control of the medium cannot be attained without due regard being paid to the interrelation of audio-visual tempi, and to the graphing of rhythmic synchronizations. The problem of negotiating off-screen space and sound has also been explored, with the conclusion that this remains a refractory area, one which requires sensitive handling if it is to be accommodated within a developed aesthetic of absolute film.

The fruits of my theoretical deliberations (from here on I shall withdraw from the impersonal 'third-person' and speak directly) are largely contained here; however, the fact that this Chapter precedes discussion of all related practical experiment should not imply that theory similarly preceded practice. In fact, quite the reverse was the case. Not until filming of Opus I was complete, and the opportunity taken to reassess what had been achieved, was it possible to abstract (in the best tradition of Eisensteinian post-facto analysis!) general compositional principles. Consequently it will be found that Opus I in no way constitutes a realization of a mature theoretical formulation, but - in arbitrating between the rival claims of the seen and the heard - rather sought by an intuitive process of trial and error to identify certain fundamental methods whereby future work in the medium might be the better integrated.

The next Chapter documents my film-experimentation before Opus I, seeking thereby to set the culminating work in context, and to point out where possible the degree to which my research into the history and aesthetics of absolute animated film and synthetic sound shaped the course of my own preliminary film-making.

CHAPTER SIX

EXPERIMENT BEFORE THE FILM OPUS I

First thoughts

Before the preparation for, and realization of, the film-composition Opus I, several film studies in visual movement were begun, some completed and publicly screened, (six films were completed, two - both screened publicly -with accompanying but non-synchronised sound, and one with a synchronised track) others remaining experimental fragments merely, or indeed never getting beyond the conceptual stage, this sufficing in enabling one - through having worked out the concept itself - to progress. They give some indication of the maturation of ideas, and plot in chronological order the direction of research, some false starts and abortive attempts included. By incorporating mention of this material it is hoped to present the research conclusions within a context of personal experiment and to explain how and why these conclusions were reached.

The catalyst for experimentation in absolute animation and tape music was an early hearing of Stockhausen's electronic masterpiece Gesang der Jünglinge (1955-6). The work was played back in a darkened auditorium, the avowed intention being to assist concentration - yet in fact the eye was for ever being caught by stray light, and the aural attention distracted by the shufflings and other slight movements made by members of the audience. One became painfully aware of that problem which has bedevilled composers of tape music from the start - the absence of any visual complement to the sound.

The crowded isolation of a darkened cinema, that sense of an invisible but very present community, can assist the intensity of audience-response to a film; but in the darkened concert-hall, where

the listener has long been accustomed to expect a living performance, the anonymity of a sound-source reproducing non-instrumental music is found disquieting. (In truth, the ghostly images of strictly silent films have the same unfortunate effect.) At best, a receptive, unsophisticated audience may find that tape-music conjures surreal or nightmare visions, and is thus tantamount to film-music minus film.

Whilst some composers have subsequently found their solution through composing tape-sound within a multi-media display including live performance, slides, and film, the possibility of 'counterpointing' sound and visuals, of relating them with precision, strongly appealed to me. Were interrelationships to be effected whereby first one, then the other, medium might claim the attention, it seemed possible that both might gain in expressivity, neither being relegated to simple embellishment or reinforcement of the other.

These thoughts arose before I became aware of any experimentation (from the 1920's and later) in film abstraction; indeed, only subsequently has an accessible literature on the subject appeared.

At the point of conceiving a situation whereby sounds similar to those synthesized in Gesang der Jünglinge might somehow be 'complemented' visually, it did not occur to me that the visuals should be other than abstract, or more correctly, absolute, in nature. Further consideration persuaded me of the rightness of this intuition; thought- and work-processes seemed to share common ground, as shown below:

Electronically Synthesized Tape Music

Absolute Animation

Previously 'unheard' sound

Previously 'unseen'
visual movement

Absence of environmental location.....

Considerable control of all dimensions

Slow, painstaking compositional process.....

The attraction of applying the same programme to both media became obvious in view of the above connections, but the lack of suitable technical facilities and knowledge prevented any immediate development of these nascent ideas, - fortunately so, because it soon became apparent that the two channels of aural and visual sensation inhabit such different perceptual time scales that any all-inclusive structuring must injure one or other medium in thwarting its innate temporal dynamic. From my viewing experience at this time, I felt it essential to avoid any hint of the mechanical in absolute animated film. Mirror-images, computer-generated images and sound, - all would have to be most carefully treated if the non-human were to be avoided. (For this art can so easily become 'soulless' and impersonal; witness the bland pattern-making of Chase's Circles, or Stehura's Cybernetik 5.3, and other early computer experiments of this kind undertaken by John Whitney.)

Furthermore, the danger of pattern-making, of providing a mere distraction is, it would seem, very great once the involvement of intuition at every possible stage of the creative process is sacrificed. One was not seeking any kaleidoscopic audio-visual extravaganza, however scintillating its technique, but a medium capable to some degree of handling a dialectic, much as autonomous music can do.

From the first it seemed desirable to avoid any typage, any permanent identity of sound and visual, such that, for example, an expanding figure should always be synchronised with a crescendo. Taking this example, various possibilities were mooted. Expansion from a point to a disc could thus be 'sounded' by a synchronised

crescendo on a note
expanding frequency range
expanding frequency range and crescendo
diminuendo on a note
expanding frequency range and diminuendo

These five accompaniments might act in the nature of point-by-point synchronized parallels to the visual. The first three would, even at a glance, appear quite 'natural'; whilst the last two are something of an apparent contradiction of the norm, unless one regards the point-expansion as a dispersal of energy on the plane, rather than as an object of constant size coming closer.

In addition to the strictly point-counter-point treatments given above, it was appreciated that one could ignore the growth-pattern of the visual as any direct stimulus, and treat the sounds polyphonically, such that one might employ the expanding point as a visual context for, perhaps, a foreground of sound-fragments, many impulses unrelated point-by-point to the visual. Conversely, the expanding point could be considered as an event amongst many, all occurring within a continuous acoustic environment such as a drone, or an ostinato. Here the concept of differing degrees, or layers, of sound-visual relationship was touched upon; from Mickey-Mousing to sympathetic ambience, to (even) a 'negative' accompaniment. Each would make connections of a different kind and strength. And within each medium, rhythmic gestures, silent and sounded, would interact; a

complex polyphony of part-sounded, part-silent voices was possible, although it would be naive to suppose that a satisfactory ensemble could be created by any careless transference of sounding into (silent) visual rhythms. Visual rhythm was less accessible to the memory than was sounding rhythm; this was a basic truth which must always be borne in mind when attempting any cross-media rhythmicising.

Arising from the above isolated, tentative, early musings on an absolute sound film, and through exposure to the literature on film aesthetics, film music, and abstract art, came the understanding that one mind must have total creative responsibility and aesthetic control over both sounds and visuals if the medium were to aspire to that level of inseparable form-and-content already enjoyed by the older allied arts of painting and music respectively. Oskar Fischinger had voiced this sentiment in 1956, at the time of his retrospective show of paintings at the Pasadena Art Museum (see the quotation heading Chapter Five).

Such of my general and specific ideas as appeared above were all penned without any concrete experience of film-making or, for that matter, of composing electronic music. On coming to grips with both media, and achieving even a very limited technical understanding of them, I became painfully aware of the problems of notation in this new medium. These problems were to remain and indeed have not been overcome; rather have the questions been reformulated! The problem of notation, even of a loosely descriptive notation, is great even when dealing in terms of either medium - tape music or absolute animated film - independently. There is no adequate short-hand notational system for either. The difficulties of holding in one's mind a concept of sound-visual relationship of any specificity (for example,

of the order of: let the red triangle-shape move so far at such a speed whilst enlarging at such a rate, whilst the sound-track ostinato accelerates to such and such a tempo) is of itself too daunting to permit its being symbolised in notation, even if a notation of sufficient mnemonic clarity existed - which it does not. Suffice it to say at this point that, after many unsuccessful attempts at controlling the sound-visual interaction progressively stage by stage, such a procedure was abandoned as wholly unworkable (unless one were to opt for a totally-integrated structuring which, for the reason that the media are so perceptually dissimilar, was not countenanced), and a method of additive-layering adopted for Opus I. This technique will be fully described in the following chapter.

Study I

Following a brief, one-minute test in eight-millimetre film, animating strips of black card to check for flow (this being my first experience of animating), I made a black and white film, Study I, lasting 3' 12". Having no understanding of cel-animation at this time, I chose to animate cut-outs, selecting three geometric shapes - a circle, and two rectangles, large and small. These three figures were all similarly checkered such that when one was overlaid upon another the overlap became virtually invisible, being minimised by the strong patterning. Since my concern at this stage was still very much with basic problems of film technique - lighting, focus, camera-rigidity, etc., - I made the actual animation a simple, continuous development of shape-relationships, there being no simulated editing, pans, zooms, or other sophistication. Filming was

undertaken without access to an animation-rostrum, the camera being set on a sturdy tripod, with cut-outs placed on a low table and viewed vertically.

At this stage in my thinking I was unable to divorce abstract shapes from ideas of animal interplay. I anthropomorphised the shapes rather in the manner of those films by Fischinger and McLaren that I had seen, and so the figures grew in my mind to represent male and female 'characters'. Without thus anthropomorphising the shapes I felt unable to fill in detailed action. The outline of this action was seen as a metaphysical progression from the chaotic state (or oneness), through a man-made unity; through man's discord; to a sudden realization of unity, or oneness (chaos!). In elaborating this action I developed the general conception in terms of a conflict between two male entities and a female.

The composition fell into several clearly defined stages, despite the absence of cuts or other articulating devices. Each stage was pointed by a momentary cessation of action at its point of conclusion; this allowed the viewer to grasp both the relevance of what had preceded (the still 'freeze' position summing past action of each stage) and to speculate briefly on the development to ensue. Also, the stills were placed for their aesthetic qualities - their expression of harmony or disharmony; the viewer could see them as a 'still life' for a moment, and evaluate them in frozen time; whereas the moving images could only be evaluated qualitatively as inextricable space-time relationships. It was as if one was 'with' the moving image and 'without' - in the sense of 'outside' - the still picture. My contemporary enthusiasm for Mondrian's later canvases encouraged these temporary withdrawals from fluid movement; the

charged 'dynamic equilibrium' of the momentarily suspended state should itself counterbalance the real-time evolution of my graphics. I responded to Herbert Read's dictum: 'the virtue of an equilibrium is that it is easily upset: the thrill it communicates comes from its delicate tension';(1) and bore in mind Rudolf Arnheim's observation that 'if a still picture is inserted in a film sequence, it will exhibit frozen motion rather than stillness.(2)

These visuals were accompanied by an unsynchronized tape of electronically synthesized sound. (At this time I was unfamiliar with the expensive technicalities of transferring tape-sound to film sound-track.) The film was thought out wholly in visual terms before any sound accompaniment was even considered; here the visuals were providing a stimulus and an environment within which to make the music (an inversion of normal animation practice); they helped delimit the sound-world without themselves being paralleled, equivalent, or duplicable in sound.

Unlike the visuals, the music was non-developmental, becoming in its turn an environment for the visual activity. There was no 'polyphony' intended or attempted between sound and visual. This situation I immediately recognised as inadequate since, whilst I was now at work with the two media, they were not coming together to form the controlled interactions originally envisaged.

The descriptive score for the visuals of Study I is reproduced in Appendix 3.1 - 3.7. For the tape no prescriptive or descriptive score was made.

Work on Study I sharpened my awareness of visual duration and dimension. The prospect of a really slow-moving animated absolute film seemed attractive, escaping the frenzied rapidity of action prevalent in commercial cartooning. (This slow-tempo piece was eventually to be realized in Opus II.) The scope for subtle handling of tempi and mood fluctuation became apparent, whilst considerations of screen-format also came to the fore, with the belief that a square screen should be the norm, from which all other ratios might be derived (- later I was to find Eisenstein preoccupied with the same concern). The question of colour, its structural potential, also pressed for attention; the interaction of two shapes of different colour might reasonably produce a spectral combination of the two, such that on parting, the shapes would be infused with a third colour in common: as blue and yellow mixing to give green. (Note the eventual optical-printing technique adopted for Opus I, in which the phenomenon frequently appears.)

But rhythmic problems were of most immediate concern - how to relate aural and visual rhythms - and in the first instance I tended to think in very simple terms as evidenced by the speculative chart of relationships given in Appendix 3.8.

Rhythmic Study No.1

An attempt at a brief two-minute sound film followed, titled Rhythmic Study No.1 - with the visual element again completed before the complementary nature of the sounds was defined. Realisation of the visuals - two stick-shapes, each moving in a different metre such that the one articulated 3/4 at dotted minim = MM 40, while the other

articulated 4/4 at semibreve = MM 40 - demonstrated that visual and aural rhythm were very dissimilar; one could not in this instance recognise the bi-metric visual system, whereas aurally it would have been readily distinguished. It seemed that the eye could not differentiate the parts from the whole, for instead of analysing an interaction of 3/4 and 4/4 it saw only a confused mix of the two, shifting rapidly across the screen to each succeeding event, losing track of the separate linear continuities involved in favour of short-term quasi-'vertical' alignments. In view of the inability of these visual rhythms to 'speak' as anticipated, the experiment was terminated.

Rhythmic Study No.2

Rhythmic Study No.2 experimented in visual articulations and speeds of movement. The differing rhythmic impact of stick figures alternately 'jumping' from one position to another, and gliding smoothly, was studied, as were various accelerandi and ritardandi in the gliding movements themselves. By this stage already I began to find that, using these simple movements and shapes, I could anticipate how the movements would appear, and what their impact would be. This realization that my imagination was gaining fluency in assessing visual rhythm meant that there was no longer the need to film (expensively) each study, but that a mental imagining and working out would often suffice.

* * *

Sundry speculations on the nature of audio-visual relationships followed upon these two simple studies, in conjunction with an investigation of 1920's absolute-film experiments. Throughout this period I was to search the literature for assistance in controlling the media, but found little useful advice on the interrelation of image with sound. The discovery of Symphonie Diagonale acted as a vital stimulus, however, proving that a visual music was feasible, and that musical visualisation (after Fischinger) was but a poor substitute for what I envisaged as a truly integrated audio-visual interplay. With no overall conception of how to relate larger audio and visual structures, I was still concerned to define the interactions of particular events. One such would read:

Let there be one image on the screen, e.g. a small black rectangle, and let there be a flurry of sounds with it. The effect may well be of the image emitting the sounds, of an image powerful in its sounds. (This was prior to my readings in Kandinsky.)

or:

Let there be a flurry of images on the screen, and let there be a single sustained sound on the sound-track; the effect may well be of the sound constituting an environment for the flurry of images, each of which is visually insignificant.

An important realization followed: namely that a great proportion of absolute animated film is extremely conservative in its 'editing' and 'camera-movement'. These two terms are both strictly speaking foreign to animation, with the exception of tracking movements of the camera on the rostrum. For one does not edit film in the manner whereby a film-editor will select and juxtapose shots in a live-action film. Any 'editing' is simulated in the sequence of filming frame-by-frame under the camera. In other words, there is not the same strong physical awareness of an identity between classic

live-action filming situations - taking long shots, medium shots, and close ups, and the subsequent re-ordering and 'tightening' into a satisfactory rhythmic flow by editing. Editing in animation is a highly conscious decision, no matter of merely splicing up two ends of film to see if they make a reasonable match. In commercial cartoon films, which are narrative/gag dominated, editing-method is - like every other cartooning device - a gross exaggeration of the live-action norm. There is thus a model from which to draw. Characters inhabit recognisable environments; we anthropomorphise strongly. But in absolute animation, where such anthropomorphism may be deliberately minimised, the situation whereby for example one would in cartooning or live-action naturally move in for a close up is simply not felt. Most absolute films, however sophisticated their imagery, seem content to regard the camera as a fixed, unblinking eye. Computer films have often proved the worst offenders, presenting an aural and visual continuum, unrelieved by any variety other than the apparently goalless metamorphosis of forms under fixation. Perhaps technical considerations preclude those flexible and sophisticated camera-movements deployed in classic Hollywood animation of the thirties and forties, but this cannot apply to 'editing' procedures, equally rare. My film Opus I later attempted to show how both 'montage' techniques and movable camera techniques could be utilized in absolute animated film. These two techniques, so common to live-action filming, can assist an audience in focussing their attention, by cutting, zooming, tracking, weaving - so that although no anthropomorphism results, a sense of being within the depicted visual world should arise. This is preferable (as a norm) to surveying the action 'out there', distanced.

Sound-Film

Considerations of audio-visual interplay eventually resulted in a two-minute film, called simply Sound-Film. Here the synchronization was to be exact, effected by the transfer of sounds from quarter-inch magnetic tape to sixteen-millimetre magnetic film, which could then be frame-counted prior to shooting the visuals in frame-by-frame synchronization. The work towards realization of this film proceeded very slowly, since I was attempting a near-total control of limited elements, a Weberian 'intensive treatment of a specific problem posed in its most basic terms'.(3) An increased sensitivity to graphic polarities, encouraged by reading about Eggeling, and more generally on Constructivism and the Bauhaus, further constrained - whilst simultaneously focussing - the imagination. The original hyper-ascetic plan was to select two intervals, the seventh A - Bb, and the seventh C - B, chosen for their very harmonic nullity. These were to be complemented by two shapes, a straight line, and a semi-circle. It was felt that the sound could be complemented by its visual partner moving or still; and that the visual image could likewise be complemented by sound moving or 'stationary'. If the image could be projected only on the plane (simulated three-dimensional movement being too complex a parameter for incorporation within this study), changing attitude by rotation, jumping, gliding, etc., could the sounds given above - these intervals - be similarly altered through 'projection'? How could they be seen from another 'angle'? Various answers suggested themselves: by rhythmic means; by octave transposition; - and in more complex circumstances, by other pitch-transformations, diminutions,

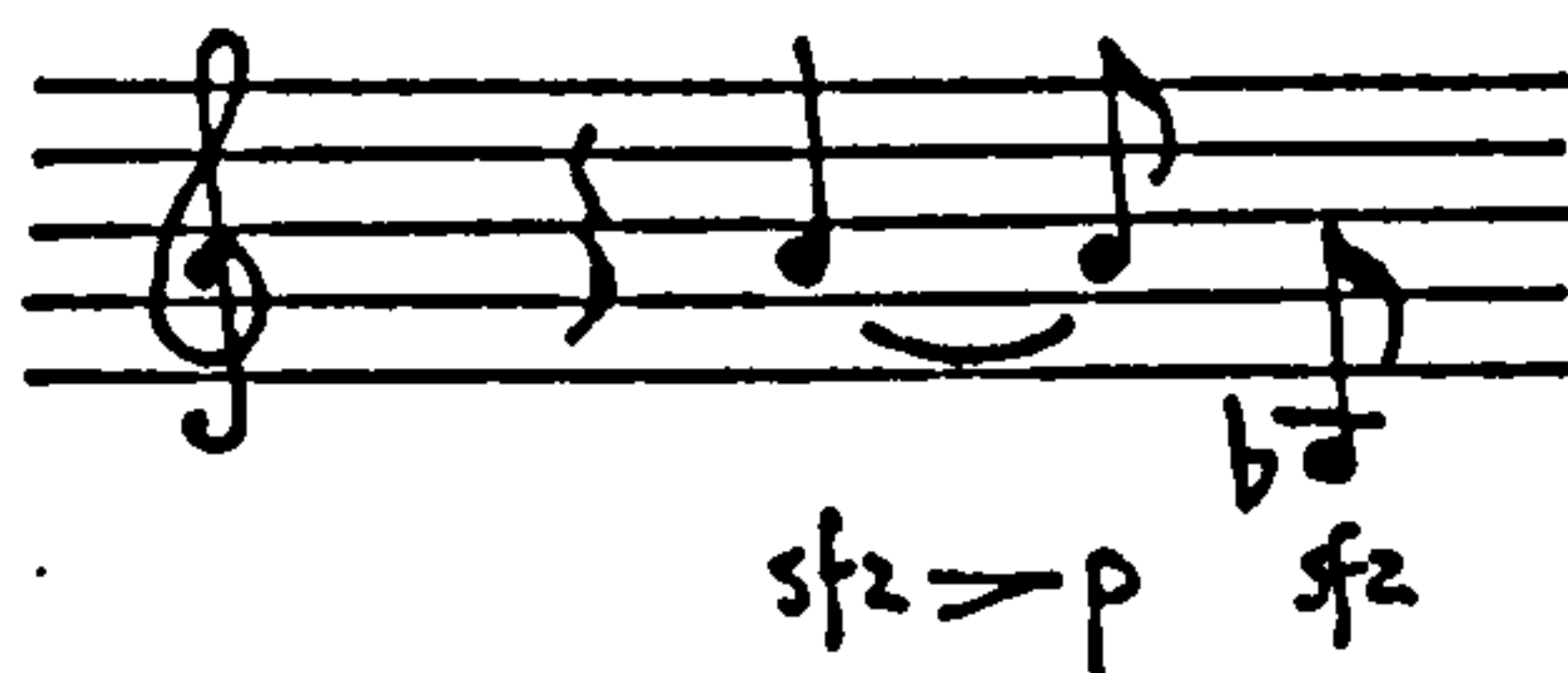
augmentations, and by various applications of dynamic envelope.

Taking a concrete instance: letting the straight line move through ninety degrees to the horizontal over a period of three seconds, one might emphasise the middle of its descent (at forty-five degrees) by beginning the A - Bb seventh motive at that point with a sforzando A, through a quick diminuendo on a dotted crotchet to 'piano', followed by another sforzando attack on the Bb as the line approaches the horizontal. The problem of describing and notating even such a simple conjunction as this proved perplexing:

VISUAL (a smooth glide [no eases] over 72 frames):



AURAL (A enters on frame 36; Bb on frame 63. No indication is given here of timbre, only the fundamental being notated.)








The sequence could be activated quite differently, either beginning sound with image, or crowding both notes of the interval at the end of the image-movement. So that, in the spirit of an exhaustive study, one could complement the one image by a number of rhythmic permutations of the A - Bb motive, each time the otherwise bland fall of the line being 'characterised' differently in sound. Further possibilities of interconnection along these lines were observed before a sound-score was notated, using only those intervals shown above, with their octave transpositions, and various


permutations on duration and simultaneity. The sound-score is reproduced in Appendix 3.9 - 3.12.

It was my intention to compose the audio-visual sequence of events concurrently, each successive step being conditioned by the desire to maintain a perceptual equality between visual and aural. If at any stage the aural rhythms appeared in danger of stagnation or monotony, then rather than re-structure them as one would in an autonomous musical composition, the visual rhythm would be worked into the argument to offset the aural, creating a variety of polyphonic interaction which would enliven the discourse. It was decided that, once the 'moves' of the notes and image-pieces had been determined (much as if establishing the rules of chess), the working out of detail should be largely intuitive, allowing however for the pre-determining of certain macro-structural points of tension or especial activity. This indeed accords with the way in which music itself has always been composed, although my exercise being rawly experimental, the field of permitted 'moves' was severely circumscribed...in retrospect, to the detriment of the appreciation of those very polyphonic interactions which I had hoped to experience.

Notation again proved problematic. Should I commence with an audio-visual rhythmic scheme alone, subsequently to be clothed by sound and shape, or somehow hazard a simultaneous total determination of all parameters? Rhythm was certainly felt to constitute the crux of the argument, but to exalt it above the more immediate 'presence' of shape and sound-quality seemed psychologically untenable. For the sake of unity, however, it was decided to relate the durations of visual movement and aural sounds, the latter being of durations crotchet, minim, dotted minim, and semibreve. At first it was thought

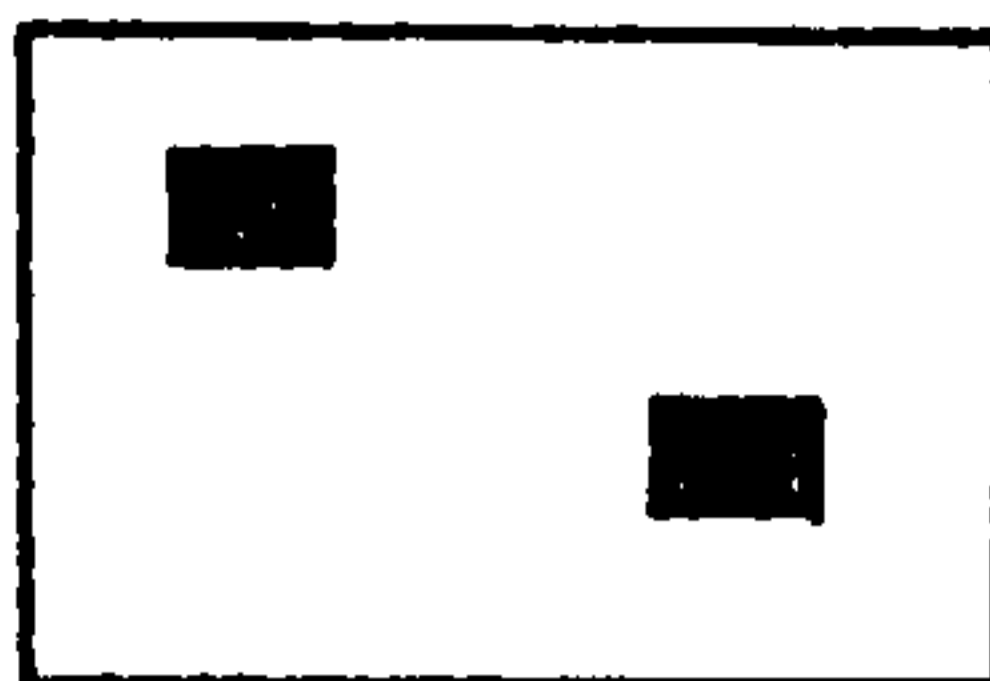
that both gliding and jumping movements might be exploited for their differing rhythmic articulations, but this was abandoned in favour of glides alone. The glide-movement itself is non-rhythmic; it cannot of itself be denoted a rhythmic element; rather is its function to 'embody' the start and cessation of itself. That is to say, the glide


 could be thought of as the two points  expressed by the curve  as opposed to the curve  or  or whatever.

Similarly, it might appear, in the case of the aural: the rhythm  can be expressed, or 'embodied' by A - Bb, or C - B. Thus, as the curve is a particular way of embodying duration visually, so the pitches are a particular way of embodying duration aurally. The problem with figures that 'jumped' on and off from one position to another was one of optical illusion; such actions looked as if the image had swiftly receded (in black on a white ground); there was an illusion of sudden vacuum not dissimilar to that resulting when leader-tape is spliced on to the end of sound...a positive nothing, a sudden hollowness. This incipient three-dimensionality was not appropriate for this film, and hence such jumping activity was eschewed. So for the purposes of this study images remained in view throughout, their presence when still (or rather, in frozen motion) being equated with the acoustic silence of the sound-track.

It was decided that the figures on the screen - eventually determined as squares - should move only horizontally and vertically from and to positions of rest; this serving as another deliberate limitation in an effort to hold the two media together. The aspiring vertical movement upwards connoted exertion against gravitational pull; downwards connoted submission to gravity. Horizontal moves were considered far weaker than vertical, neither submitting to, nor

combatting gravity, but operating within its field, thus acknowledging gravity. The diagonal would only appear in the form of a 'freeze' of the two squares, so:

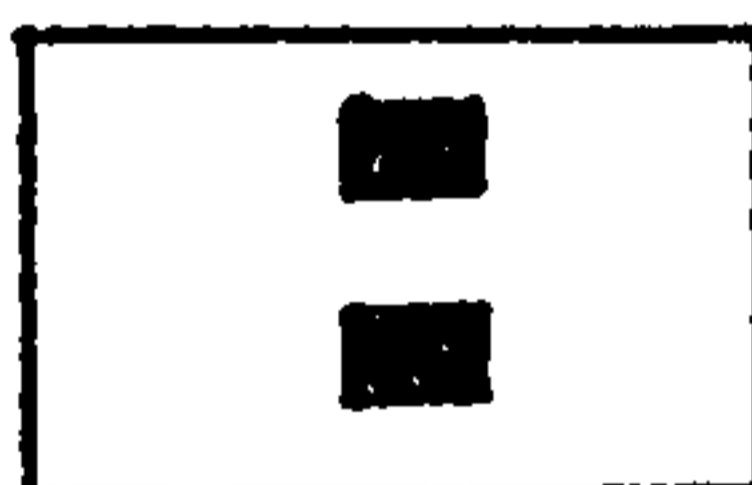


Thus in stasis one was dealing with three degrees of visual stress:

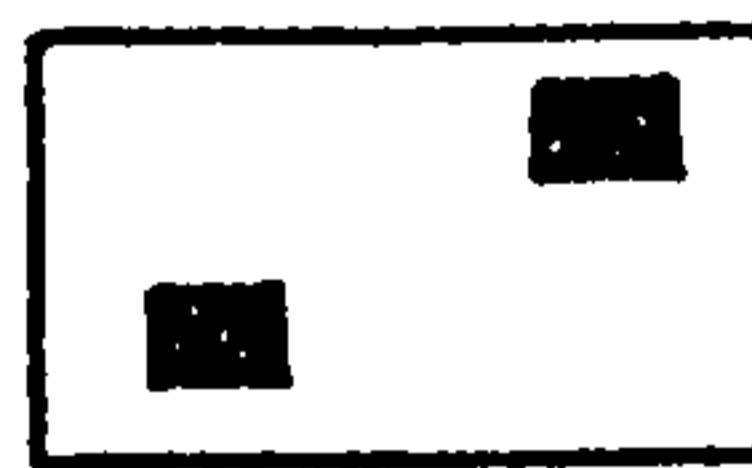
1. The horizontal relationship: non-dynamic, static balance;



2. The vertical relationship: perhaps indicating suspension of gravity, or its defiance;







3. The diagonal relationship: expressing within the screen-shape a dynamic equilibrium;



so called because it sustains tension mid-way between a vertical and a horizontal alignment.

The selection of the major-seventh interval was conditioned by its appearing to embrace all degrees of consonance and dissonance, being at once at the furthest remove from unison (utter concordance), and yet most close to resolving its discordance. C rising to B exhibits extreme tension, yet is implicitly resolved by the C overtone a semitone above the the B fundamental. Similarly in the case of the A - Bb interval or chord. It was felt, moreover, that a musical 'gravity' could be illustrated using these pitches, in such simple terms that from high to low pitch could be equated with submission to

gravitational pull, and low to high as its defiance. It was noted that the dissonance level of the major seventh is more acute when it is placed in a low register than when it is set high. Hence in the score the shorter durations appear in low octaves so as to secure a balance of acoustic tension.

An important question to be resolved was that of relating the speed of visual movement to the rhythms on the sound-track. As there were three sounding durations , each linked with a different octave transposition ( in the lower octave,  in the middle, and  in the high), so there might be three different, but similarly related, speeds of movement. These speeds might be identified with the various octave-transpositions of the musical material, or by asynchronous polyphonic means.

The attempted rigorous interrelation of sounds and visuals in this composition resulted in some highly artificial and arbitrary connections being made, the emotional/intellectual impact of which proved to be insignificant on viewing. A few truths about the medium were thus revealed:

1. On the aural plane, it was found that the potential of sound to be re-heard is still there during silence. The potential of the visual image to be re-seen is not nearly so strong.
2. In considering how a 'dynamic equilibrium' might be achieved when the two squares reached a temporary rest, it became clear that it was neither necessary nor desirable for a particular balance always to be struck at these times for, the work existing in time, - not wholly fixed in space as is a picture - equilibrium, as in a piece of music, is attained only when the composition is over, whereupon its accumulated tensions and relaxations can be experienced as a whole, and retrospectively reconciled.

A considerable effort was expended in devising durational and registral connections between the sounds and the visuals in movement and stasis. This was too detailed and wholly peculiar to this particular film to be further recounted here; suffice to say that the experiment is now considered abortive in its misguided attempt to control interactions so much on a quantitative level. The arbitrary relating of durations and registers revealed to the viewer no absolute truths of proportion; rather did it bore by its blandness and lack of 'colour' and emotional variety.

In conclusion, the plan of action of this film can be shown below. The sounds were electronically-generated sine-wave tone; the visuals were two black squares on a white ground.

Total Duration: 120" (2 minutes), divided into four equal sections of 30" each, these sections labelled A,B,C,D.

A (30")	Statement of characters.Slow speed for sounds and medium speed for the visuals
Bi(15")	Decrease visual activity quickly Increase sound activity slowly
Bii(15")	Increase visual activity quickly Decrease sound activity slowly
C(30")	Maximum visual and sound activity
Di(15")	Maintain maximum visual activity Decrease sound activity slowly
Dii(15")	Decrease visual activity quickly Decrease sound activity slowly

From this plan there evolved a work-method for the film:

1. Blocking in rough the durations of stasis and movement of visuals throughout the piece. No movement-directions indicated at this stage.
2. Following this, but only in a tentative, generalised fashion, inserting notes and silences according to the above 'activity' plan.
3. Modifying the visual blocks to speeds of movement (i.e., some were the wrong length, generally too long...a square would have strayed beyond the board even at the lowest speed.)

I found again that I could not compose visuals and sounds in the same instant as I proceeded; although I felt that this would be ideal, enabling one to build an inter-media 'polyphony' of voices. At the time, I realized that the piece was far from realizing my intentions. Being unable to visualize the kind of audio-visual relationship which would have 'meaning', I was relying upon chance sound-visual encounters to teach me which procedures might be fruitfully pursued, and which not. The 'score of visuals' for this film plotted the direction and speeds of movement. It is reproduced in Appendix 3.13 - 3.27.

Point-Music

A silent study in visual balance followed. The attempt was to 'orchestrate' time in the manner of Hans Richter. A title, Point-Music, was chosen to indicate that the visual argument was to be musically conceived. Eggeling had titled his films Horizontal-Vertical Orchestra and Symphonie Diagonale for the same reason.

Here it was decided to structure the visual activity on two axes, the lengths of which corresponded to the standard frame-ratio of sixteen-millimetre film, 1:1.3. This format was felt to cause least tension with the perimeter of the projected frame. Small rectangular black 'weights' were to be placed at the ends or at the intersections of these lines, concentrating the attention into appreciating the various tensions effected. I was attempting a rigorous analysis of visual weighting, on the lines of Paul Klee's studies in The Thinking Eye. It was a further effort to come to grips with some absolute

visual truths, some quantifiable statements which might, as it were, seem to demand particular musical responses. The points, or small black rectangles, were to be seen in various positions, jumping, not gliding, from one to the other, as if a series of stills were being projected. The jump movement was desired for reasons of simplicity and clarity in the composition and perception of point relationships. Were the pieces here to glide, the rate of movement during the glide (- constant?; quick to slow?; slow to quick?) would have to be taken into consideration as a structural element. This was of course the case in the previous film, but there the symmetry of the two points and the proportional speeds of preparatory movement required to reach such positions could unfortunately not be sustained in accordance with any predetermined relationship, as had initially - in the faulty drafting of the score - been expected. Indeed, half the logic of that piece was lost, with the speed of visual movement, and the pitch of the sounds not being - as desired - strictly and unalterably determined. In the realization, some variations of speed had to be admitted, so that a (square) symmetry might be arrived at on cessation of movement, when a state of stasis was prescribed. The film Point-Music was, however, abandoned before realization, since it ignored the crucial problem of audio-visual interconnection, and thus appeared a regression.

Finding such intellectual reduction ultimately stultifying, I now attempted to work more intuitively, concentrating on constructing just a very brief, one-and-a-half second moment, the most I could hold as an 'instant' in my mind. Here was an attempt to coordinate each note with the moves on the screen. [See Appendix 3.28] This study was filmed in line-test, the animation proving successful. But the

impossibility of proceeding with such minute attention to detail persuaded me not to continue with realizing the sound-synthesis, the effect of which could, in any case, be imagined.

Sonata-Form

The next study, Sonata-Form, again remained unfilmed and unrecorded. It was to be a three-minute absolute animated film with an electronic sound-track. For the first time the question of colour was considered. (In common with Richter in his Rhythm 25, I felt that colour must become an element integrated within a visual language, resisting decorative function or symbolic interpretation.) The form of the piece was so chosen on account of its familiarity in music, and its consequent assistance - both to myself and to any prospective audience - in providing some structural reference-points. Once again, absolute visuals were chosen. These comprised lines and squares of various sizes. A very simple colour-plan was devised to articulate the main structural divisions of the form:

Exposition

Subject 1 Red
Subject 2 Green, with Red

Development

Blue and Yellow predominant, but with
Red and Green

Recapitulation

Red predominant

The visuals were to be correlated with sounds of specific intervallic relation: squares complemented by fifths (stable intervals); lines complemented by minor seconds (labile intervals). The formal

structure was further detailed in terms of duration and colour, all the while paralleling the dimensions and dialectical organization of 'text-book' sonata form. Even the Exposition observed its customary repeat. Durations were then translated into cinematic frame numbers.

In compliance with the conventionally simplistic mis-reading of sonata-structure I determined that Subject 1 should display characteristics of vigour and dominance, whilst Subject 2 should counter with decorative and submissive activity. Although these qualities were initially attributed to the subjects, in the course of their Development (as in music) the one subject might properly appropriate the characteristics of the other, effecting a temporary role-reversal, only to be rectified in the Recapitulation. This was therefore to be no more anthropomorphic, than was the classic thematic (and harmonic) polarities in sounding sonata form. The square was not an abstract for 'man', nor the line for 'woman'; rather was the drama universalized through the conflict and the conference of two forces, one exhibiting a 'masculine' creativity (initiating form), the other a 'feminine' creativity (developing form). Paul Klee's "Genesis as formal movement" had promoted such thinking at this time.(4)

The 'tonality' of the work should be conditioned by two dimensions:

- 1.Colour. Establishing at first one hue throughout the first subject, but in the development changing colour swiftly.

- 2.Relationship of sounds, defining areas of stability, reference points, whether these be heard as pedals, as sharing timbral identity, rhythmic identity, or comparable registral limitations.

One or more musical dimensions would lend any one section its dominant character. Sound activity should occupy a foregrounded role,

articulating detail; whilst broader tonal argument should be undertaken through visual colour change. The music would thus be relieved of this role, permitting linear total-chromatic treatment of the chosen intervals. No persistent one-to-one parallelism was countenanced, no Mickey-Mousing other than at special moments where such synchronism would add weight to an argument. Instead, fifth and square should be regarded as two reciprocal components of Subject 1, the one heard, the other seen. Following the establishment of their identity, these elements might subsequently appear individually, but would still then recall their original complement. Visuals might thus 'resonate', and sounds 'appear'. A peculiar bi-sensory discordance might result were, for example, the minor second interval originally presented as a Subject 2 constituent later to be heard against the Subject 1 square. In this way, a dialectic of 'collisions' (after Eisenstein) might be articulated.

This preparation towards the film had in itself clarified for me the potential of audio-visual interrelationship. But subsequent attempts to 'fix' activity broke down, again because of notational inadequacies. My capacity to hold in mind counterpointed actions was steadily improving, but this enhanced facility proved of no assistance in designing a prescriptive score. The Exposition and opening of the Development were completed in score, but then the project was abandoned as unrealizable, for my notations could not even cope with the very limited material selected. The trajectory and rhythm of simple visual movements could easily be indicated, but to notate the tempo of a glide as it slowed or sped, was another matter. (Even the most advanced musical notation resorts still to the imprecision of Italian terms when attempting to define tempi-fluctuation:

rallentando, accelerando, etc.) For the record, though, bars 1 - 45 (Exposition) and 1 - 11 (Development) are reproduced in Appendix 3.29 - 3.36. Here, each pictorial 'frame' of the score corresponds to one bar of music. An analysis of the first eight seconds is given below bars 1 - 8.

The inherent sterility of this experiment (not unlike the Whitney's early work in conception) was too readily apparent. No allowance was being made for man's differing perceptual responses to two distinct media. Visual activity was being treated as if it were, paradoxically, silent sound. Indeed, it has always proved for me enormously difficult not to 'sound' pictorial rhythms in the imagination, when composing an audio-visual work. This dubious practice can all too easily lend a counterfeit intensity to visual rhythm; one even tends to 'pitch' visuals, confusing pitch-frequency for high and low on the screen-canvas.

Song for Song

The film Song for Song may be mentioned in passing. This was, and perhaps remains, a unique experiment in combining film with live chorus. From the Oxford Dictionary of Quotations I drew a number of the more familiar quotations about 'song', abstracted the key-words, and filmed them in various typographical dispositions (using Letraset on transparent acetate cels), composing a sequence of evocative word-images, and including some repetitions and moments of visual silence (white or black screen). Thus there might frequently appear in large type the one word 'SONG', set in context against phrases such as 'glorious dance', 'one grand sweet song', 'bugles blown', 'fable',

'brotherhood', 'wordless', etc.. Diagonal, vertical and horizontal masks were used to reveal or obscure sections of these isolated words and texts. A sequence of two minutes was filmed and then printed three times, resulting in an overall performance duration of six minutes.

Since the film bears only tangentially upon my work in absolute animation, I shall limit further description to stating that my intention was for the choir (SATB - both speaking and singing) to respond intuitively to the evocations of the text, drawing new inspiration from the words at each successive appearance and thus 'resonating' to different facets of their meaning. In the event, this rawly optimistic ideal soon foundered, and I was obliged to resort to a temporary score which might be part-memorized, part-read in conjunction with a viewing of the screen-imagery. The choir improvised from simple directions - loud or soft, said or sung, high or low. Within these bounds, each singer made an individual response to the images, now synchronising, now echoing, now voicing an associated word from the text. Thus life was breathed into the film which then, as a complete audio-visual experience, became personal and unique to the time and place at which it was shown and performed. One important aspect of the piece then, was that the visuals should operate within the specific acoustic of whichever auditorium they were screened in, and that this acoustic was activated by the choir's unique (temporal and spatial) contribution. The screen-shape was, incidentally, altered (apparently, not literally) for almost every successive word, and the words screened also differed in size. This was intended as a rhythmic device, since it directed attention within the frame and also created links with similar screen-shapes and

word-sizes appearing elsewhere in the film.

Much spontaneity (unlikely anyway, in the inhibiting context of a chamber-choir recital) was lost through the use of a score, and the resulting performance proved unsuccessful. The central notion - which inspired the film - was salvaged, however. This was the concept of sounding variations upon a visual 'ground-bass', developed from Hanns Eisler's speculation that 'the picture might be treated as a musical theme, to which the actual music would serve as a mere accompaniment...' (5) Whilst the cyclic image-succession remained immutable and inflexible, projected at a constant rate, living sound might refresh an audience's response, pointing new shades of meaning at each recurrence. Although Song for Song failed on the occasion of its only screening, this variational principle proved invaluable in composing Opus I, where not only are visual sequences re-presented against altered sound-tracks, but sound-sequences recur combined with modified visuals. Thus the one is re-contextualised by the other, permitting subtleties of inflection and metamorphosis quite unlike those available within absolute music alone. A peculiar tension arises when the one medium affirms the recurrent identity of its material, and the other insists that we re-evaluate it, seeing/hearing it with different eyes/ears. As I said in my original programme-note, not without due deference to Kandinsky: 'the "body" (image) receives a different "soul" (sound).'

Opus II

At this period I was already planning a major absolute animated colour film with tape music, far in advance of any real technical familiarity with animation, and still barely keeping pace with fast-developing electronic studio equipment and related techniques. I was also aware that the few studies completed, and the greater number conceived but unrealized, were proving the necessity of developing my intuition within silent rhythmic structures, unimpeded (as it now seemed) by the intrusion of the more familiar rhythmic contouring of music. Consequently I postponed further work on Opus I in order to concentrate upon Opus II, a silent study lasting 13' 50". This clearly drew from the concept of temporal orchestration in Richter's Rhythm 21, but was also under the spell of Mark Rothko's Tate Gallery canvases, and of those of Barnett Newman. This work was supported by a local Arts Association grant, and in the course of my application for financial assistance, I described the project as follows:

Opus II is an absolute animated film whose concern is to reveal a certain 'dynamic equilibrium' both temporally and spatially through the employment of the structuring potential found in the proportion of the Golden Section and the Fibonacci series.

My study of the music of Béla Bartók* has suggested that Golden Section proportion may attain aesthetic validity as much in the temporal arts as in the spatial, and it seems to me that film, perhaps more than music, is the ideal medium for an investigation of the capacity of Golden Section and Fibonacci series for a truly integrated structuring. I would hope to show that both within the frame, i.e. spatially, and through the film's duration, i.e. temporally, this proportioning can achieve a wholly satisfactory balance, - in Mondrian's words a 'dynamic equilibrium'.

The visual content of the film will be as follows:

Bands of colour (violet and purple only) move

* Eisenstein's revelation that the antithetical sections of Battleship Potemkin accorded with Golden Section proportion was another influence.(6)

horizontally and vertically across the screen. The bands are the full width of the screen when moving vertically, and the full height of the screen when moving horizontally. The bands may be of any thickness, from the full width or height of the screen to thin lines. The activity of the film will consist of the movement and appearance/disappearance of these bands...that is to say, it will be a study in visual rhythm.

The structure of the film will be A , B , [A plus B] such that

A consists of moving bands (5 minutes)

B consists of pop-ons (3 minutes)

[A plus B] consists of both moving- bands and pop-ons (5 minutes: 2 plus 3)

Every element of movement, of stasis, and of placement within the frame, is to be controlled by the same simple structural principle of Golden Section.

Violet and purple are both 'heavy' colours, being the least readily absorbed by the eye. This fact, combined with the film's silence, will engender an oppressive atmosphere wherein the viewer is drawn into the image, just as the silent image is sucked flat against the screen surface. Then the absence of sound will not be experienced as deprivation, but on the contrary its presence would be felt as an intrusion upon the private communion of viewer and viewed. The images should, as it were, be felt as originating BEHIND the eye, and the movement of colour-bands will be experienced as a natural expression of that organic growth which is found numerically in the Golden Section and Fibonacci series.

Opus II was my only film to be traditionally cel-animated. That is to say, line-tests were made on punched animation paper, and acetate cels subsequently painted. This work, culminating in the rostrum-filming, proved extremely laborious and, owing to technical misinformation, resulted in a grossly overexposed first answer-print, from which it proved impossible to take any acceptable release-prints. Experience gained through this seemingly fruitless undertaking did reinforce yet again what I had for some time sensed: that so-called

'pre-compositional' systematization invariably resulted in an artificial gestural language which lacked all sense of necessity. There remained only a bland concatenation of apparently unmotivated movements, communicating none of those nicely gauged emotional fluctuations over which I had already secured some control in musical composition. Opus II was pure, intensively organized, and - even allowing for its faulty exposure - remarkably unappealing. The anticipated excitement which should have derived from my semi-intuitive awareness of the conjunction between spatial and temporal equilibria was not forthcoming. At best, a very partial truth was being stated; this was a lack-lustre universality indeed.

Time and Again

Shortly after this set-back, work resumed on Opus I, and continued over several years. Throughout this period, during which I acquired a technique in synthetic-sound composition, and in animating, rostrum-filming and optical-printing appropriate to my needs, I occasionally felt drawn to the more immediate rewards of live-action film-making, and finally committed myself to the realization of one such film, Time and Again. As with Song for Song mentioned above, there were here aesthetic lessons to be learnt, applicable to my ongoing researches into absolute animation. Time and Again can be viewed in the tradition of recent English structural film-making in so far as it interrogated the medium's aptitude for moulding our awareness of time through montage. One sequence of events was filmed repeatedly, from different angles, so as to allow great flexibility in editing. A time-based Cubist faceting resulted, where repetition,

elaboration, augmentation, diminution and recapitulation constituted an exhaustive investigation of cinematic time and space, heightening the manifold ambiguities of recurrence in film. The residual narrative content of the action - a man enters a room, is seated, and shoots/does not shoot? himself - at first persuades the viewer that a story is being told, but gradually the realization dawns that this film is contemplating nothing but its own rhythmic design. In this way it shows kinship with my preoccupations in animation, where the material is similarly self-referential. A major influence on the concepts underlying Time and Again was Noel Burch's Theory of Film Practice, and notably his chapter on "The Structural Use of Sound". His lucid classification of modes of spatial and temporal articulation impelled me to undertake a film-study which might realize some of the 'collision'-values he promulgated. The several forms of temporal continuity, ellipsis, reversal and flashback categorized in his book were all incorporated in Time and Again, as were his species of spatial continuity and discontinuity. In particular, attention was drawn to the role of off-screen space and (by implication) off-screen sound, in clarifying or commenting upon on-screen activity. Great care was taken over shot-transition - the junction between shots, which Burch, like Eisenstein before him, regarded as 'the essential cinematic task'.(7) Abrupt sound (gun-shot, and a door opening and closing) was used to punctuate the visual action, sometimes in a seemingly naturalistic fashion (as when the man 'reacts to' a noise off-screen), but as often purely structural in intent, divorced from any dramaturgical significance. Such use of sound, whereby, for example, a static, undynamic visual can be invested with nervous energy owing to the anticipation of sudden noise, may initially recall a Hitchcockian horror-movie practice, but appears to retain its

potency even after narrative expectations have receded.

Through the use of repetition in Time and Again parallels can be drawn with the cyclic visual sequences of Song for Song, where variations were sounded upon a silent visual theme. In Time and Again, recurrent visual events similarly received different weighting, either through changing camera-position, or through some sound interjection, or both. A field of expectations was generated, now contradicted, now reinforced, with the result that at any one time the reverberations of earlier sound-visual matches carried over to the present, inflecting the particular action (or inaction) on screen, which itself then retroactively demanded a re-assessment of previous material. A complex audio-visual rhythmic argument was thus sustained, occasionally seeming to support a narrative interpretation of events, but ultimately defining itself as autonomous.

Work on Time and Again offered some respite from the endless animation required for Opus I, and contributed many insights into the power and scope of montage-techniques. This new understanding was to prove invaluable when I came to the final optical-printing of Opus I, and indeed encouraged a radical departure from the plan I had originally conceived for animating the visuals. Whilst the earlier work had proceeded sequentially in the order of ultimate screen-projection, I now saw how much more flexibility lay in animating characteristic gestural movements, which could be edited together, or superimposed, reversed, and frame-skipped in the eventual optical-printing process. By this means, the visual material would be as 'present' and malleable as it was in the live-action Time and Again. The fearsome impracticality of remembering lengthy sequences of absolute visual movement whilst animating need no longer prove an

obstacle, since it would be possible to accumulate - not in any specific order - a range of relatively discrete animated events which could be organised in a semi-improvisatory manner during the final stages of filming. This proved a crucial breakthrough, rekindling an enthusiasm for Opus I which had faltered more than once when animation problems had appeared so intractable.

Art is indeed the discovery and establishment of a new world of forms, and form is rational; but art is a continual transformation of form by forces that are vital and irrational.

Herbert Read(8)

CHAPTER SEVEN

TECHNIQUE OF OPUS I

Sound-Composition

It had been my intention throughout this research to reach a point where both technically and aesthetically it should appear possible to conceive and notate the 'monistic ensemble' of both sound and visual material at the same time.* The previous chapter has documented the experiments preceding Opus I and has revealed that no satisfactory solution was found to this problem of simultaneous notation. Consequently it has proved necessary to use the traditional method of cartoon animation, but with the difference that the visual 'story-board' cannot be by any means as closely pre-scripted since one is not working with characters, well-defined personalities of a limited repertoire of behaviour. Thus one is obliged to embark upon the composition of sounds shortly after the initial broad outline-plan of the audio-visual relationship has been formulated, trusting that, as composition proceeds (- and by composition is here meant the method of constant auditory testing, point by point, common in the making of most electro-acoustic music) one will be stimulated into making note of a suitable 'complement' on the screen, and that consequently one will be able to enclose within the sound-composition passages which can only be rendered entirely sufficient and 'whole' by the introduction of a visual. This method is as close to the ideal as can at present be found, and may perhaps not be bettered, since any spontaneous interplay of aural and visual activities demands that as

* 'The Japanese have shown us another extremely interesting form of ensemble, the monistic ensemble. Sound-movement-space-voice here do not accompany (nor even parallel) each other, but function as elements of equal significance.' (1)

Sergei Eisenstein

many elements as possible of the eventual sound-film be actually present in the process of creation. The above method of hearing the sounds whilst clothing a visual sketch seems to fulfil this need.*

The catalyst for any studio animation is invariably a visual situation, and long before a music-track is planned, the story-board of visual action will be complete and approximately timed. However, it is conventional in cases where any close synchronization between picture and sound is required to record the sound-track first, that is, before any laborious cel-animation is undertaken. The reason for this is that it is comparatively simple to insert or delete a number of frames from a picture sequence, whereas it can be difficult, if not impossible, similarly to tamper with a sound-track, the rhythmic and harmonic sense of which would be upset by such alteration. So for purely practical, not aesthetic reasons, it is in commercial animation the practice to record the sound-track - music, effects, and speech - before line-tests begin. This practice does not imply any predominance of sound over visuals; indeed it is quite obvious that the visuals dominate overwhelmingly. (It is even common practice for sound-cartoons to be distributed on the amateur home-movie market in silent form.)

In the case of absolute animation there is no requirement that visuals should dominate the action. It is an inescapable fact that our visual perception is generally keener, more active than our aural, but this of itself does not require an equally disproportionate stress in the audio-visual compound offered us.

* The current advances in real-time computer graphics and sound-synthesis will facilitate this compositional method in future audio-visual work.

It immediately became apparent in Opus I that there were major problems to be surmounted, and that they were of a two-fold nature: firstly, how to conceive of audio-visual detail; and secondly, how to define it, bearing in mind that the sounds were to be synthesized, and the visuals were to be absolute and non-anthropomorphic.

Simpler audio-visual relationships - on the level of, for example, a crescendo and one expanding shape - are readily conceived, but this level of simplicity can hardly be expected to satisfy an audience's appetite intellectually or emotionally for longer than a few seconds. The conception of progressing, metamorphosing, complex sounds and shapes - where expansion and contraction, movement and stasis of shapes, and various sound activities pertain - poses imaginative problems of an order unmet in other artistic fields, either because only one medium is being treated, or because a number of co-workers share the creative burden (as in opera, ballet, and conventional film-making). The basic requirement in absolute animation of defining point-by-point synchronisms and audio-visual cause-and-effect interrelationships demands a most detailed and accurate notation, and, as indicated, I have found it impossible mentally to compose more than a few seconds of material before this detail became blurred, and the chief argument of the passage distorted.

The problem of conceiving these relationships seems connected with the problem of notation. It so happens that neither in animation nor in electronic music is there any adequate prescriptive notation which might define the essential characteristics of the flow of events. And what are these essential characteristics? In electronic music one no longer presupposes them to be pitch and rhythm; timbre,

density, location, may constitute the sine qua non of a passage. In animation, is it to be the colour, shape, size, direction of movement, or speed of movement, which constitutes the essential? Or can one indeed relegate any dimensions of sound and visual to a position of less essential, let alone inessential? As outlined in the previous Chapter, many abortive attempts were made to formulate a short-hand prescriptive notation to 'fix' the essential temporal interrelations between image and sound, but all had proved wanting. In the interest of retaining a coherent 'score' it seemed impossible to progress beyond the most limiting, impoverished audio-visual argument; Graeff's scores and Hirschfeld-Mack's were already difficult to 'read' in real time, even though their visual activity was of the simplest. Any such problems were compounded when the complexity of a musical 'counterpoint' was countenanced. Early in my research, films were designed in which the range of sounds and visual activity was so proscribed as to render composition in score form feasible. This was effected however wholly at the expense of musical and visual variety. Other silent films permutating shape-activities similarly failed to excite interest, since that fine balance between intellectual and emotional stimulation (in so far as they can ever be isolated) was lost in favour of the intellectual. Opus II proved the most overdetermined, and pernicious, example.

Following much work in this direction, it eventually became apparent that it would not be possible to hold faith with the original purist ideal of 'making' sounds and visuals 'in one'. In the absence of both the imaginative capacity and the notational means it is surprising that this realization was not earlier forthcoming, but such was the determination not to drift into the methods of elaboration and

ornamentation espoused by Fischinger, McLaren and others. A great sense of relief was experienced on abandoning the purist approach, and the realization of sounds for Opus I began almost immediately. Here again, another hurdle was encountered. Whilst admitting the present impossibility of conceiving or notating the audio-visual complex in one, it was still hoped to keep visual activity in mind whilst working on the electronic sounds, and consequently at first the realization attempted to follow standard (i.e. non-electronic music) compositional procedures: working from the the beginning through to the end. (This work-process is quite foreign to that adopted in an electronic compositional practice dependent upon manual operation of voltage-controlled equipment and upon the generation of sounds in real time.)

Eventually, in the interests of maintaining aural continuity, even this attempt to memorise detailed visuals was relinquished, and the realization of sounds progressed almost autonomously, with the important qualification that the tempi, duration and general character of the several sections of the work remained true to the original mixed-media conception. If this had been similarly jettisoned, the danger of the sounds' temporal trajectory taking over completely - to the detriment of the eventual visuals - would have been considerable. As it was, a tight rein was kept on the duration of each section, and only minor amendments were required. The original sketchy outline of coordinated visual and sound activity is reproduced below. It may be of interest to compare this plan with the descriptive analysis (of the eventual nine sections) which appears later in this Chapter, and with the film itself.

"The film is made up of thirteen sequences, characterized as follows (N.B. within each sequence, sounds and visual occur concurrently):

1. VISUALS: shapes slowly appear/disappear in a network of lines; vertical movement only. Black on white ground.
SOUNDS: very few, isolated, fairly pure, mostly mid-high range; no chords. Dynamic: p/mp.
2. VISUALS: network of lines rotates 180 degrees and freezes action of shapes. Black on white ground.
SOUNDS: introduce echo; on freeze introduce increasing sound activity - more urgent - in an accelerando, with pitch range spreading to include lower region. Dynamic: mp/mf.
3. VISUALS: camera tracks slowly past other 'nearer' shapes into one shape, right inside it. Let this shape be screen-shape, and be suffused with yellow at the point of freeze.
SOUNDS: ostinato - suggesting inevitability of reaching the screen-shape. Dynamic: mf.
4. VISUALS: shapes moving vertically (quicker than in Section 1); this stopped by repeated vertical line wipe, travelling left to right. Colours blue and orange.
SOUNDS: brittle and abrupt, mostly out of synch with the visuals, but some in synch. A few chords, with voices entering/leaving together OR variously. Dynamic: mp/mf.
5. VISUALS: shapes moving horizontally; this stopped by repeated horizontal line wipe, travelling top to bottom. Colours red and green.
SOUNDS: - of long duration; subtle transformations by small shifts in pitch. Dynamic: mp/mf.
6. VISUALS: now involving diagonal actions also. Shapes expand and contract, some fragmenting. Colours various; let background change colour by 'cutting' at varying durations.
SOUNDS: a combination of 4 and 5 above, with stronger dynamic contrasts. Dynamic: mp-f.
7. VISUALS: shapes rotate variously. Many perspective views employed. Increase speed of background colour-change; occasionally divide ground into distinct opposing blocks of colour.
SOUNDS: growing fainter and sparser. Dynamic: p-mf.
8. VISUALS: multiple perspective ceases. Section of lines and dots only. From metrical to non-metrical movement. (This recalls the original network of lines from Section 1.) White ground; lines and dots change from black and white to red and blue.
SOUNDS: silent - except for one complex, dense chord coming and going in the midst of silence, during which sound the screen images fade away, and then return. Dynamic: pp-mp-pp.

9. VISUALS: lines and dots joined by other shapes (in the nature of a varied recapitulation). Shapes in black and white.
SOUNDS: similar to those in Section 1 above. Dynamic: p/mp.
10. VISUALS: reduction of shapes both in number and in size, but with exceptions.
SOUNDS: grow louder and closer in duration. Dynamic: mp/mf.
11. VISUALS: shape of screen gradually reduces within the screen, compressing moving shapes. The screen shapes cyclically repeats its reduction. Eventually the screen blots with yellow, and then reduces for a final time.
SOUNDS: a climax of sound-noise, utilizing elements of the ostinato in Section 3. Dynamic: mf/f.
12. VISUALS: screen-shape is gradually surrounded by a network of lines, which revolves 180 degrees (counter its rev. in Section 2) and wipes out shape and itself in so doing. Lines in black and white.
SOUNDS: abrupt tape-montaging (paralleling the colour-cuts of Section 6) proceeds through a gradual diminuendo, above an ostinato. Elements, memories of earlier sections return.
Dynamic: f-mp.
13. VISUALS: after last image has gone, leaving a white screen...
SOUNDS: a few motives drift into silence. Dynamic: mp-niente."

Accompanying several Sections was a drawing (black ink on paper) illustrating a 'characteristic' moment; the desired colour-palette was indicated in each case.

It was found that, as each section began to take shape and more nearly approach the original conception - rendering specific what was at first only generalized - so were 'allowances' made for the eventual visual contributions.

At the conceptual stage it had been considered whether or not areas of 'inadequacy' or 'insufficiency' should be incorporated into the sound-composition to allow for the intervention of a dominant visual action, -the intention being to pre-script the locus of the audience's attention on a graph plotting visual and aural attention against time. A 'deficiency' in the one was to be remedied by a

contribution from the other. A crucial decision had to be taken whether to 'build into' the sound-track such inadequacies of temporal thrust (which would be remedied by the visuals), or whether to compose a track which independently made musical sense, and to which a visual track could but add another layer of meaning.

However, the former option rather pre-supposed that I held the key to the psychological interface between visual and aural stimuli...which I did not, and so rather than trust that lacunae in the musical composition might be compensated or supplemented by a concurrent visual, I elected to make a piece of music which, allowing that I foresaw its ultimate function as an equal partner in an audio-visual dialogue, should hold together adequately in its own, specifically acoustic, terms. This aesthetic breakthrough only came by way of a temporary capitulation in the face of insuperable difficulties; rather than remaining obstinately true to my original ideal of conceiving an audio-visual totality, I determined upon breaking down the activity into its constituent parts - sound first, then visuals, whilst never overlooking the fact that eventually these strands must run concurrently. By so doing, the way was clear to a relatively spontaneous composition of the electronically-synthesized tape-track. Working to a simple sectional plan of activity which indicated the tempo, dynamic, and articulation of sounds, and with a sketch of the visual complement, the sound-composition was built up by a layering process very similar to the eventual layered optically printed superimpositions of the visuals. An element of sound-material would be generated, stored on tape, and subsequently mixed with other material. This is how the complexity of Section 7 was created; and in Section 5 it will be apparent that Section 2 is repeated 'verbatim'

but with the addition of a contrapuntal line. (This overlay is matched visually by a mirrored, angled repetition of the visual material from Section 2, with an overlay of elements synchronized to various 'attacks' within the added contrapuntal line. In this case, it was hoped that such simple paralleling would clarify the fact that a varied, enhanced repetition was taking place.)

Little further need be said about the composition of the sound-track, which proceeded along lines familiar to any composer acquainted with the electronic-music studio resources of synthesizers, mixing desk, and tape-recorders. Source tapes were conventionally edited by means of tape-splicing, and then mixed down to a mono track suitable for transfer to magnetic cine-film.

As heard alone, the sound-track of Opus I might be criticized on the following counts:

1.

It is too sectional, without cohesive form. The justification for this can be found in the sound-tracks of any film, - animation, feature, or documentary. Section-joins are 'explained' by the synchronously changing nature of the visual activity, which encourages the ear to accept such breaks unquestioningly. One need only point to the equally sectional treatment of music in commercial cartoons (for example, Scott Bradley's masterly, concise scores for M.G.M., miracles of compression, charging visual high-jinks with a dynamism unknown to latter-day efforts in the medium) where the musical fragmentation, even stylistic discontinuities, pass unremarked in their uninhibited compounding of visual frenzy. So then, in absolute animation the flux of images, so dominant in their claim for attention, effects

continuities where none may exist on the sound-track. One may defend and recommend a film-aesthetic of juxtaposition as opposed to that of semantic transition. It is in the nature of film (if not of video) to concentrate the author's attention upon linkage, upon the junction between shots (see Eisenstein's 'collision-values') and even between frames (see Breer and Kubelka). An absence of connectives was not only a feature of Satie's Relâche/Entr'acte music, but has proved a characteristic of a twentieth-century art which, in dispensing with the conjunction, plays upon the ambiguities available to sheer juxtaposition.(2) Time and Again in particular exploited just such ambiguities to their limit.

2.

The sound-track is too simple. Much of the track is pitch/rhythm dominated. There are two reasons for this: firstly, my inclination in electronic music is still to think chiefly thus - a legacy of a traditional music education; secondly, working in these terms, where pitch and rhythm are discrete and readily identifiable - as opposed to a less differentiated sound-continuum - facilitates exact visual synchronization with discrete musical events. The track is often no more than 'melody' and accompaniment, occasionally even monophonic. This degree of simplicity is explained by the fact that it was anticipated that the addition of visuals - by competing for the audience's attention - would limit the degree of concentration available to the sound, which would then function as one polyphonic 'voice' amongst several, the remaining (silent) 'voices' of activity being furnished by the visuals. (The concept of 'melody and accompaniment' should be qualified by consideration of the fact that the pitches of the melody will often be identified with various levels

of visual activity - that is, the one aural 'melody' may be shared by several visual strands such that, say, notes 1,3,5 are taken by one strand, and notes 2,4,6 by another; thus the 'melody' becomes terraced and accordingly rendered less two-dimensional. A more complex, dense musical texture might - in conjunction with interrelated and similarly complex visuals - overwhelm the audience in a surfeit of stimuli. The relative sparseness and clarity of much of the music encourages linear thinking, whereupon it appears appropriate now to plot temporary confluences and congruences of synchronism with the visuals, now to exploit asynchronism. A highly-complex sound-track might be desirable at a future stage, but at present it was felt necessary to point audio-visual relationships unambiguously, so as to establish synchronous attacks as a norm in terms of which non-synchronous activity might be understood. Indeed, Opus I is often rather conservative and unadventurous in its devotion to synchronous attack. All sections exploit this device to a greater or lesser degree. There is no section or passage where non-synchronism becomes the norm. Perhaps Section 7 comes closest; here the sound-track attains an apogee of contrapuntal density - with a compensating reduction in synchronous visual activity. In an exploratory, innovative work like this, a didactic element is inescapable, and this didacticism is here primarily articulated through facets of synchronism. A mnemonic sound-score (broadly descriptive) of Opus I is reproduced in Appendix 4.1 - 4.11.

Visual Technique

Opus I was so titled in order to proclaim its 'musicality', and more specifically to relate it to Ruttmann's Opera - the first absolute animated films with specially-composed musical accompaniments. The imagery of Opus I derives from the films of Eggeling, Richter, Ruttmann, Fischinger, and Harry Smith's No.7, and from canvases of the Constructivists, De Stijl, the Bauhaus, Mondrian, and (especially) Kandinsky. Hard-edge geometric 'abstraction', without any intended anthropomorphic, or mystic association, constituted the elementary matter from which the graphic activity was evolved.

When the film Opus I was first conceived, it had been my intention to realise the visuals by means of fluid cel animation, and in consequence a large amount of material was drawn with the expectation that ultimately conventional inking and cel-painting would be required.

Early attempts at filming the line-tests proved disappointing because the pencil drawings were too faint to be clearly seen. To remedy this I inked over all the lines, and was rewarded by satisfactory results on film. But in the process of inking it occurred to me that if I were to black-in the outlined figures it might be possible to dispense with yet another stage - inking and painting on cels - by refilming the silhouetted black and white images through colour filters. By so doing, not only would the considerable labour and expense of cel-painting be avoided, but for my purpose the technique of working through optical printing promised to be

preferable - for the almost inescapable 'boiling' of cel-painted images would not arise, nor would there be problems of matching the hue of outline-ink to opaqued body-colours or of pre-planning and appropriately colouring for the several layered positions of cels. (Here the unhappy results of Opus II, where such 'boiling' and greyness of lower cel-level colours had ruined the film, had proved a valuable lesson.)

The decision to experiment with optical printing proved well-founded, for after the necessary exposure tests and camera alignment, work on refilming black and white high contrast images (originally shot on Agfa-Gevaert T553) proved relatively speedy, the whole film ultimately being shot in under one hundred hours.

Since the technique is relatively unfamiliar outside professional specialist optical filming laboratories it seems appropriate to detail the technical arrangements and the work-method followed, before describing the aesthetic underlying the selection, superimposition, and colouring of imagery.

At present, fully professional optical printers can cost tens of thousands of pounds, and even semi-professional equipment of the specifications usually required by student film-schools and University departments cannot be acquired for less than two or three thousand. In England the only readily-accessible semi-professional printer is owned by the London Film-makers' Cooperative, members of which may book use of the machine for short periods, although any temporary heavy demand limits its availability still further. My first exposure tests were undertaken on this equipment, and whilst this experience was valuable, it became clear that the reliability of the machinery

could not be guaranteed, nor could ideal working conditions be secured. This, together with the impracticality of making several journeys at long intervals, and with the need to re-set precise alignments on each occasion, determined me upon constructing for myself a rudimentary optical printer sufficient to my purpose, such that I could work uninterruptedly on the filming.

Having studied and operated the London Film Coop printer, I felt confident of being able to reproduce its essential features, and set about building a simplified model from a cheap slide-projector (serving as the source of illumination and as a filter-holder); the transport-mechanism of a Victor 40 16mm projector (where the gate aperture was enlarged to permit refilming of the entire film-frame); and a loaned Bolex H 16 Reflex camera equipped with extension tubes and a 75mm ex-television camera lens. Preliminary tests of the equipment unmounted demonstrated that - if a correct alignment could be secured - there should be no problem in refilming satisfactorily from the Victor 40 projector-gate. Trial and error were used to locate the proper distance of Bolex lens from Victor 40 gate, and the equipment subsequently secured as rigidly as possible to a wooden base-board.

However, the need to keep the camera back clear of any permanent fixtures posed insuperable problems when it came to effecting an ideal rigidity. (After every 100 feet of film had been multiple-exposed through filming and repeated re-winding, the back had to be removed and a new 100-foot roll inserted.) A partial solution was to shoot as much single-frame material as possible before re-winding, stopping wherever possible at a point where evolving imagery was replaced by different material, so that any shift in alignment would not be

apparent. By and large, this makeshift method worked well.

Many other problems arose, mostly too individual to this particular set-up to be worth detailing at length. These included light-leakage into the camera, frame-number slip on re-winds, registration problems in the Victor 40 gate (every frame was wound on manually), and towards the end of filming, intermittent take-up within the Bolex camera, resulting in a concertinaed, buckled length of film and much wasted effort. These, and allied problems, are ever the lot of the low-budget, independent experimenter who, if sanity is to be preserved, must learn to expect equipment to malfunction.

Once the printer equipment was aligned and exhaustive tests for exposure and superimposition made, work proceeded satisfactorily, interrupted only by the need to re-adjust the camera or make running repairs on equipment as it deteriorated, or failed. Considering the raw crudity of the set-up, results were good, with exposure, focus and image-stability all up to standard. Unfortunately at such close focus, the Bolex's reflex finder proved slightly inaccurate, a defect unobserved even after exhaustive preliminary test-exposures. Consequently, repeated viewings of the film will reveal that the left-hand side of the projector gate obtrudes slightly. Fortunately this does not seriously detract or distract from a viewing of the film, since the eye is fully engaged with activity centre-screen.

When the technique of optically-printing Opus I occurred to me, I had already drawn the whole of Section 2 and much of Section 3 in sequence, synchronized to the music track. On realizing the potential for multiple superimposition afforded by optical printing, I was relieved of the need to continue drawing elaborate designs such as

would have been required by conventional cel-animation. Not only could the visual material now be broken down into discrete cyclic and non-cyclic events, but the potential for re-using the same material - enlarged, or back to front, upside-down, faster, etc, - could be realized, since such exhaustive treatment seemed to provide the key to effecting fruitful interconnections between the several parts of the composition. That is, whereas in narrative cartooning coherence is sustained through concentration on figures given clichéd behavioural patterns, in the absence of anthropomorphism the flux of visual activity has to convey an inner quasi-musical argument expressed in terms of repetition, variation, contrapuntal device, etc.. So it became my practice in the preliminary rostrum-filming of black and white imagery to shoot several versions of the same material, for example long-shot, medium-shot, and close-up, or angled by rotation. With an extensive repertoire of this material made available in both negative and positive, it became possible to select from a vast array of imagery, and at the optical printing stage it occasionally became my practice to defer selection of material until the last moment, such that later overlays of material were conditioned very much by what had just been recorded on film. To this marginal extent, superimpositions within a few passages (for example, Section 4) were improvised, although the general outline of activity, and the frequency of one-to-one synchronous points between audio and visual, were determined at an early conceptual stage.

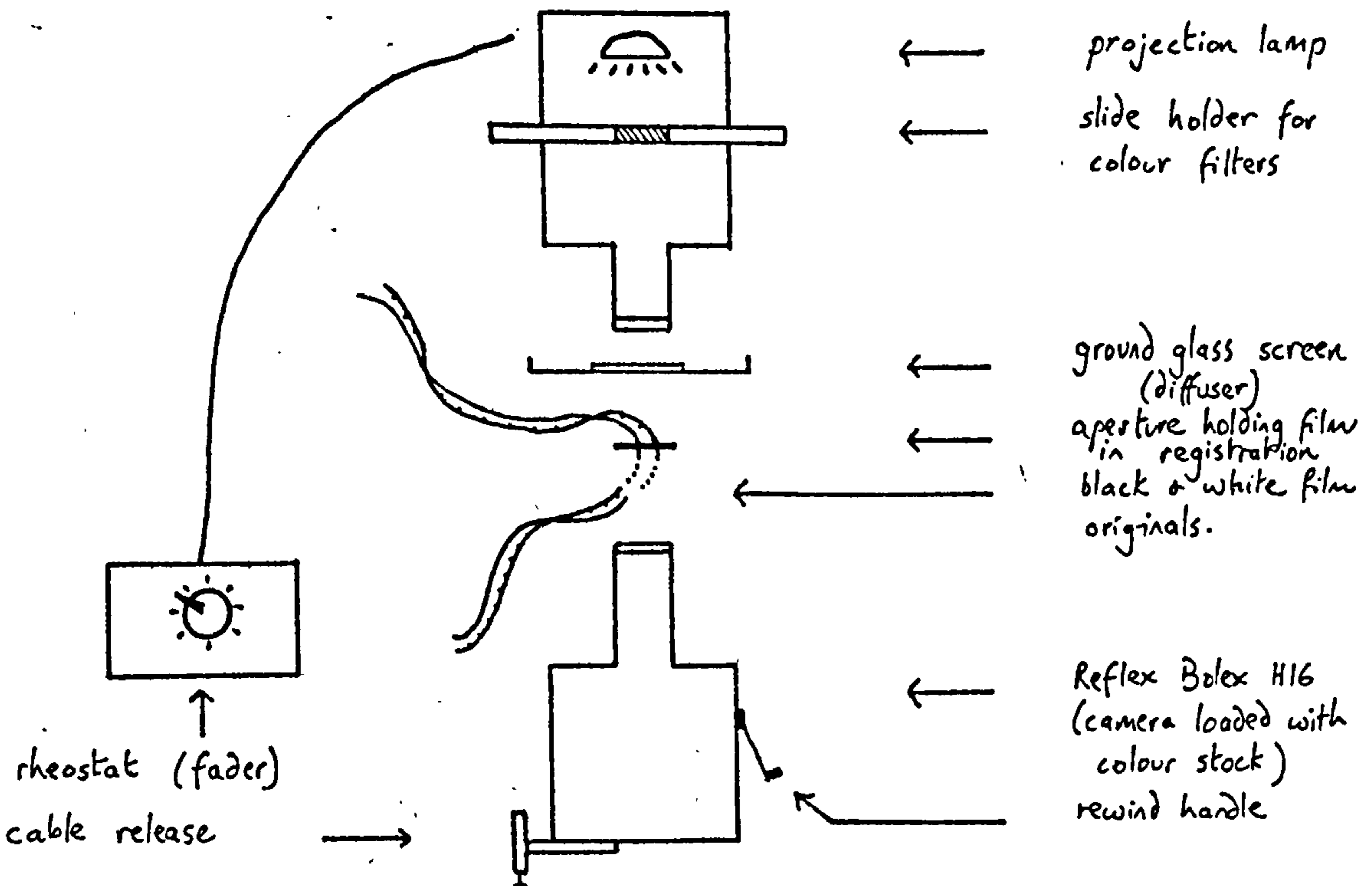
In undertaking further work in this field of absolute animation, the experience -gained here would certainly argue in favour of a similar practice of preparing 'moments' of animation, the precise interrelationship of which might remain relatively fluid until the

ultimate point of overlay via the optical printer. A prime virtue of this approach derives from its spontaneity - an element so distinctly lacking from cel-animation - but a spontaneity in the handling of already finely-honed material - no loose ill-considered extemporization. To an extent one would still be enjoying the flexibility of fluid cel animation, together with the immediacy of cut-out work; new subtleties of relationship could be explored in the moment of filming, without detriment to technical quality through an over-hasty realization. Thus the freedom to select from a rich repertoire of film-strips restores an element of idiomatic improvisation to the last stages of the compositional, and hence communicative, process. As a 'performer' of the prescribed composition - now largely determined, but still flexible enough to accommodate such inspirational inflection - one may inject that spirit of 'creative evolution' which totally preplanned absolute film-graphics can lack.

I should add that, whereas before working through Opus I I found it impossible to conceive such an audio-visual complex, having now experienced the completed film, the prospect appears no longer so daunting. The compositional method common to image and sound, that of assembling a collection of 'moments' which can then be layered by mixing, relieves the composer of the burden of devising a fully worked out prescriptive score, and allows him to think in terms of a repertoire of elements, audio and visual, which may then be intermingled in various temporal configurations. A familiarity with the results of colour-superimposition on the optical printer completes the composer's armoury. The consecutive method of composition which ultimately worked satisfactorily in the case of Opus I can be

advocated for further work along the same lines. What has been outlined is advanced as a working method for any composition within this medium, and is far from being peculiar to the one completed piece.

Use of colour



The diagram above shows a design of the rudimentary optical printer used in Opus I. In essentials it is identical to any professional printer, but unlike sophisticated apparatus there is no possibility of altering the alignment of the several elements which were fixed securely in position following experiments for focus, and for light intensity.

Filters of high photographic quality are unnecessary when used behind the recorded image as is the case here. Only when filters are interposed before the image need the expensive Kodak Wratten filters be purchased. Lee Filters - as used for theatrical lighting - proved inexpensive and ideal for the purpose. Cut to size, they were mounted

in glass slides to prevent buckling through long exposure to the heat of the projection lamp. Experimental colour-film tests revealed that only the more intensely saturated hues should be used as a norm, any necessary lightening or darkening being effected not by replacement filters but by alteration of the rheostat setting to increase or decrease the brightness of the projection lamp.

A 100-foot colour-film test was made to check registration, focus, alignment, and superimposition as much as to estimate aperture and recorded colour. It was found that the aperture needed to be varied from f.4 to f.16, depending on the density of the colour-filter; so, for example, bright yellow would require a setting of f.16, whereas an intense dark blue might be recorded at f.4. The stock used - ECO 7252 - proved remarkably true to the original hues as viewed through the camera, and furthermore it appeared that the stock reacted to brightness as did the eye; so it became possible to assess the desired aperture settings for a particular filter-colour by eye alone. No separate light-metering system was required. Most of the material was however shot at f.5 - f.8, and in subsequent laboratory grading very little correction was needed, except to take down some white figures which were over-exposed. For a reversal stock, ECO 7252 affords generous exposure latitude; this was indeed a consideration which encouraged its choice.

The colour-film test had largely confirmed initial speculation over the effect of overlaid hues. Red overlaid by green gave yellow, for example; blue overlaid by red gave pink. One of the most trying aspects of working with the optical printer was the need to remind oneself constantly of the ultimate desired effect, and to retain confidence in one's judgement right through to the point of - perhaps

- a sixth superimposition. (Unlike sound superimposition, in film there was no second chance. A single error in frame-counting, focussing, or aperture-setting, ruined an entire sequence.) Beyond a certain point it became impractical to foresee the outcome of such superimpositions, and the 'field of discs' passage in Section 4, together with the 'psychedelic' events of Section 9, were only approximately pre-judged, the resulting kaleidoscopic variety being regarded as a delightful serendipity.

The purity of hue was especially valued. The complete absence of colour 'boiling' which so bedevils all cel-animation, professional and amateur alike, and the brilliance of colour available through recording projected, not reflected, light, endowed the film with a luminosity unavailable to conventional techniques.

One experimental filter treatment deserves mention. It was found that, if two filters of different colours were held in the slide, one occupying the right half, the other the left, at the point where they abutted they diffused into the combination colour; thus green and red would appear to diffuse mid-screen into a band of yellow. This phenomenon was exploited to good effect in Section 5 of Opus I, where such tri-colour backgrounds were dissolved one into another, and in Section 4 for the above-mentioned 'field of discs' sequence. This latter proved particularly effective, for the negative imagery of transparent discs on a black background allowed discrete points of filtered light to be recorded across the entire frame, with the result that discs of many differing colours were recorded simultaneously.

An attempt was made to structure the use of colour throughout the film. Perhaps a weakness of Harry Smith's No.7 is its undifferentiated colour-palette. The same can be levelled against Fischinger's Allegretto and An American March, in both of which the kaleidoscopic brashness of colour seems to hold only decorative value.

The colour-schema for Opus I can be summarised as follows:

INTRODUCTION

Blue ground and figures

Section 1

Blue ground and white figures. Ends with multiple zoom moving from blue through to yellow.

Section 2

Yellow animated background overlaid by blue, white and red figures.

Section 3

Yellow animated background overlaid by green foreground, with middle-ground of blue and red figures.

Section 4

Red background, overlaid by white and yellow figures. At the first retrograde point there occurs a briefly alternating blue and yellow background, then a green background overlaid by white and yellow figures.

Section 4a

On a low 'D' pedal, the 'field of discs' passage uses primarily alternating yellow and blue backgrounds, with complex asynchronous overlay of tri-colour discs, plus white figures.

Section 5

Blue and pink ground, inflected by superimposition of tri-colour slides to produce mauve and white; with superimposed white figures.

Section 6

Recall of Section 1. A blue background with red

figures.

Section 7

Complex colour changes - from pink to blue; then yellow, in alternation. Overlaid by green, yellow, and pink figures. On an 'F' pedal appear yellow and red bursts of activity in alternation.

Section 8

Tri-colour slide of blue---red gives subtle pink-based background, with red and white figures.

Section 9

Dark red background with multi-coloured figures exploiting multiple colour superimposition.

* * *

A work-method for absolute animated film-making with tape music

1. Preliminary conception, in which the nature of the audio-visual Gestalt is perceived in the 'moment'.
2. The thinking-through of formal possibilities adequate to a larger realization of the inspirational moment.
3. Sketches, in the nature of a rough 'story-board', fixing the larger structural features in both visual and aural, especially tempi relationships and a graph of synchronization.
4. Construction of the tape sound-track; created so as to make a musical 'sense' of its own, but with inbuilt deficiencies of activity, later to be remedied by the visuals. (The composed sounds should always be conditioned by visual conceptions.) A highly sectional sequence of musical ideas is not to be feared...this being typical of good editing/montage, and avoiding the continuum-obsessed world of many absolute films.
5. Transfer of final master (mono mix) of sound from magnetic tape to sprocketed 16mm magnetic film. (Also making a working copy of master for subsequent use.)

6. Working descriptive score made of tape sounds, indicating approximate pitch, rhythm and dynamic envelope of all key sounds, sounds that is, likely to be required for synchronous matching with visuals. All potential synch points to be marked in the score...rather too many than too few.
7. Frame count of magnetic film, numbering every tenth frame.
8. Locating and numbering of all synch points marked in 6. above.
9. Transfer of these location-numbers to work-sheets, later to be read in conjunction with the score; on which the numbers corresponding with synch points are also marked.
10. Commencement of pencil line-tests, working closely from frame-count work-sheets, from repeat playings of a working copy of the master-tape, and from sketches on the story-board, but not necessarily in eventual projection-order. Characteristic movements, many of a cyclic nature, may be drawn for incorporation at points still to be determined.
11. Rostrum-filming on black and white stock of inked line-test sections, with subsequent correction of any inadequacies in animation. Imagery may be shot single or double frame, forward or reverse, skip-frame, and at various angles and enlargements, drawing a wide repertoire from each short sequence. (Initial tests need only be processed to negative, i.e. only developed and fixed. This can be done by the film-maker himself using a cheap home developing tank. Final high contrast neg-pos printing should be entrusted to a professional laboratory.)
12. Optical printer re-filming of high contrast black and white imagery through colour filters on to colour stock, incorporating multiple superimpositions, montage-techniques, dissolves and fades, and further image manipulation through reversing the film (both back to front and head to tail) and through skip and freeze framing.
13. Processing work on film and sound-track undertaken by professional laboratory.
14. Married answer print of film checked for colour grading and for any remaining animation-flaws.
15. Authorization to laboratory to make subsequent release prints of the film.

* * *

Observations on audio-visual synchronization

As has been explained, the electronic sound-track was completed before any animation was undertaken. A transfer was made from quarter-inch magnetic tape to 16mm sprocketed magnetic film and every tenth frame numbered in sequence within each Section of the film. Then every attack on the sound-track was located, its frame-number found, and a list of such numbers compiled. At the same time, a descriptive manuscript score of the sound-composition was prepared, indicating pitches or pitch-bands and rhythms, so as to act as a useful mnemonic when undertaking the animation. The frame numbers defining musical attacks were then transferred into the score.

At this point no attempt was made to determine which musical events would be synchronised, or indeed the nature of the synchronization. It sufficed to plot all available synchronism points from amongst which a selection might eventually be made.

Early experimentation in visual rhythm had demonstrated its obscurity when compared to sounding rhythms. Any direct transfer of rhythmic device from sound to visual - in the fond expectation that a coherent interplay would be engendered - seemed inadvisable, and indeed only at one point in the film is such an attempt made - in Section 7, where three glissandi are on two occasions rhythmically echoed on the screen...rather like an 'afterimage' where the comparative weakness of the visual could be turned to advantage.

Elsewhere in the film interrelationships are of a different order. The basic approach was to play over the music many times, visualizing various 'complementary' movements using the subject-matter

already prescribed in the first draft. Were the visuals to Mickey-Mouse each and every musical attack, or only some of these - if so which? Or should no such identity be forged? By dint of repeated hearings, a visual scenario ultimately emerged, and in the case of Sections 2 and 3 (these Sections were the first to be animated) animation was begun, working in sequence to the music.

There follows a brief description of some audio-visual interrelationships which arise in each Section:

Introduction

So as to establish in the mind of the audience that sounds and visuals are interlinked (unlike, for example, Harry Smith's early films where the sound-tracks were very much an afterthought) the introduction presents a musical arpeggio-figure heard eight times, against which a visual appears synchronously with the final sustained note of the arpeggio. Thus musical and visual gesture are here one; we have almost the equivalent of lip-synch...the picture makes the sound. (For, bearing in mind always the dominance of the visuals, it will invariably appear to the audience that the picture 'voices' the sounds, not that the sound is embodied by a visual. So despite the nature of the work-process...sound made first, then visual - the visual must generally be treated as the 'leading' element, with sound heard as its manifestation. 'Sound is the soul of form, which can only come alive through sound and works from the inside outwards. The form is the outer expression of the inner content.' (Kandinsky: Über die Formfrage, 1912)) Although highly-abstracted, this opening Section was, throughout its animation, referred to as the 'doors sequence' -

in reference to William Blake's

If the doors of perception were cleansed,
Everything will appear to man as it is, infinite.

Graphically it echoes Victor Vasarely's (b.1908) Homage to Malevich (1953) [Slide 70].

Having established, by virtue of its placement at the head of the film, and by insistence on the musical repetition, that synchronism is a norm (as one expects in any commercial film) it is possible to become more selective on the choice of synchronous points in Section 1.

Section 1

Here again we can find a model in commercial cinema, albeit a distant one. Synchronous material is now selective; a sound environment is heard, with foregrounded melodic features. The first three 'melody-notes' are left without visual complement (the audience will not, of course, be expecting any, but it is as much the composer's decision not to provide synchronous visuals as it is to provide them) and it is only on the repeated Eb's in bars 3 and 4 (see sound-score) that visual synchronism appears and then recurs intermittently throughout the Section. An interesting polyphony can be created by this practice, for the synchronous visuals will somehow be seen and experienced as 'enhancing' the sounding pitches, elevating them to a higher, more foregrounded role in the musical argument. Diagrammatically it might appear:

VISUAL :			x x	x x
AURAL :				

In other words, the synchronism of the visual lends a silent accent to the ringed pitches, marking them out prominently. The Eb repetitions so synchronised link up with the high E natural repetitions of the Introduction. Synchronism has now been confirmed as a primary binding element between the media, but one which may be disregarded at will. It is at once a means of emphasis and a means of 'marrying' sound and visual such that the two appear as one. The compositional discreteness of sound and visual generation is wholly disguised...the two become one medium - soundfilm, perceptually inseparable.

The repetition of the A's in bars 9 - 11 is similarly enhanced, and there follows an interesting treatment of the musical material in bars 13 - 14. The figure E Eb Eb F is synchronised to a visual figure which earlier appeared against (bar 6) Db F E D natural. This is an instance of a visual recall allied to new sound material, and is a useful device for binding and relating disparate musical materials by visual means. Whilst the melodic and rhythmic shape of the musical material in bars 6 and 13 - 14 is really quite dissimilar, the visual repetition makes them seem related - they are thus unified by extra-musical means. Similar devices can be found in ballet and modern dance, when the same gestures may accompany different music, and indeed were the practice quite unfamiliar it would hardly be effective in the present context. Here, though, the oneness of the audio-visual synchronism is much stronger than in dance; it is

absolutely exact, shares the same 'location' and is stripped of anthropomorphic content; the elements are purified and speak the clearer in consequence.

Returning to bar 12, the high C and the low, rich D dominant-seventh oscillation are heard to 'release' the network of lines into rotational movement, a movement which relates to the dimly perceived trajectory of lines seen as background to the Introduction. As the rotation continues, it is overlaid by an enlarged version of itself - a silent 'crescendo'.

The repeated pulsing isosceles triangles seen during bars 15 - 17 are an unsynchronised complement to the synchronous repetitions occurring earlier in the Section and in the Introduction.

At Ib (bar 18), as the melodic line breaks up in a burring C sharp 'diminuendo', a multiple zoom into the background rectangle begins, moving from blue gradually through to yellow, which is to be the background 'rain of triangles' colour of Section 2. These zooms are unsynchronised, for there are no discrete events on the sound-track, only an oscillating figure which dies away, 'beating' on a C/B sharp as the screen is flooded with yellow. (Compare this zoom with Vasarely's rotating-zoom 'chronophotograph' entitled Vonal (1966) [Slide 71]. Vonal is again echoed in the background network of lines (Introduction) and in the background rotation of Section 6.

Section 2

Musically this Section is a monophonic, palindromic 26-bar statement. The sounding retrograde is paralleled by a visual retrograde, only this appears in close-up - hence much of the material seen in the original presentation is now off-screen. Action of material is mainly vertical. (That of Section 3 is mainly horizontal; thereafter diagonal moves are added, followed by rotations and simulated 3-D effects, concluding with the 'psychedelic' fluttering of the last Section, Section 9.) The recurring sustained B's in bars 3-4, 7-8, 10-11, and in retrograde 16, 19, 23-24, are visualized as a decorated 'wipe' figure moving across the screen from side to side. In this Section there is a high degree of synchronous activity, although the almost constant fluid animation of the graphics plays down the staccato harshness of the sound-track.

Section 3

The opening links this Section to Section 2. The accompanying oscillating 4th figure is loosely related to the constant spatter of green images (single-frame 'unrelated' shots), and to the horizontally moving isosceles triangles and pulsating circles. There is a strong illusion here of three levels - foreground green spatter-shapes, background horizontal triangles, and in the middleground, the individually synchronized material which corresponds to the 'melodic' material in the upper stave of the score. This kind of allocation of 'voices' across the media is not integral to the medium of course; one does not have to account for each audio-visual gesture in such a

simplistic manner. Even here, the two-stranded music track is complemented by clearly three-stranded visuals, such that those visuals relating to the sounded accompaniment are 'sandwiching' the melodic line. Thus here the visualized melodic line has to be sought out from within the cyclic continuum - it is not as prominently displayed as was the case in Sections I and 2.

The wipes of Section 2 are present here also, but moving vertically now, and infilling acoustic silence (in bars 8 and 17). A musical echo on B (again) is provided by a blue figure moving out of screen left and then returning from screen right. Off-screen space is strongly exploited here (- not at all in the Introduction) now that attention is with individual movement. The off-screen space implied through the visual movements of both background and foreground figures in Sections 2 and 3 enriches the medium, releasing the viewer from that fixity of gaze common to much abstract animation. At a later stage in the film (Section 7) simulated panning movements are incorporated, further to relieve the dominance of central fixation. Section 3 closes with a cycled pulsation of a blue figure mid-screen, set to a D held above the 'fourth' ostinato which has persisted throughout the Section.

Section 4

Musically, a clear repetition of Section 2, retrograded as before, then presented again forward and back. This material is itself unaltered, but at bar four a 'counterpointed' line enters, overlaid on the original material, and sharing its timbre and register to the extent that many new interconnections are heard. At bar 37 a

low D pedal is sounded and retained until it fades just before the close of the Section where the retrograde in the other musical voice reworks back to its beginning. The pedal entry functions as a point of synchronous climax with the visuals. This will be discussed in a moment.

To accompany the opening music of Section 4 (drawn from Section 2) the visual material of Section 2 is presented again, and again synchronised as before to the sound. But the angle has been turned from vertical to diagonals, mirrored Rorschach-fashion - as if the earlier and subsequent musical retrogrades were now present simultaneously in the visual mirroring. The resultant visual complexities immediately compensate for the repeated use of already familiar material, and on the entry of additional music in bar 4, an overlay of synchronous visual entries is encountered - strong diagonal sweeps of yellow discs, followed by several permutations.

At the point of retrograde in bar 26 there is a change from the red background to an alternating yellow/blue background which resolves itself into green at bar 28. The acciaccatura coloured-noise impulses in bars 33-37 are synchronised to flashes of yellow which cut into the flow of imagery, building an extended anacrusis into the anticipated D downbeat at the close of bar 37. This is the culmination of Section 4, and to increase its impact the most complex and 'splendid' visual overlays are now introduced. A field of pulsating 'op-art' discs with fast-interchanging hues half-masks the ongoing retrograded activity of the visual animation. The pace of colour-fluctuations and metamorphosis of shape is so fast that any real-time visual analysis is precluded, and the observer can only submit to the welter of activity.

Section 5

Exhausted by the abundant exuberance of Section 4, a momentary quietude is now found; the sound-track is silent, and a mesmeric blurred rotation of pink on blue lulls the viewer. Imperceptibly, a densely-scored chordal complex enters, peaks three times, and fades. It introduces gravity-defying stick-shapes, which twist and turn in three-dimensional space, cleansing the screen of its previous burden of multicoloured imagery. A fade to black leads to

Section 6

The return of the material from Section 1 will be recognised, for the music is virtually the same (transposed up a tone with a consequent slight tempo increase) but with an overlay of a sustained C - Bb seventh (the interval of a seventh later appears throughout Section 9), and the visuals are clearly variants upon their former selves; the background, previously still, now rotates very slowly, as if freed from stasis by the soundless background rotation of Section 5, and the superimposed figures are seen at close quarters, enlarged and reddened. Four symmetrically placed discs rotate in place of the network of lines from Section 1. (In addition to the influence of Vasarely's Vonal noted above, acknowledgement should also be made to Hans Fischinger's background rotation in Tanz der Farben.)

The multiple zoom which closes Section 1 is replaced at the equivalent point in Section 6 by a faster rotation overlaid on the slowly rotating background which is about to complete one revolution.

A dissolve, both visual and aural, links Section 6 to Section 7.

Section 7

The sound-track of Section 7 is complex. There are up to six strands moving at a time. Rather than attempt to 'cap' the climax of audio-visual activity already achieved at bar 37 ff in Section 4, the visual material here is deliberately restrained, the incorporation of a new device - 'panning' movement of the camera - being considered enough to hold the attention. In so far as is possible, the viewer is encouraged to listen more actively than he might customarily do to the music during this Section as far as bar 21. As noted earlier, it is the aural glissandi in bars 4 - 6 and 13 - 15 from which visual echoes arise, and the only synchronization - to the high 'glockenspiel' pitches of bars 6 - 8, 10 - 12, 15 - 17, and 19 - 20 - is in the form of a change of background hue: blue, yellow, blue, yellow, respectively. Many aural events are left unsynchronised, notably the staccato entries on the fourth stave in bars 17 - 20.

A sudden burst of white noise/white screen in bar 21 is followed by rapid fire spatter-imagery drawn from Section 3, with a low sustained F similar in function to the sustained D of Section 4. This spatter is twice interrupted before a pulsating augmented 6th (Ab - Fsharp) introduces

Section 8

In some ways linked to Section 5, with a static sound-track, and hues predominantly of blue and pink, sharing the white stick overlays which, no longer so fluidly handled, now respond in obedience to the pulsations of the sound. A spinning red triangle grows and diminishes before a diagonal background of a stylised 'keyboard' design (drawn from a close-up of the large background of Section 1 and Section 6), bursting out of this into a swift succession of primary-colour expanding discs, set centrally.

Section 9

The final Section resumes the tempo of Section 8, transforming the 'seventh' pulsation into a heavy intake and expiration of breath. The 'seventh' figure appears as a gravity-bound oscillation which, at each successive entry, is synchronised to multicoloured versions of the designs originally synchronised to the Introduction, but now seen in reverse order. The influence of Vasarely is again apparent; compare his Sirka (1964) [Slide 72]. A more immediate stimulus was the garish brilliance of Fischinger's Allegretto. The rapidity of colour-change in these figures is literally dazzling, and only on the entry of the final figure is there a suggestion that full circle has been found in the return of a simple blue figure recognisably the same as that which was synchronised to the first high E. As the 'breathing' becomes more prominent a multiple swift dissolve on a still figure taken from early in Section 2 is superimposed, the background having earlier been released from stasis into the now

familiar clockwise rotation. The film ends suddenly at a climax of 'breathing', and it is left to the ensuing blackness to defuse/diffuse the tension created.

* * *

Opus I is not a closed form, but open, like series- or scroll-paintings or - more directly - like a live-action shot where the criteria for starting and stopping the flow are difficult to define. 'It is as if one says, this fragment will suffice, it coheres internally, even though one acknowledges that it is really part of an indivisible continuum. Perhaps one is hazarding a form of communicative synecdoche? One selects a part, in the full knowledge that it is only a part, and that the simultaneity of sensations ensnared within the film's specific clock-duration must escape into the viewer's psychological time in order there to secure release from the confines of its medium.

CHAPTER EIGHT

CONCLUSIONS

The history of absolute film outlined in the earlier Chapters has demonstrated the crucial role taken by music in guiding artistic experimentation. Unsure of their ability to control graphics in time, artists approached music as mentor, seeking out hierarchical relationships and fundamental laws of polarity which might with equal efficacy be transposed to the visual plane.

From a synthetic unison of colour and sound, art progressed to an awareness of the essential perceptual differences between the seen and the heard. Aspirations towards the transcendental, conjoined with a curiosity about temporal experience, then persuaded some artists of the necessity ultimately to relinquish the canvas in favour of the rostrum-camera. The unfamiliar medium of film at first posed such technical and imaginative problems that artists retreated before its complexities. Eggeling, Richter and Ruttmann, however, met the challenge, creating works that, for all their limitations, established a range of techniques and aesthetics upon which future absolute-film makers could found their own practice.

Oskar Fischinger, Harry Smith, and others, refined these techniques of absolute animation, whilst the Whitney brothers advanced a radical aesthetic of audio-visual interrelation against which earlier mixed-media experiment pales into insignificance. Their work of the late 1940's remains unquestionably the outstanding achievement in this field.

My own work has moved towards establishing a middle-ground between Fischinger's very accessible visualizations of popular music, and the testing cerebrations of the Whitney Film Exercises. Fischinger's lack of compositional training compelled him to animate

to existing recordings, although he readily acknowledged that properly both sound and visual should be under the control of one mind. The Whitney brothers, virtually achieved this ideal, working aesthetically as one, albeit with complementary skills. However, their Exercises, remarkable products of a serialist aesthetic, remained exploratory and experimental, doggedly plotting interrelations of sound and visual whilst seemingly disregarding their impenetrability as works of art.

Opus I has sought to communicate on many levels, aspiring to delight by its kinetic excitement, to stimulate by its varied electronic sound-world, and to provoke intellectual curiosity by its faceting of audio-visual correlation - now in close and obvious synchronism, now operating in some multi-layered, polyphonic, and asynchronous mode. In attempting such a major work, fluidly animated throughout its ten minutes' duration, the temptation to overburden the senses was not altogether resisted, and consequently I now feel that Opus I may suffer from an *embarras de richesse*. For all its necessarily detailed pre-planning - whereby intellectual justification might now be given for much of the film's content - so foreign does this medium remain, even to myself, and so conditioned is one to experiencing visuals as either narrative-bound or simply decorative, that it is still all too often the case that true understanding of the audio-visual compound is found wanting. Surface activity may entrance, whilst its intended function in the scheme of things passes unobserved. I believe though, that it was justifiable to overreach myself in Opus I, for it now becomes possible, indeed desirable, to return to a simpler style, where individual problems of audio-visual interrelation may be addressed. A more contained use of colour, shape, and sound must follow, each dimension of the argument invested

with an authority and purpose which in Opus I was rather lost amidst the welter of activity. The value of Opus I lay in offering a glimpse of the goal.

Lacking a corpus of masterworks in the medium, and dissatisfied with cloistered experimentation, I have tried to foresee the potential of a symbiotic absolute image-with-sound medium, adumbrating some of the riches in store. Fortunately, reliance upon traditional animation and sound-studio techniques is no longer essential, for there is little question but that future work will be facilitated by the intervention of computer technology. Indeed, the hardware is fast becoming so readily available to the individual that it is only the audio-visual aesthetic which has yet to come of age.

ERLÄUTERUNG ZUR PARTITUR: FARBENSONATINE (3 TAKTE)

1. REIHE: Takteinteilung für das Farbenspiel. Durch Zusammenlegen einiger Takte wird jeweils eine größere Bewegung zusammengefaßt.

2. REIHE: Die Farben. Die Sonatine beginnt mit weißem Licht.

3. REIHE: Die Musik.

4. REIHE: Die Stellung der bewegbaren Lampen. Während des ersten Teiles der Sonatine im Takt 8-12 verändert sich die Stellung der Lampen in eine Horizontallage in 2 Reihen übereinander geordnet. Die Lampen, zum langsamen oder raschen Öffnen und Verschließen eingerichtet, werden von 2 Personen bedient. Das Öffnen erfolgt in der Reihenfolge 1, 2, 3, 4 usw. Durch Überschneidung der Lichtstrahlen erscheinen die Lichtfelder in der Reihenfolge von oben nach unten (siehe Reihe 9 und vergleiche die Tonbewegung der Reihe 3).

5. REIHE: Das Öffnen der Schablonen erfolgt in der Reihenfolge 1, 2, 3, 4.

6. und 7. REIHE: Haupt- und Lampenschalter.

8. REIHE: Die Widerstände. In der 8. Vertikalrubrik erfolgt das allmähliche Ausschalten – vergleiche das Verklingen in der Tonreihe – bis zur völligen Verdunkelung der Lichtquellen. Nur das Licht der Lampe 2 bleibt länger liegen – „d“ in der Tonreihe bleibt länger liegen – und leitet über zur neuen Kombination im Takt 2.

Takt 2, 1. Rubrik Das Finschalten der Widerstände wird nicht sichtbar, da in dem Moment der Verdunkelung alle Lampen geschlossen werden und nur Lampe 1 Licht entsendet.

9. REIHE: Das lineare Gesamtbild. Die sich durchdringenden Lichtflächen sind schematisch durch lineare Darstellung angegeben.

L. HIRSCHFELD-MACK

DREITEILIGE FARBENSONATINE (Ultramarin grün) von Ludwig Hirschfeld-Mack
Die ersten drei Takte

Tempo $\text{♩} = 50$

	TAKT 1	TAKT 2	TAKT 3	TAKT 4
1 TAKTEINHEIT	[Musical notation]			
2 FARBEN	weiß			
3 TON	[Musical notation]			
4 LAMPEN	[Lamp positions diagram]			
5 SCHABLONEN	[Stencil positions diagram]			
6 HAUPTSCHALTUNG 1 u 2	[Switch states]			
7 LAMPENSCHALTER 1 bis 4	[Lamp switch states]			
8 WIDERSTÄNDE 1 u 2	[Resistor states]			
9 LINEARES GESAMTBILD	[Linear light image diagram]			

ERLÄUTERUNGEN $\text{♩} = 50$ Takt Formate \circ Widerstand langsam ausschalten \bullet Widerstand rasch ausschalten
 \downarrow nach dem Rhythmus der Musik ruckweise öffnen der Schablone \downarrow allmähliches Öffnen der Schablone \ast Lampe 2 ist gesondert geschaltet

1.3 Luigi Russolo. The Awakening of a City

ESORDIO

Dalla rete di rumori: -

VEGLIO DI UNA CITTA.

Musical score for the 'ESORDIO' section, featuring eight staves of noise instruments. The staves are labeled from top to bottom: Ululatori, Rombatori, Capittatori, Strapiculatori, Scoppiatori, Ronzatori, Gorgogliatori, and Sibilatori. Each staff contains a series of rhythmic and pitch-based noise patterns.

Musical score for the 'VEGLIO DI UNA CITTA.' section, featuring eight staves of noise instruments. The staves contain noise patterns with dynamic markings: 'F' (Forte), 'FF' (Fortissimo), and 'P' (Piano) are visible on the second, fourth, and eighth staves respectively.

106 Russolo Score of 'The Awakening of a City' 1914

SHOT I SHOT II SHOT III SHOT IV SHOT V



PICTURE FRAMES

	A		B		A		B		C	
MUSIC PHRASES	1	2	3	4	5	6	7	8	9	

MUSIC

Adagio e-48

LENGTH (in measures)	1	1	1	1	1	1	1	7/8	1/8	1
	2		2			2		1 1/8		1 1/8

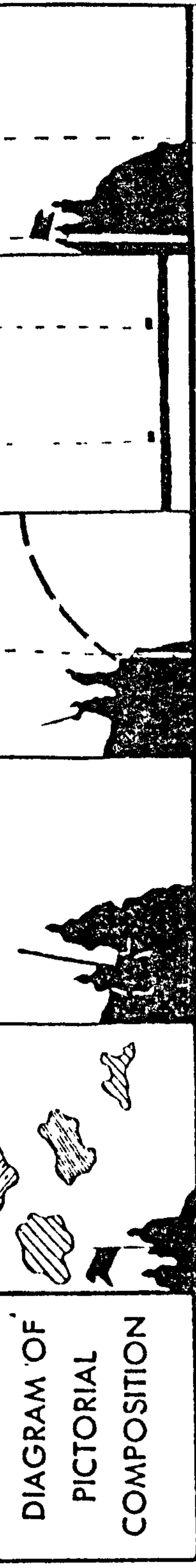


DIAGRAM OF PICTORIAL COMPOSITION

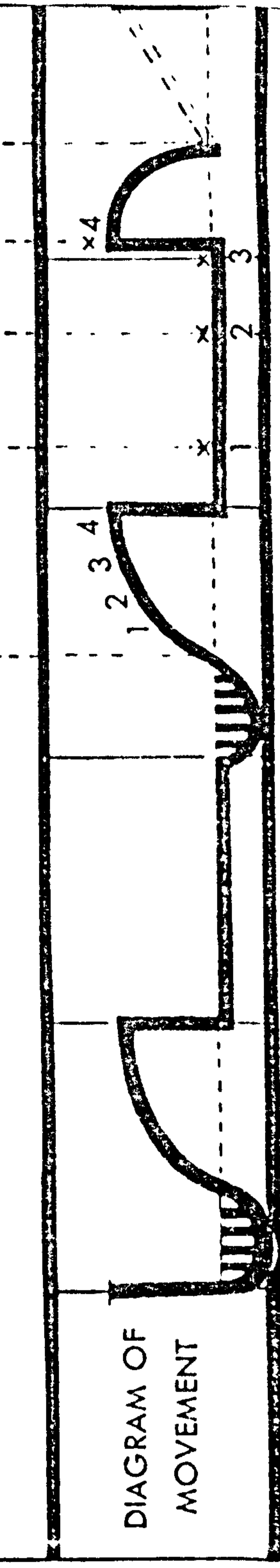
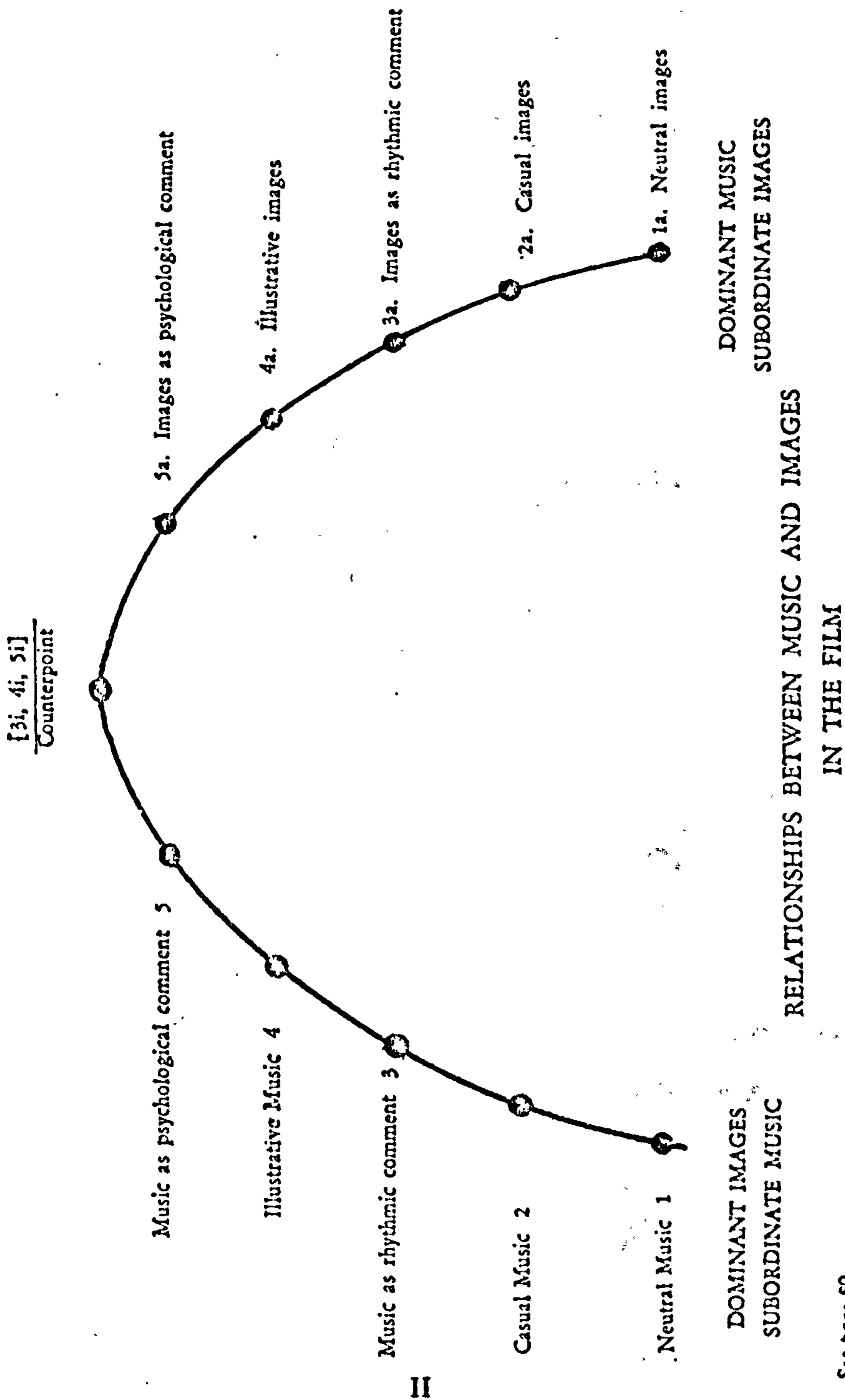


DIAGRAM OF MOVEMENT



1.7 Erik Satie. Entr'acte; rhythmic scheme

A

"Relâche"

Cinema

1 Titie *deuxième, l'air qui se fait*
lent & long & allongé

2 4/4

3 4/4

4 8/8

5 8/8

6 8/8 *avec 2 lya. & allongé*

7 8/8

8 4/4

9 4/4

10 8/8

11 8/8

12 8/8

13 *Ving-tair, par Taitou &*
ditonné ad lib. (60)

14 4/4

15 8/8

16 8/8

17 8/8

B

La deuxième figure Justine
(60)

18 8/8

19 8/8

20 8/8

21 8/8

Chaque & début de l'entracte
(premier & sixième)
60 - 60

22 8/8

23 4/4

24 8/8

25 8/8

26 *(La main)* 8/8

27 *(La main)* 8/8

28 *(La main)* 8/8

29 *(La main à la main)* 8/8

Contre au palente

30 8/8

31 8/8

32 8/8

33 8/8

8 Satie's pre-compositional 'rhythmic structure' for *Entr'acte*.

1.8 Arnold Schoenberg. Die Glückliche Hand

22

das über Braun (♩).....in ein schmutziges Grün übergeht (♩).....
.....seine Augen werden aufgeregt (Schmutzig

130

Tempo

Fl. Bb. Braun
Cl. B. sp
B. ppp
Ob. Kl.
Hr. pp
Trom. pp
Pos. pp

grün (♩).....

poco rit. gedehnt
etwas langsamer

135

Tr. pp
Fl. ppp
S. Gg. ppp
Hr. pp
Cl. B. pp
Trom. pp
Pos. pp
Cyl. pp

.....Daraus entwickelt sich ein dunkles Blaugrau (♩).....

accel. Tempo ♩ = 92-100

Cl. B. pp
Pos. mp
Tr. pp
Hr. pp
S. Gg. pp
Cl. B. pp
Trom. pp
Pos. pp
Cyl. pp

U E. 5669

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VARIATIONEN

I

Sehr mäßig $\text{♩} = ca 40$

Anton Webern, Op. 27

1 2 3 4 5
6 7 8 9 10
11 12 13 14
15 16 17 18

pp
p
f
dtm.
p
pp
rit.

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FILMPARTITUR KOMP. II/22

WERNER GRAEFF

I II III IV V VI VII VIII IX X XI XII XIII XIV



0 1% 3 →

XV XVI XVII XVIII XIX XX XXI XXII XXIII XXIV XXV XXVI XXVII XXVIII XXIX XXX XXXI XXXII XXXIII



XXXIV XXXV XXXVI XXXVII XXXVIII XXXIX XL XLI XLII XLIII XLIV XLV XLVI XLVII XLVIII XLIX L LI



→ 30%

Dichtespiel op. 1 von Willem Ruidman

Musik

von

Max Butting
(op 23)

Veröffentlichung am 27. April 1921 im Maxmorkaus (Berlin)
auf Wunsch Willem Ruidman, Bayreuth.

Handwritten musical score for the first system, consisting of five staves. The notation includes various note values, rests, and dynamic markings such as *p* and *f*. The staves are connected by a brace on the left side.

Flöte als temporäres für Hornausgetauscht
Nicht zu verwenden

Handwritten musical score for the second system, consisting of five staves. The notation includes notes, rests, and dynamic markings such as *p* and *f*. The staves are connected by a brace on the left side.

Handwritten musical score for the third system, consisting of five staves. The notation includes notes, rests, and dynamic markings such as *p* and *f*. The staves are connected by a brace on the left side.

Flöte
Flöte

Handwritten musical score for the fourth system, consisting of five staves. The notation includes notes, rests, and dynamic markings such as *p* and *f*. The staves are connected by a brace on the left side.

13

4

The musical score is written on five systems of staves. Each system consists of a vocal line on the left and a piano accompaniment on the right. The piano part is highly rhythmic, featuring complex patterns of notes and rests, including triplets and sixteenth notes. Dynamic markings such as *f*, *p*, and *pp* are used throughout. The vocal line contains lyrics in a non-Latin script, likely Hebrew or Yiddish. The score is enclosed in a hand-drawn rectangular border.

No 4

Allegro energico

5

Violin I (Vl.)
Violin II (Vla.)
Viola (Vlc.)
Cello (Cb.)

10

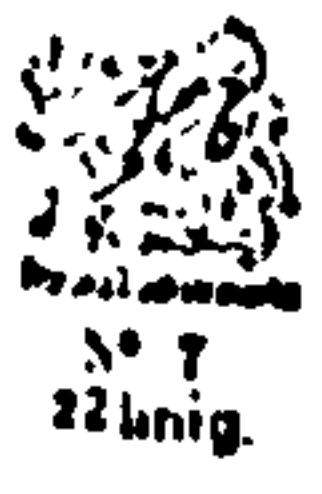
Trumpet I (Trp. I)
Trumpet II (Trp. II)
Violin I (Vl.)
Violin II (Vla.)
Viola (Vlc.)
Cello (Cb.)

15

20

Flute I (Fl. I)
Flute II (Fl. II)
Trumpet I (Trp. I)
Trumpet II (Trp. II)
Violin I (Vl.)
Violin II (Vla.)
Viola (Vlc.)
Cello (Cb.)

non legato



1.16 Hanns Eisler. Music to Opus III (cont)

2

Musical score for the first system, measures 25-28. The score includes parts for 1.2. Fl., 1.2. Cl. B, Trp. B. (1. and 2.), Pos., Schlagw., Vl., Vla., Vlc., and Kb. The music features complex rhythmic patterns and dynamic markings such as *pp*, *f*, *mf*, and *ppf*. A *non legato* marking is present above the Flute part in measure 28. The percussion part includes a *Drum* part with a *mf* dynamic.

25

Musical score for the second system, measures 29-32. The score includes parts for 1.2. Fl., 1.2. Cl. B, Trp. B. (1. and 2.), Pos., Schlagw., Vl., Vla., Vlc., and Kb. The music continues with complex rhythmic patterns and dynamic markings such as *f*, *mf*, and *ppf*. A *non legato* marking is present above the Flute part in measure 32. The percussion part includes a *Drum* part with a *ppf* dynamic.

30

Subito-ppp

1.2. Fl. *staccato*

Ob.

1.2. Cl.

Fg.

2 Trp.

2 Cor.

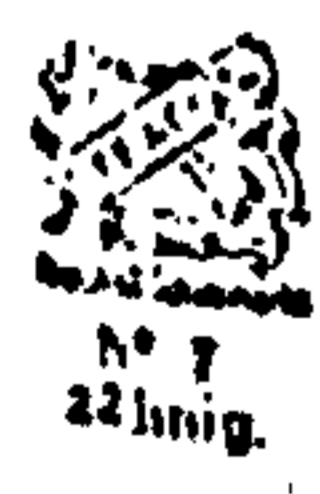
Cellos *Bretschneider* *mf* *mf*

Violins *alco* *ppp* *alco* *ppp*

Viola

Cello

30



The musical score is arranged in a standard orchestral format. At the top, there are three empty staves. Below them, a circled number '35' is centered. The instruments and their parts are as follows:

- 1. & 2. Fl.**: Flute parts, mostly silent in this section.
- Ob.**: Oboe part, mostly silent.
- 1. & 2. Cl. B.**: Bass Clarinet parts, playing a melodic line with a first ending bracket.
- Fg.**: Bassoon part, playing a melodic line with a first ending bracket.
- Tsp. B.**: Trumpet B parts, playing a rhythmic accompaniment with a *(marc.)* marking.
- Pos.**: Trombone parts, playing a rhythmic accompaniment with a *(marc.)* marking.
- Kl. Tr.**: Percussion part, playing a rhythmic pattern with triplets.
- Kl. Trk.**: Cymbal part, playing a rhythmic pattern with triplets.
- Fl.**: Flute part, playing a melodic line with a *simile* marking.
- Vla.**: Viola part, playing a melodic line with a *simile* marking.
- Vlc.**: Violin part, playing a melodic line with a *simile* marking.
- Kb.**: Cello part, playing a melodic line with a *simile* marking.

At the bottom of the score, there are three empty staves. A circled number '35' is also present in the lower middle section of the score.

A STATEMENT

THE DREAM of a sound-film has come true. With the invention of a practical sound-film, the Americans have placed it on the first step of substantial and rapid realization. Germany is working intensively in the same direction. The whole world is talking about the silent thing that has learned to talk.

We who work in the U.S.S.R. are aware that with our technical potential we shall not move ahead to a practical realization of the sound-film in the near future. At the same time we consider it opportune to state a number of principle premises of a theoretical nature, for in the accounts of the invention it appears that this advance in films is being employed in an incorrect direction. Meanwhile, a misconception of the potentialities within this new technical discovery may not only hinder the development and perfection of the cinema as an art, but also threatens to destroy all its present formal achievements.

At present, the film, working with visual images, has a powerful affect on a person and has rightfully taken one of the first places among the arts.

It is known that the basic (and only) means that has brought the cinema to such a powerfully affective strength is MONTAGE. The affirmation of montage, as the chief means of effect, has become the indisputable axiom on which the world-wide culture of the cinema has been built.

The success of Soviet films on the world's screens is due, to a significant degree, to those methods of montage which they first revealed and consolidated.

Therefore, for the further development of the cinema, the

257

important moments will be only those that strengthen and broaden the montage methods of affecting the spectator. Examining each new discovery from this viewpoint, it is easy to show the insignificance of the color and the stereoscopic film in comparison with the vast significance of sound.

Sound-recording is a two-edged invention, and it is most probable that its use will proceed along the line of least resistance, i.e., along the line of *satisfying simple curiosity*.

In the first place there will be commercial exploitation of the most saleable merchandise, TALKING FILMS. Those in which sound-recording will proceed on a naturalistic level, exactly corresponding with the movement on the screen, and providing a certain "illusion" of talking people, of audible objects, etc.

A first period of sensations does not injure the development of a new art, but it is the second period that is fearful in this case, a second period that will take the place of the fading virginity and purity of this first perception of new technical possibilities, and will assert an epoch of its automatic utilization for "highly cultured dramas" and other photographed performances of a theatrical sort.

To use sound in this way will destroy the culture of montage, for every ADHESION of sound to a visual montage piece increases its inertia as a montage piece, and increases the independence of its meaning—and this will undoubtedly be to the detriment of montage, operating in the first place not on the montage pieces, but on their JUXTAPOSITION.

ONLY A CONTRAPUNTAL USE of sound in relation to the visual montage piece will afford a new potentiality of montage development and perfection.

THE FIRST EXPERIMENTAL WORK WITH SOUND MUST BE DIRECTED ALONG THE LINE OF ITS DISTINCT NON-SYNCHRONIZATION WITH THE VISUAL IMAGES. And only such an attack will give the necessary palpability which will later lead to the creation of an ORCHESTRAL COUNTERPOINT of visual and aural images.

This new technical discovery is not an accidental moment in film history, but an organic way out of a whole series of im-

passes that have seemed hopeless to the cultured cinematic avant-garde.

The FIRST IMPASSE is the sub-title and all the unavailing attempts to tie it into the montage composition, as a montage piece (such as breaking it up into phrases and even words, increasing and decreasing the size of type used, employing camera movement, animation, and so on).

The SECOND IMPASSE is the EXPLANATORY pieces (for example, certain inserted close-ups) that burden the montage composition and retard the tempo.

The tasks of theme and story grow more complicated every day; attempts to solve these by methods of "visual" montage alone either lead to unsolved problems or force the director to resort to fanciful montage structures, arousing the fearsome eventuality of meaninglessness and reactionary decadence.

Sound, treated as a new montage element (as a factor divorced from the visual image), will inevitably introduce new means of enormous power to the expression and solution of the most complicated tasks that now oppress us with the impossibility of overcoming them by means of an imperfect film method, working only with visual images.

The CONTRAPUNTAL METHOD of constructing the sound-film will not only not weaken the INTERNATIONAL CINEMA, but will bring its significance to unprecedented power and cultural height.

Such a method for constructing the sound-film will not confine it to a national market, as must happen with the photographing of plays, but will give a greater possibility than ever before for the circulation throughout the world of a filmically expressed idea.

(signed by) S. M. EISENSTEIN

V. I. PUDOVKIN

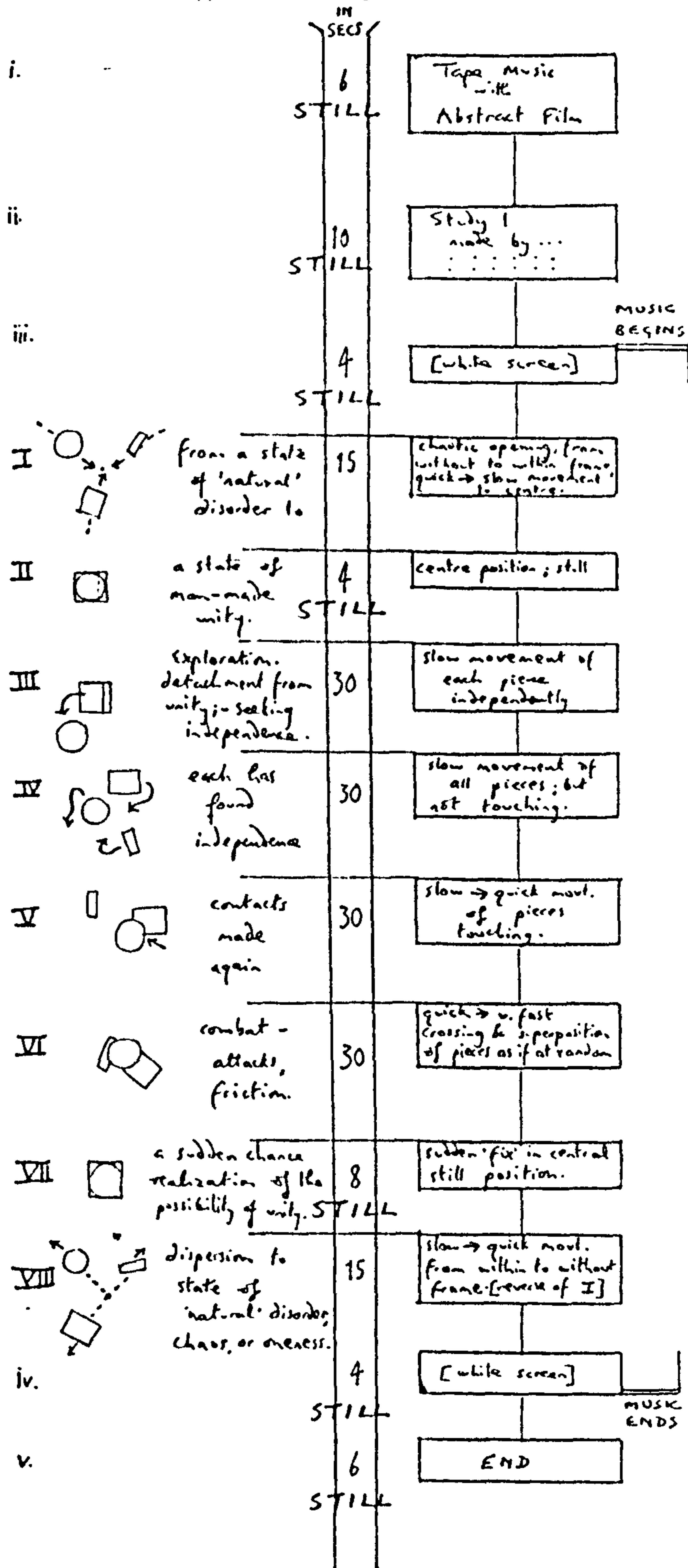
G. V. ALEXANDROV

ories and endorsed by the other two, first appeared in the Leningrad magazine, *Zhizn Iskusstva*, on August 5, 1928. All previous English texts have been translated from a German publication of the statement later in that month. The above is the first direct translation into English from the original Russian text. As predicted by the Statement, progress in the technical development of the Soviet sound-film was slow. In September of that year, the Shorin sound-system was first tested in Leningrad, and these tests were exhibited in March of the following year; in Moscow the Tager system was tried out in July 1929. In August the Leningrad studio of Sovkino constructed the first sound-stage, which was first used for the synchronization of recently completed films. Following the release of *Old and New* in October, arrangements were made for Eisenstein, Alexandrov, and Tisse to go abroad to study the sound-film.]

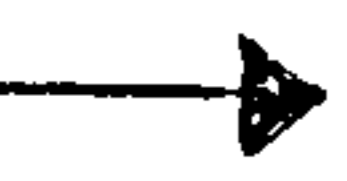
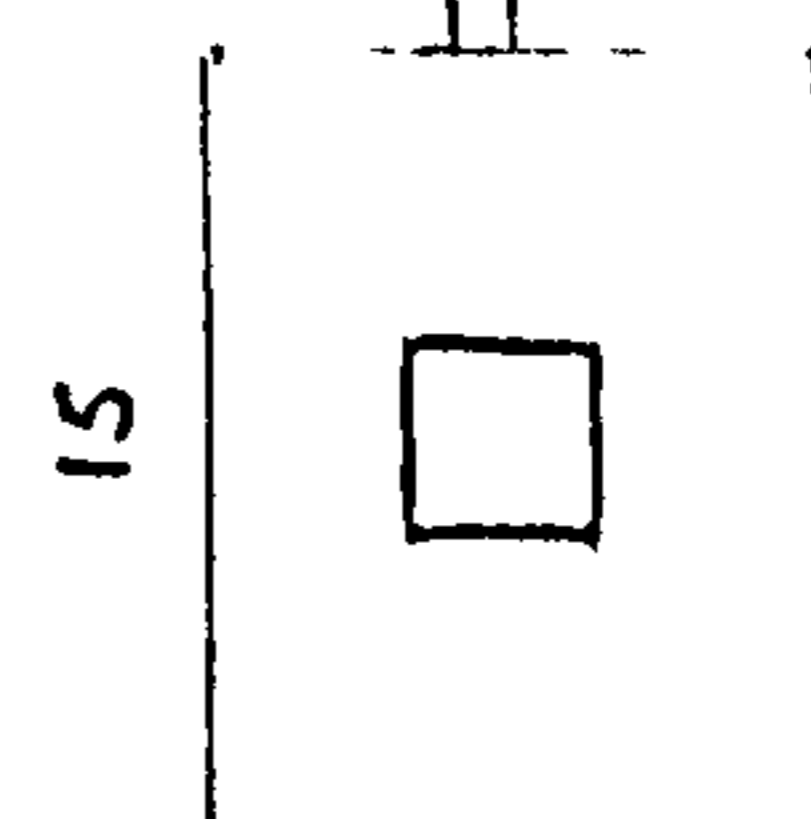
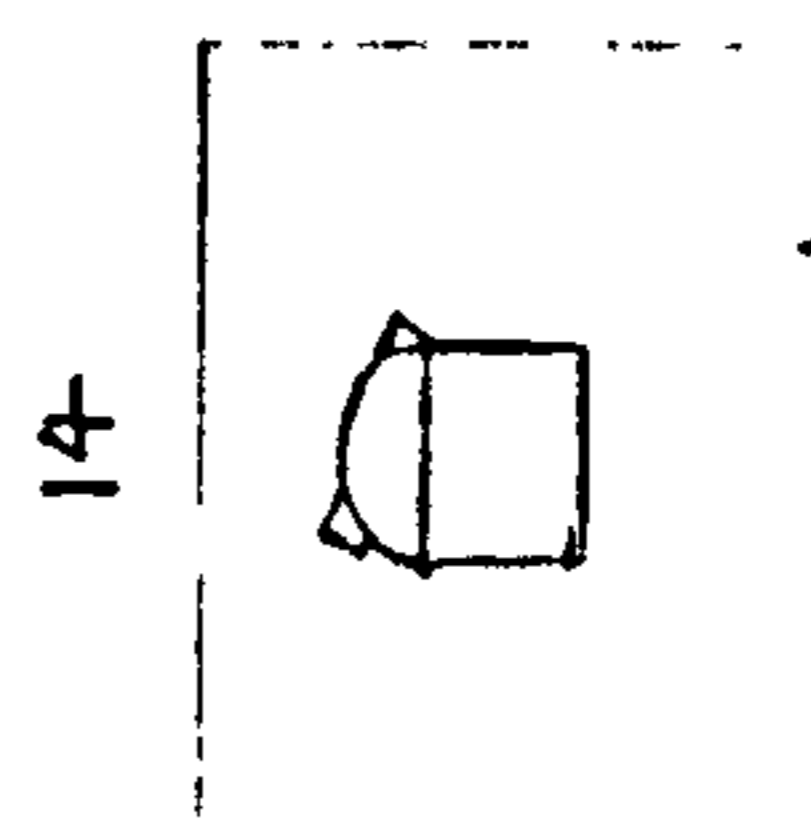
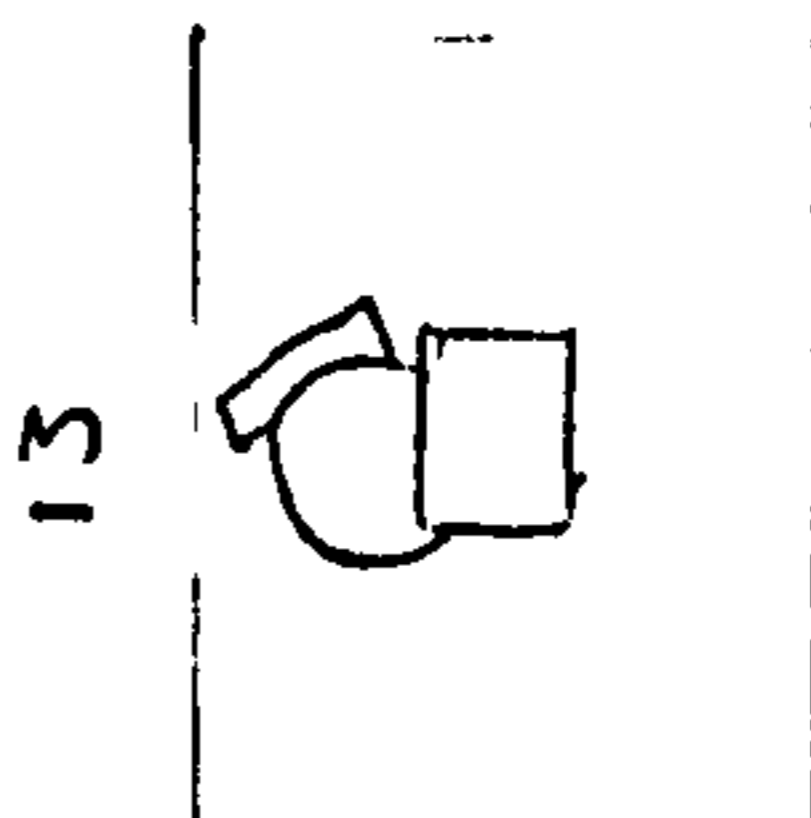
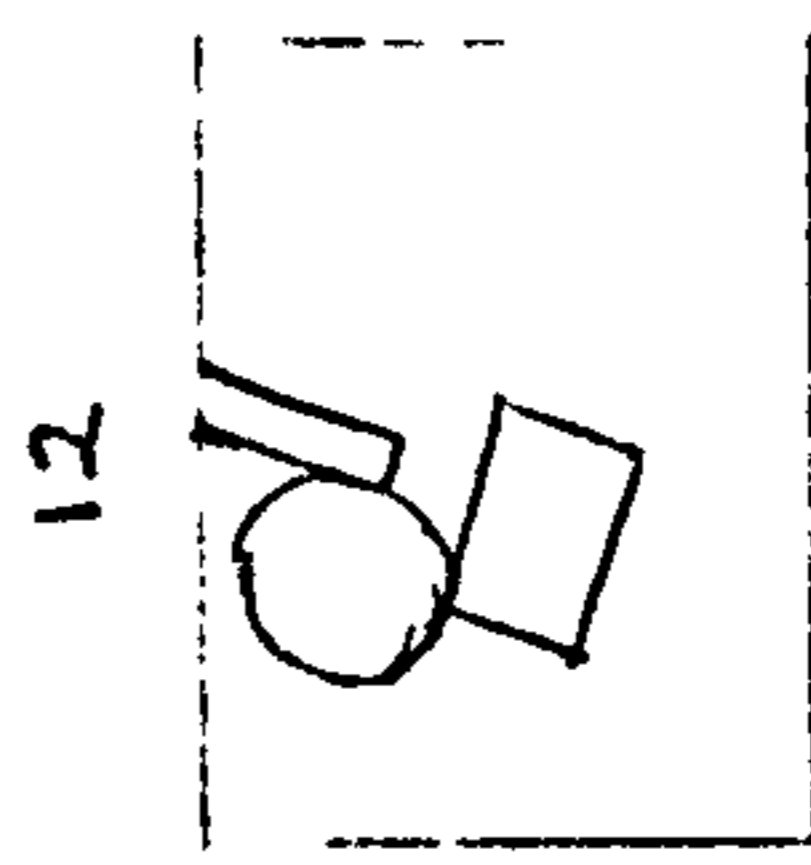
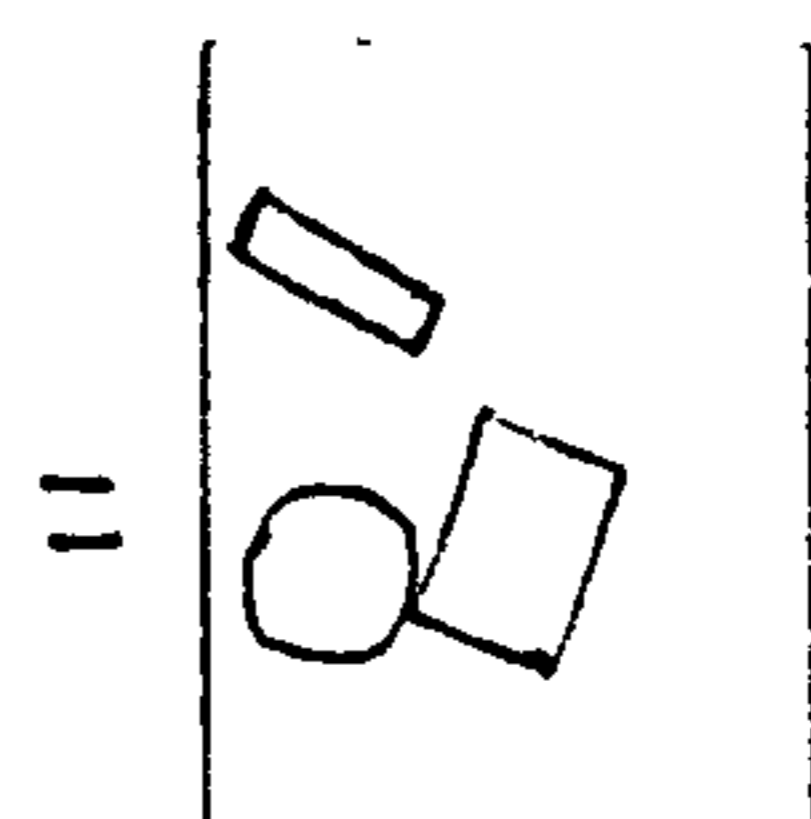
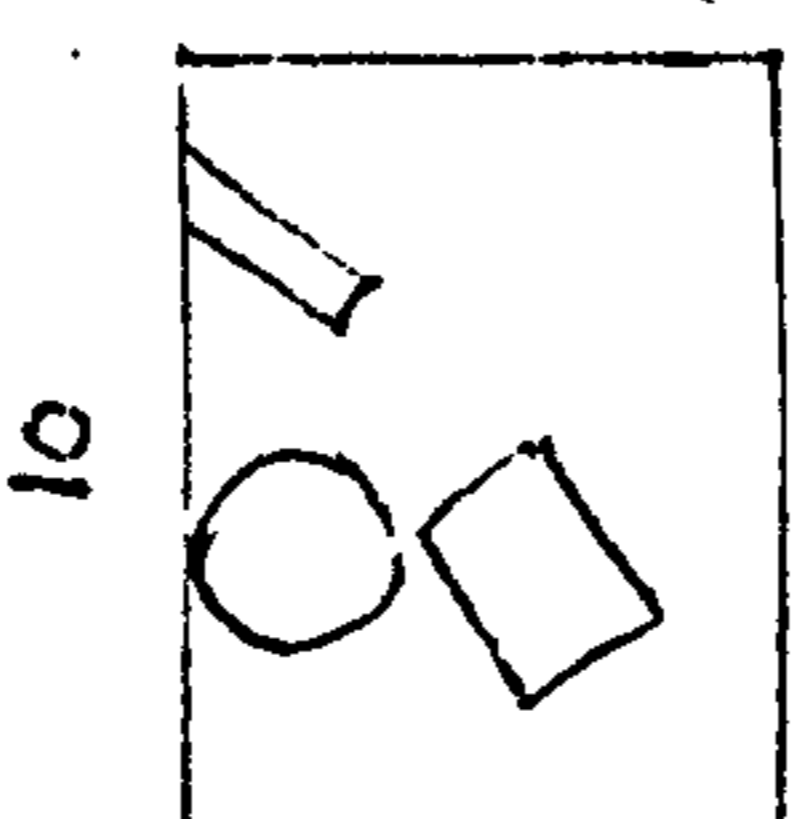
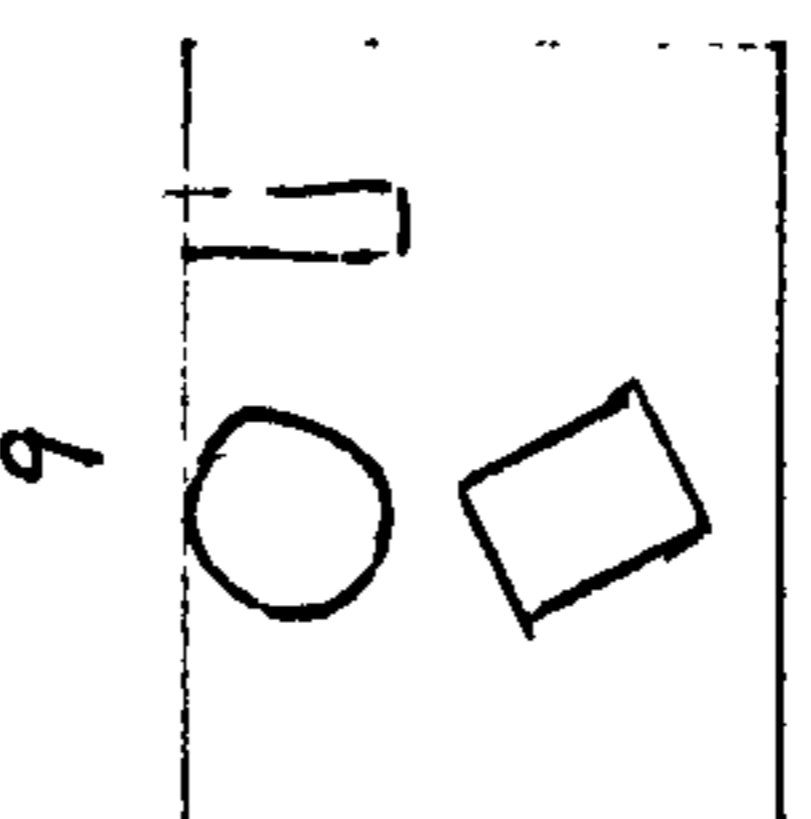
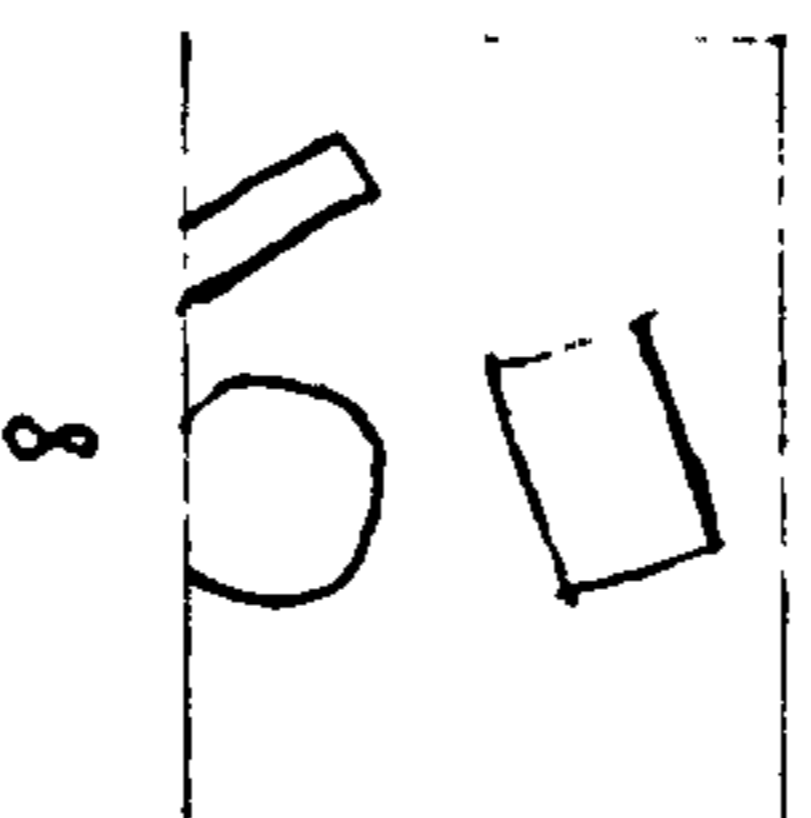
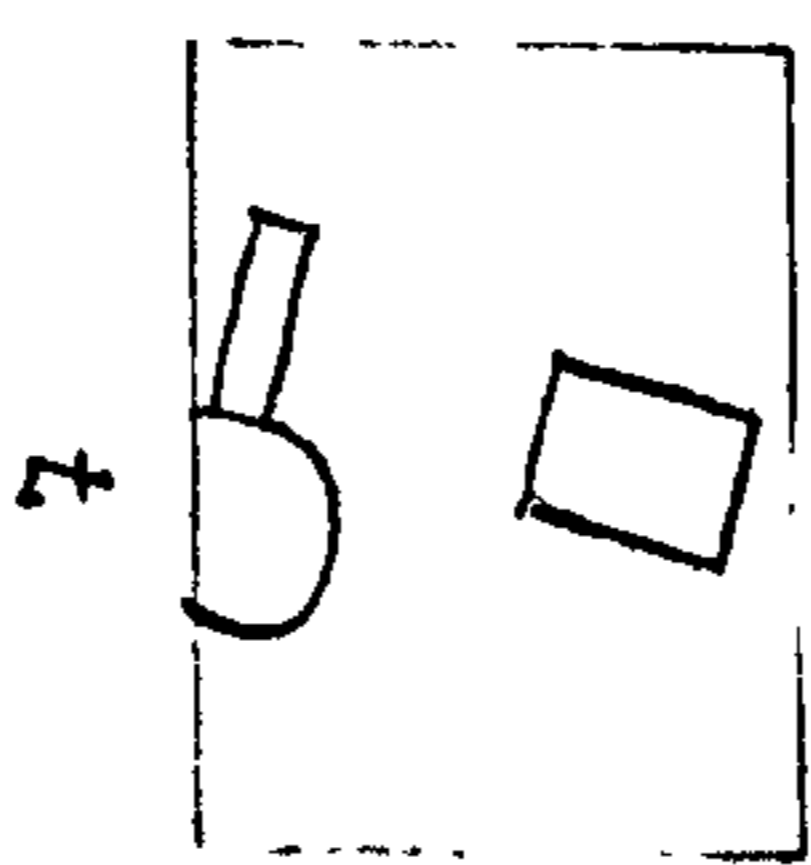
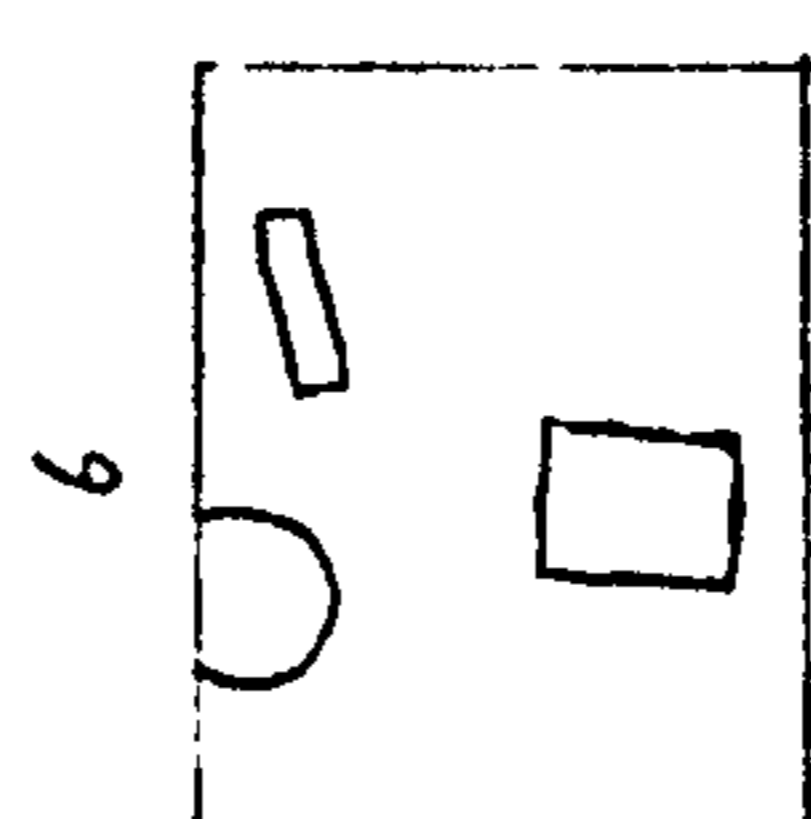
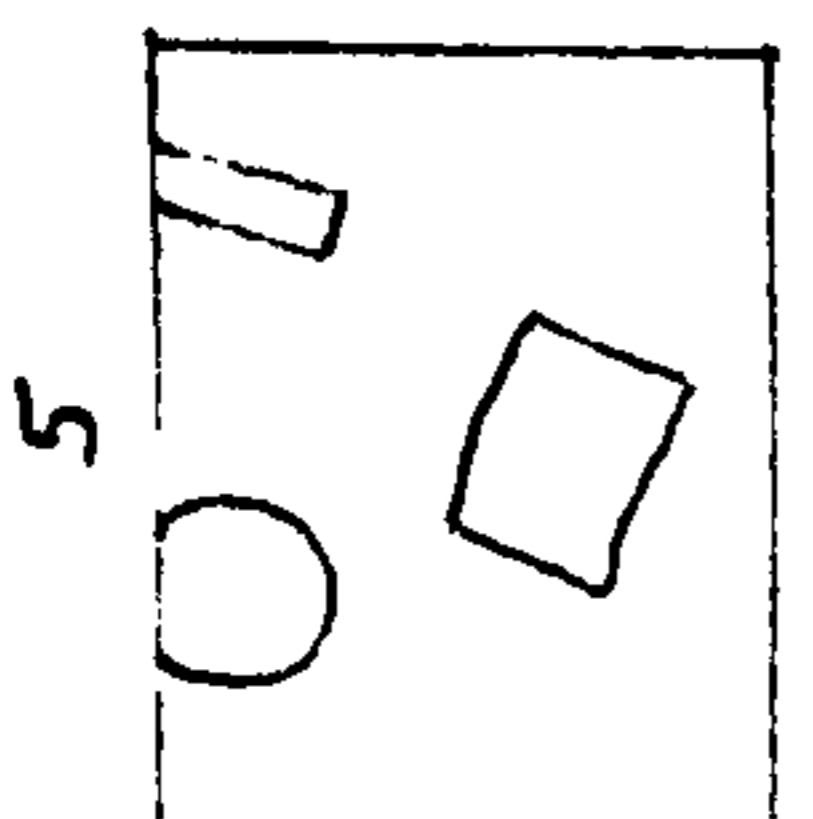
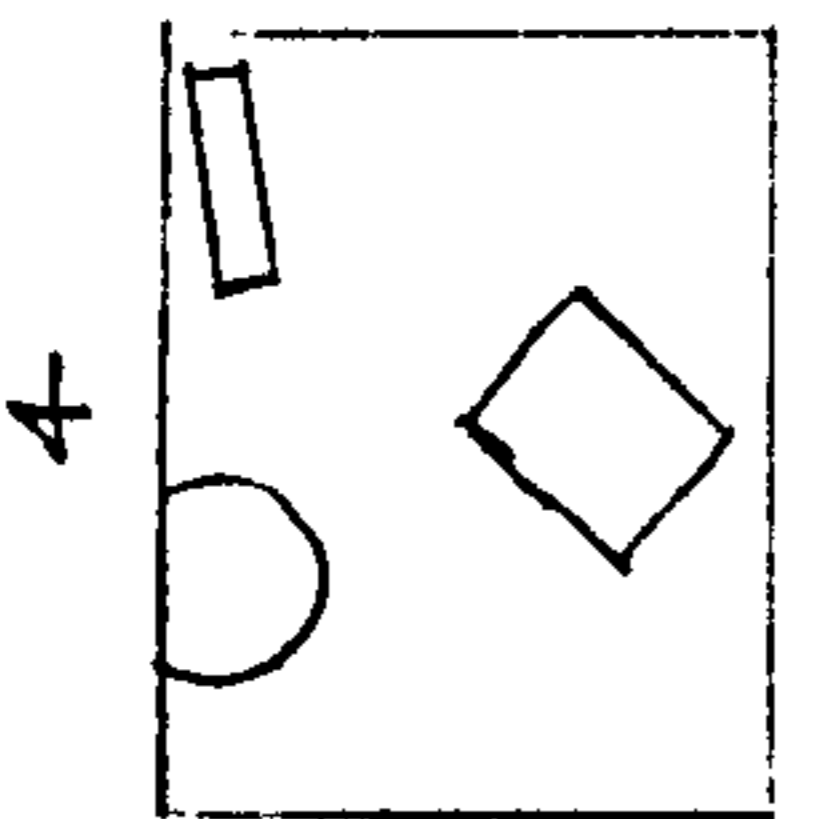
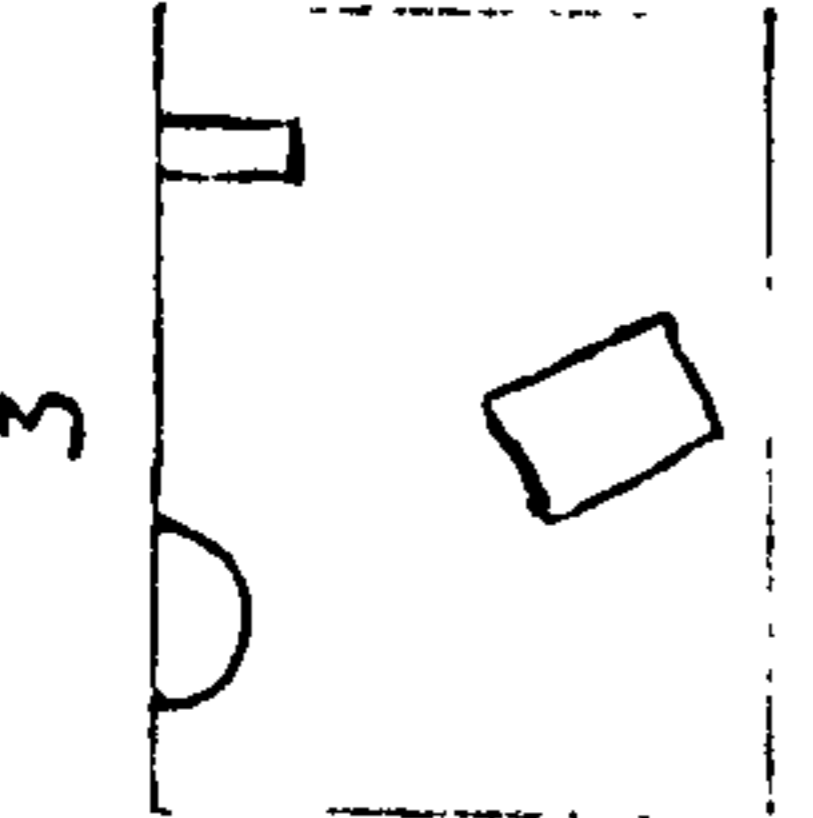
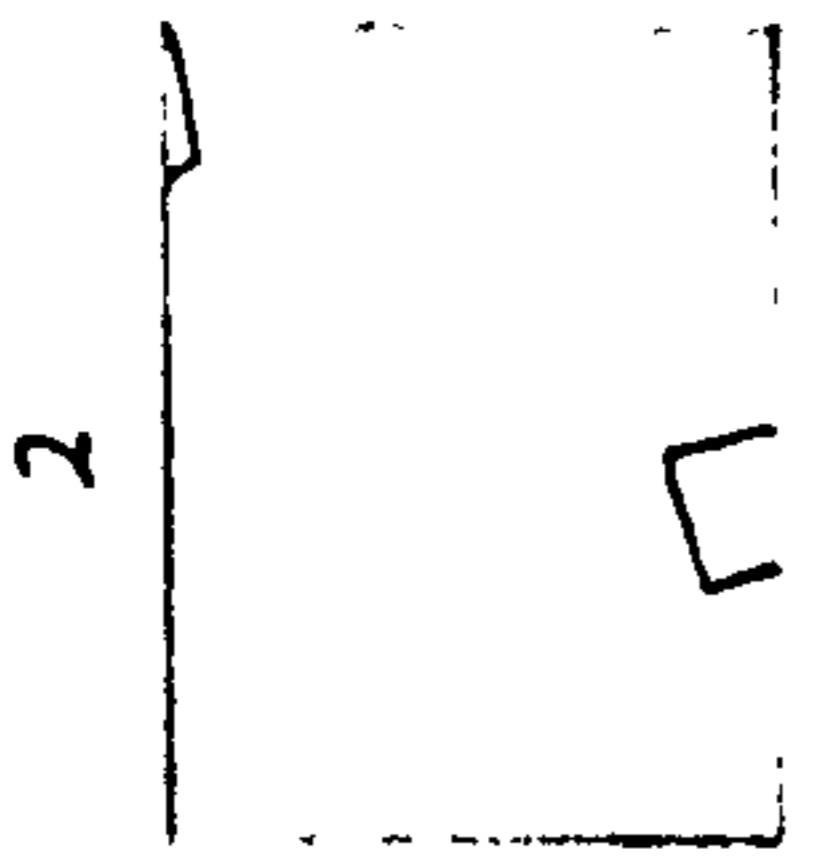
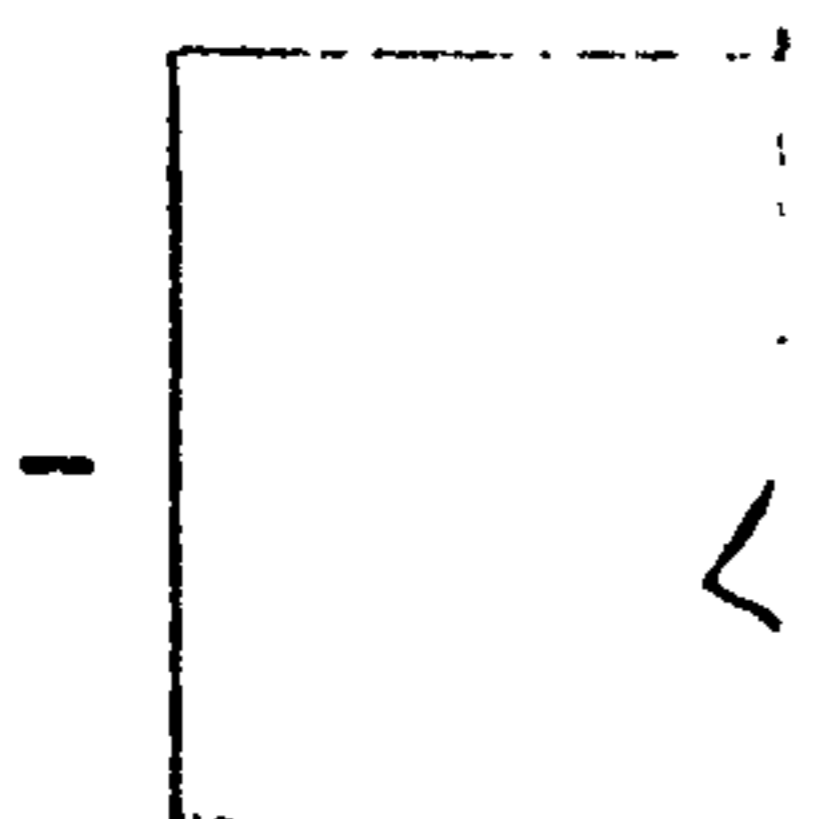
[Note: This historic collective "Statement," generally assumed to have been initiated and composed by the first of its three signa-

Total Duration of Film :- 3'12"

Music :- 2'56"

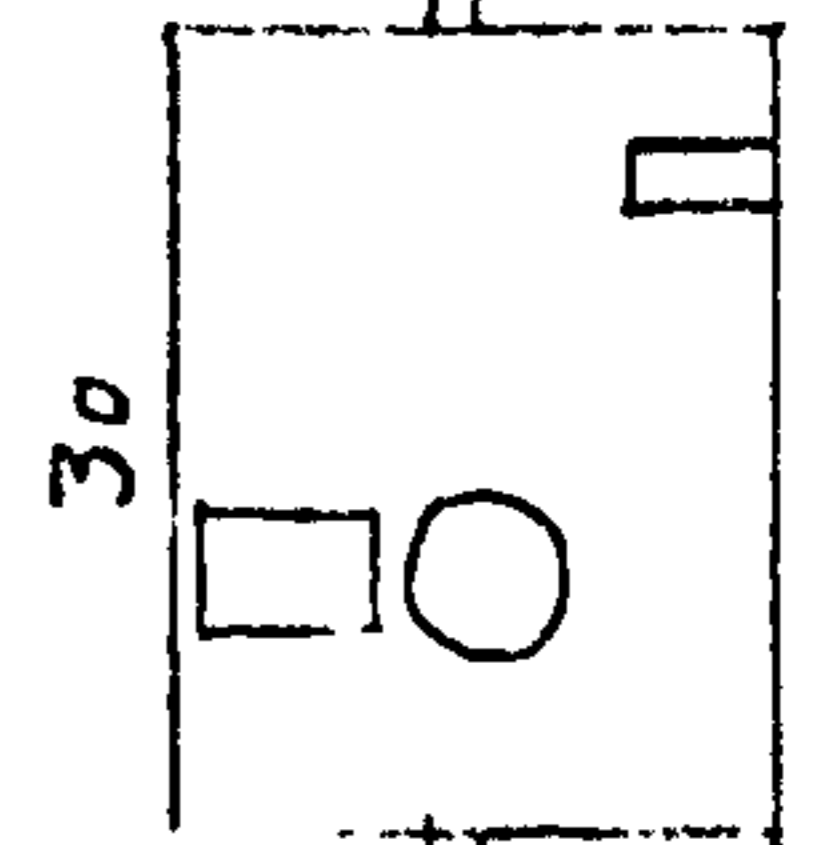
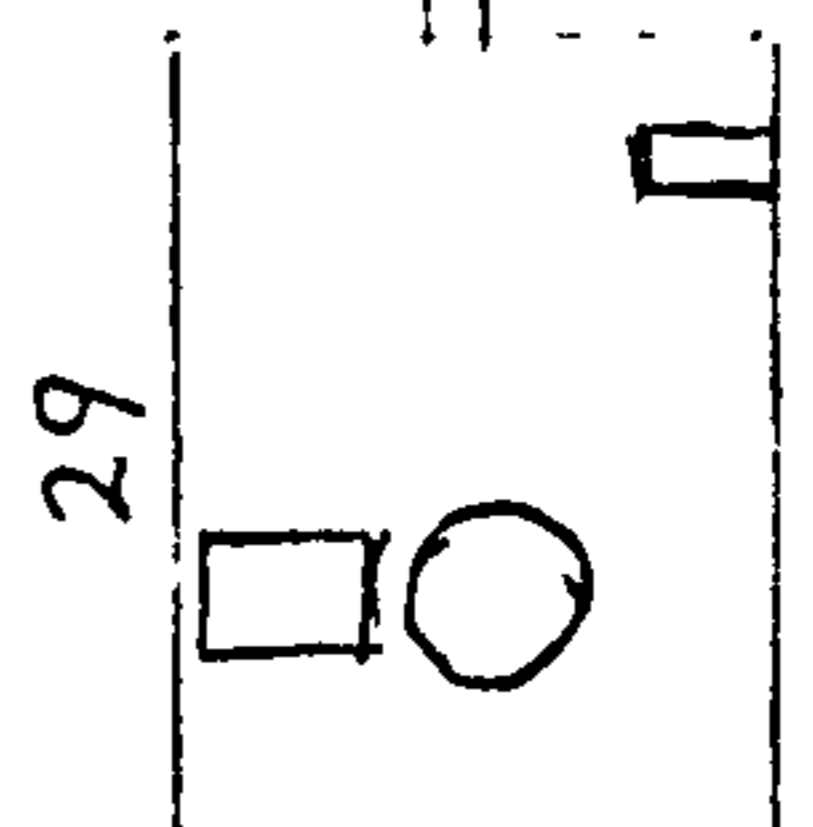
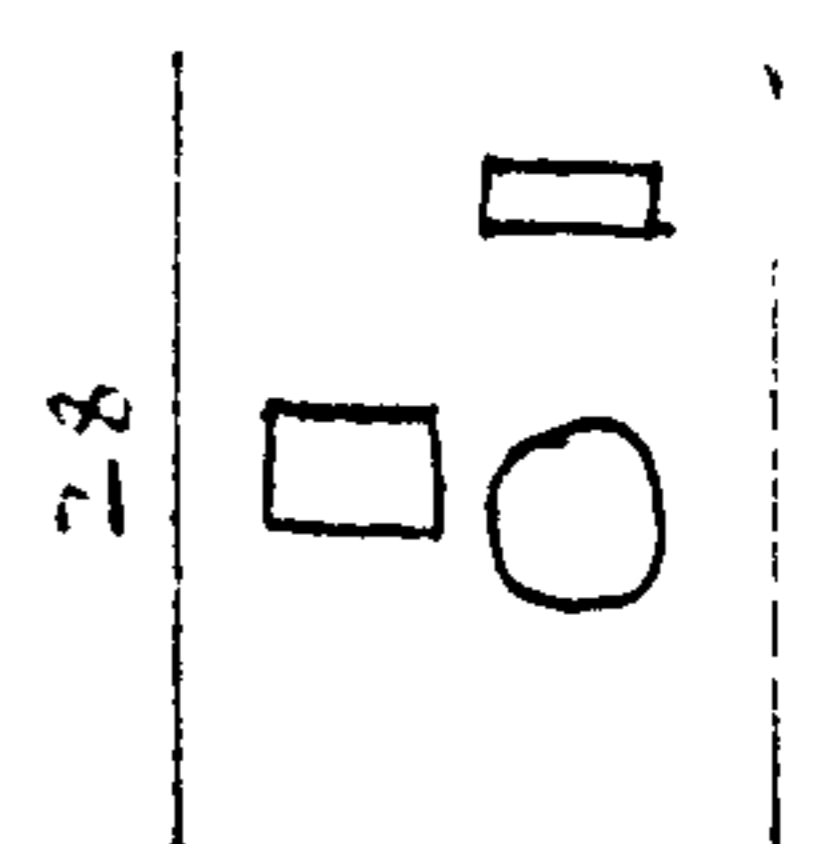
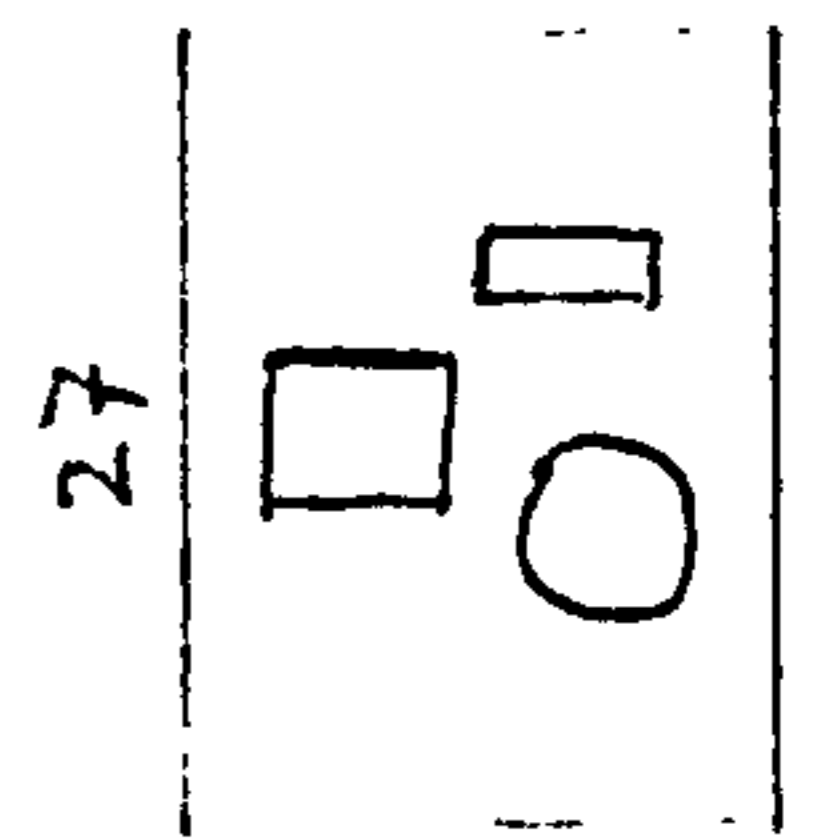
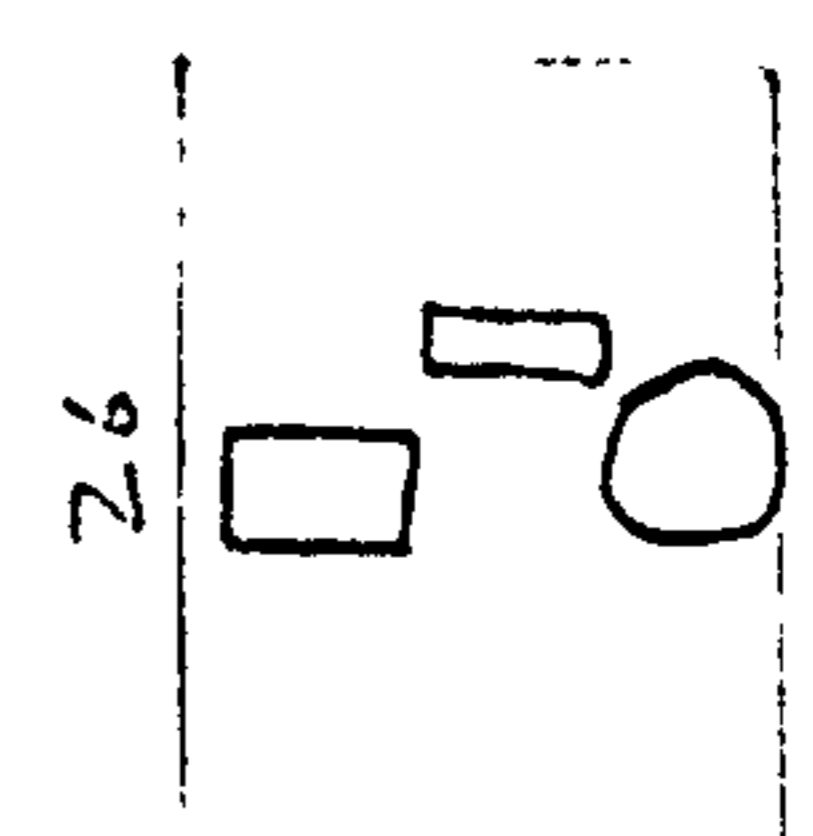
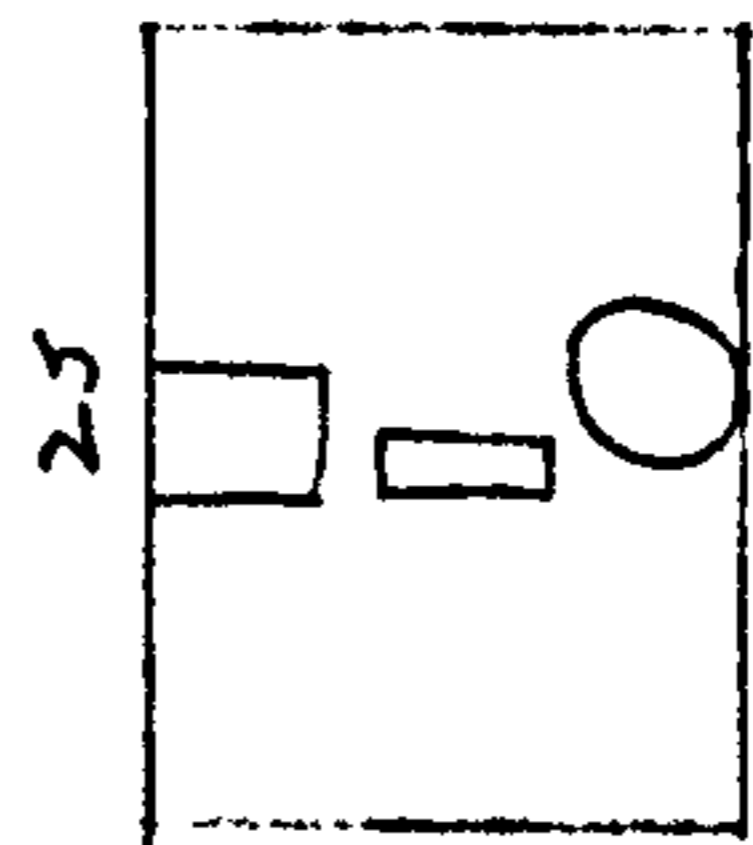
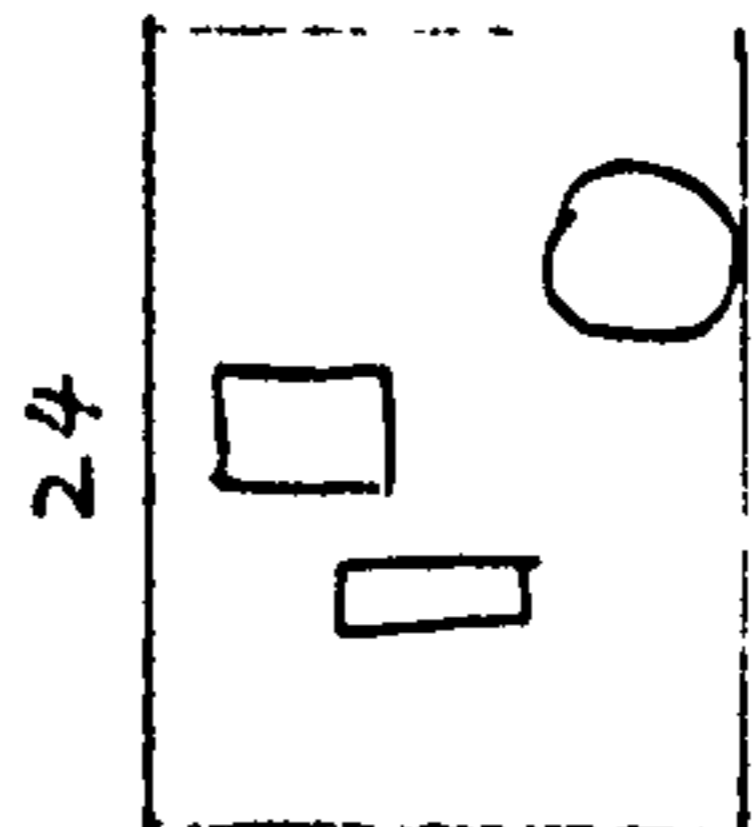
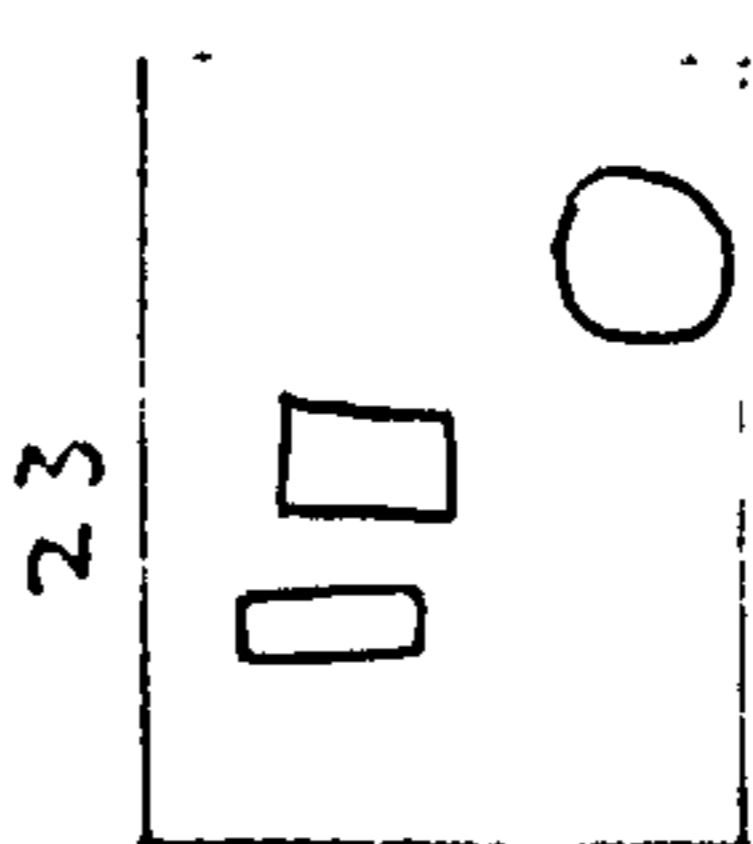
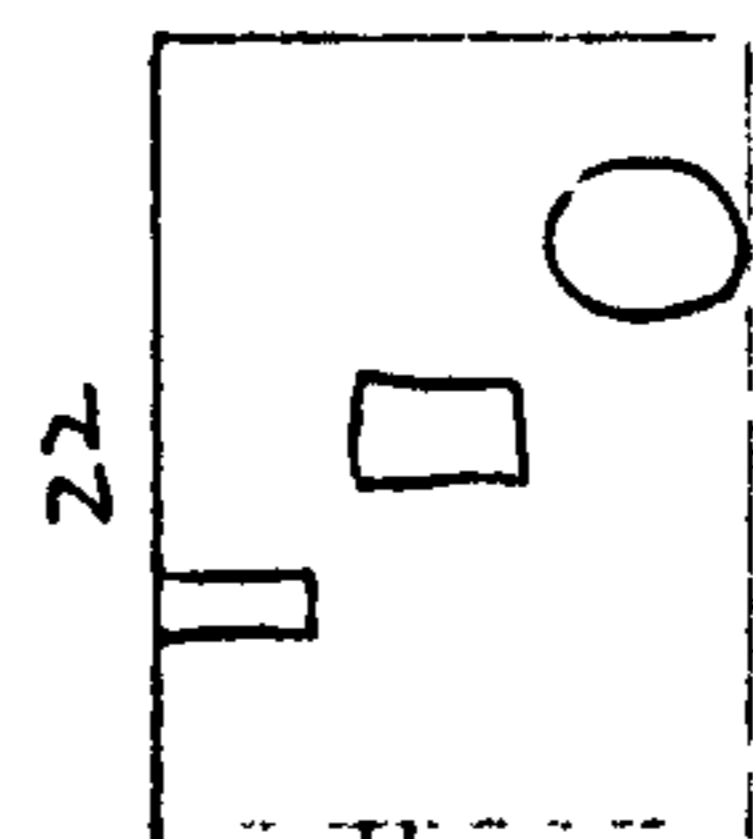
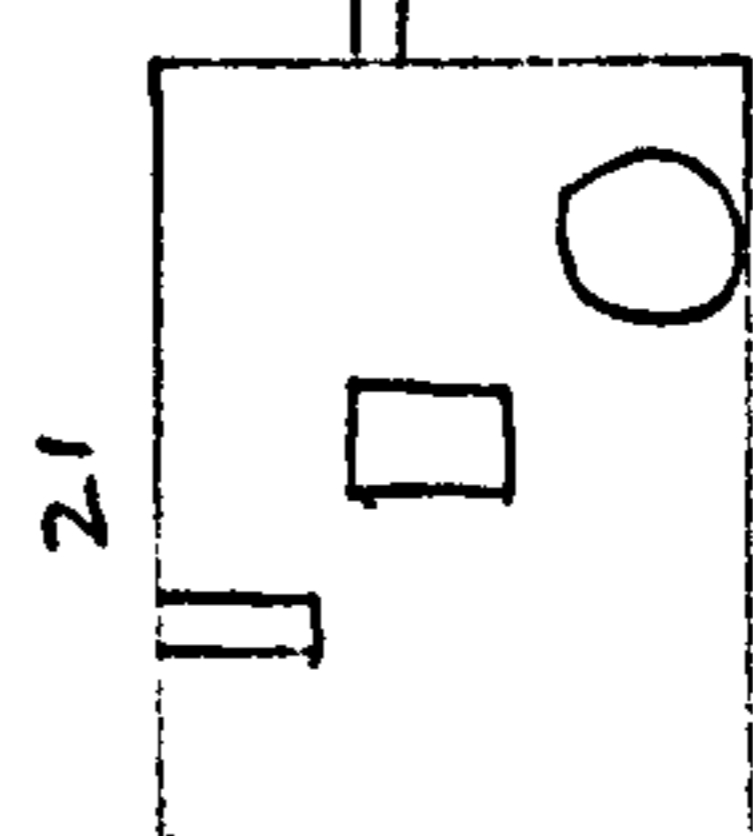
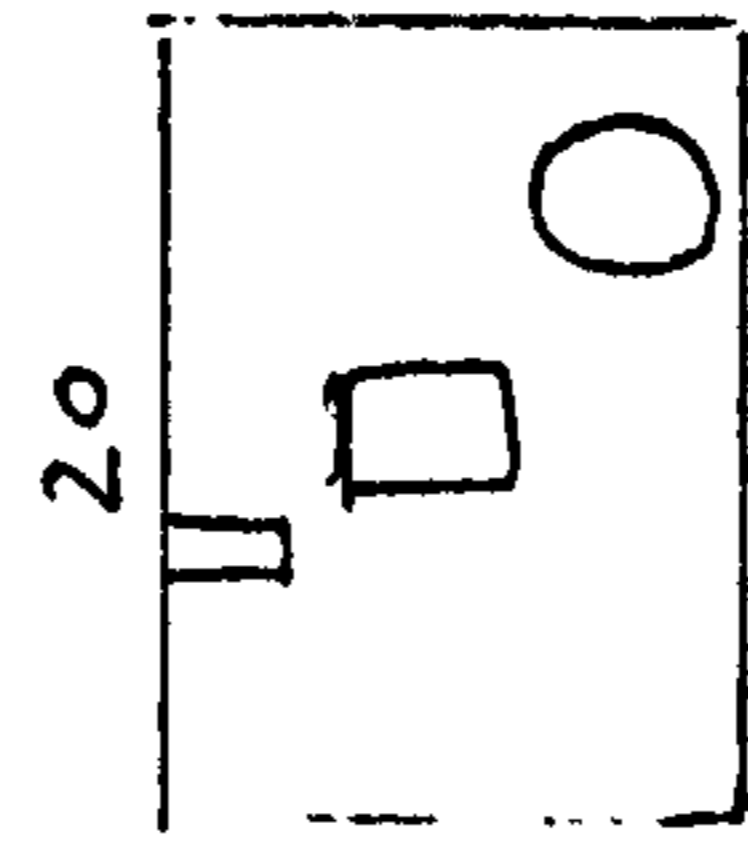
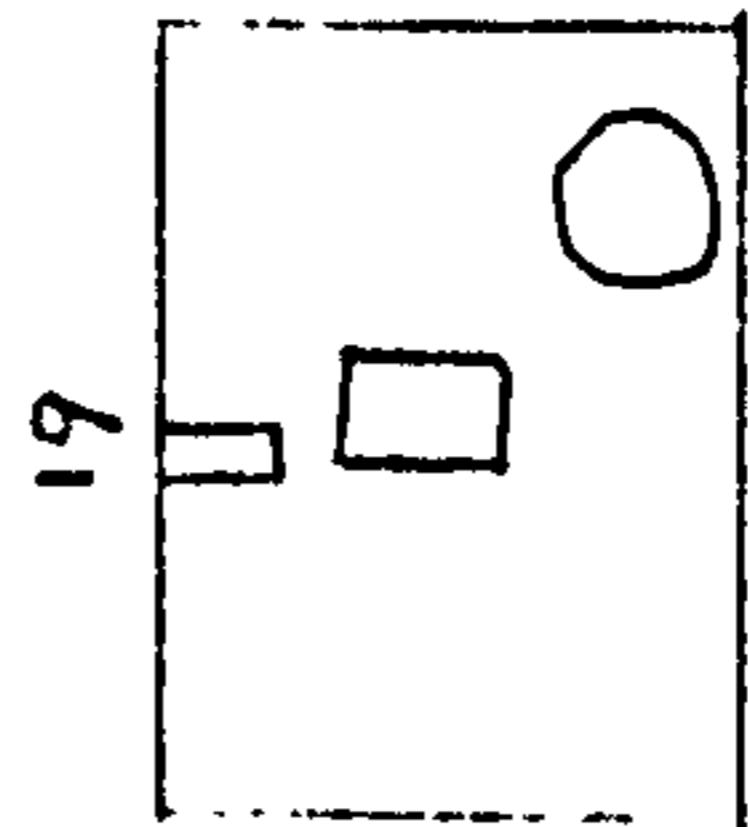
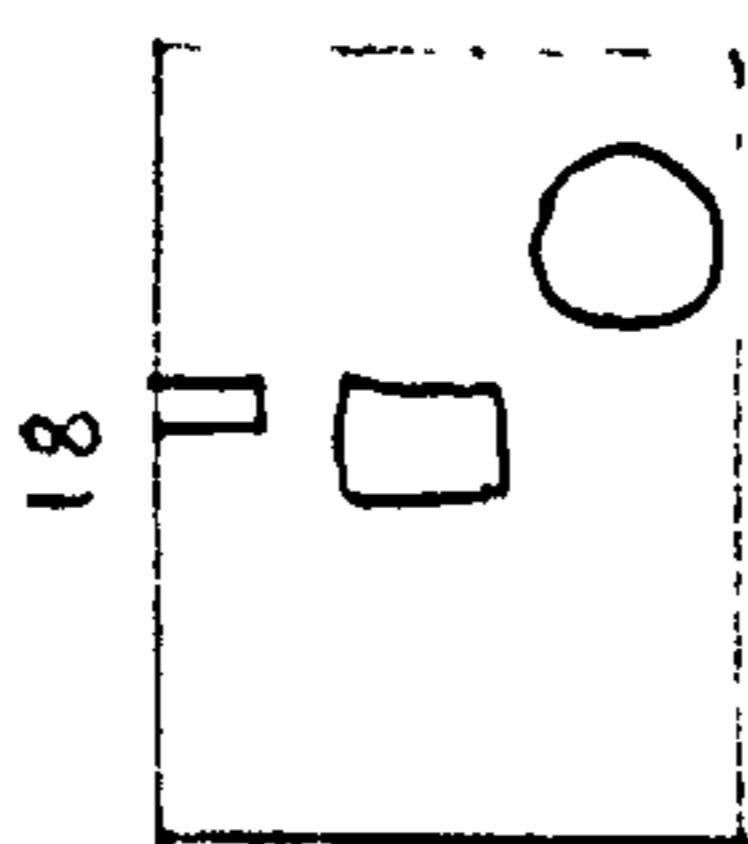
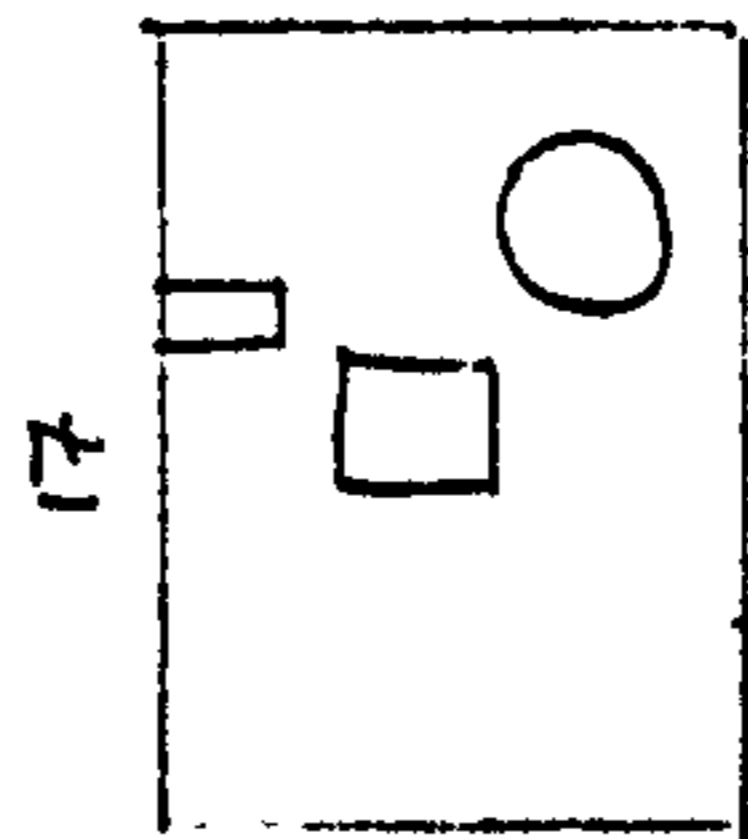
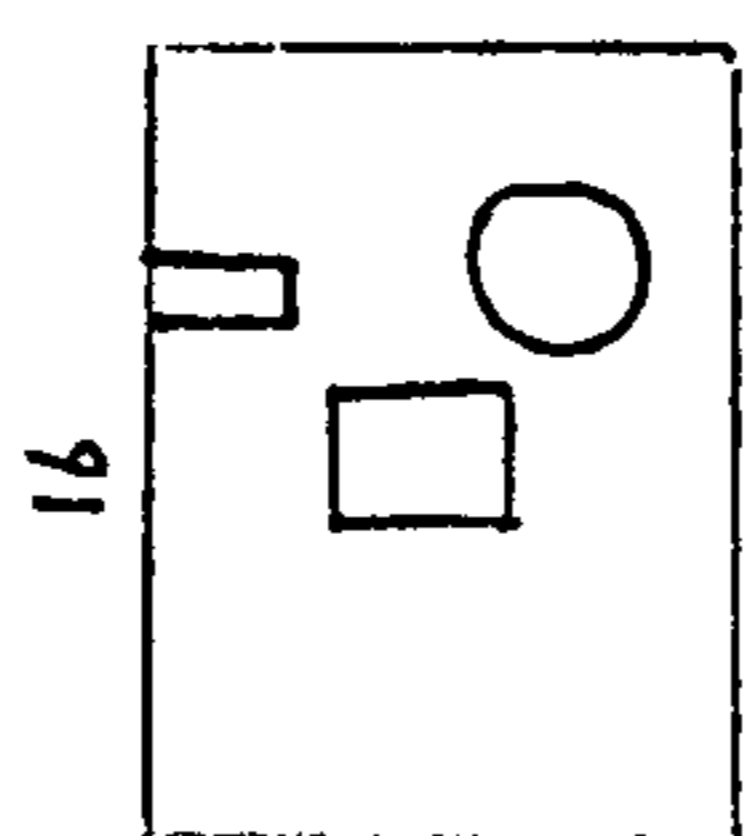
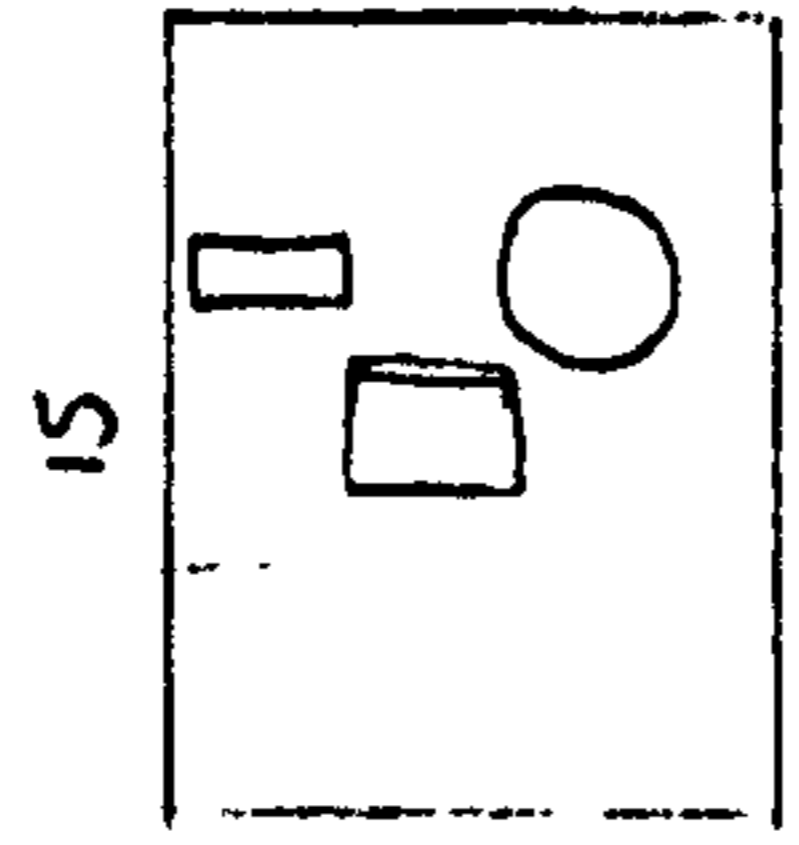
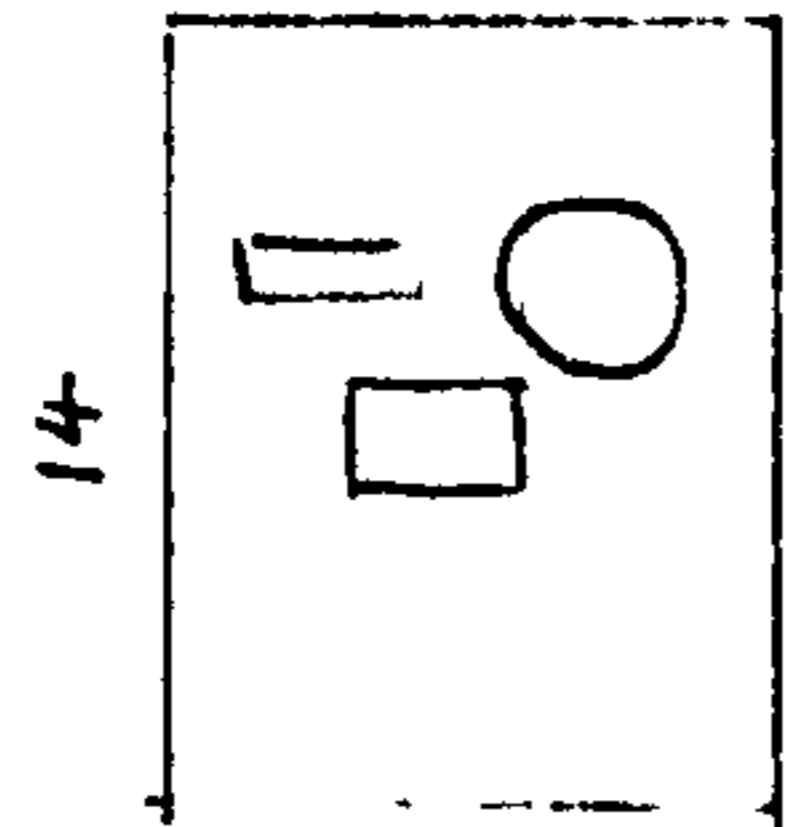
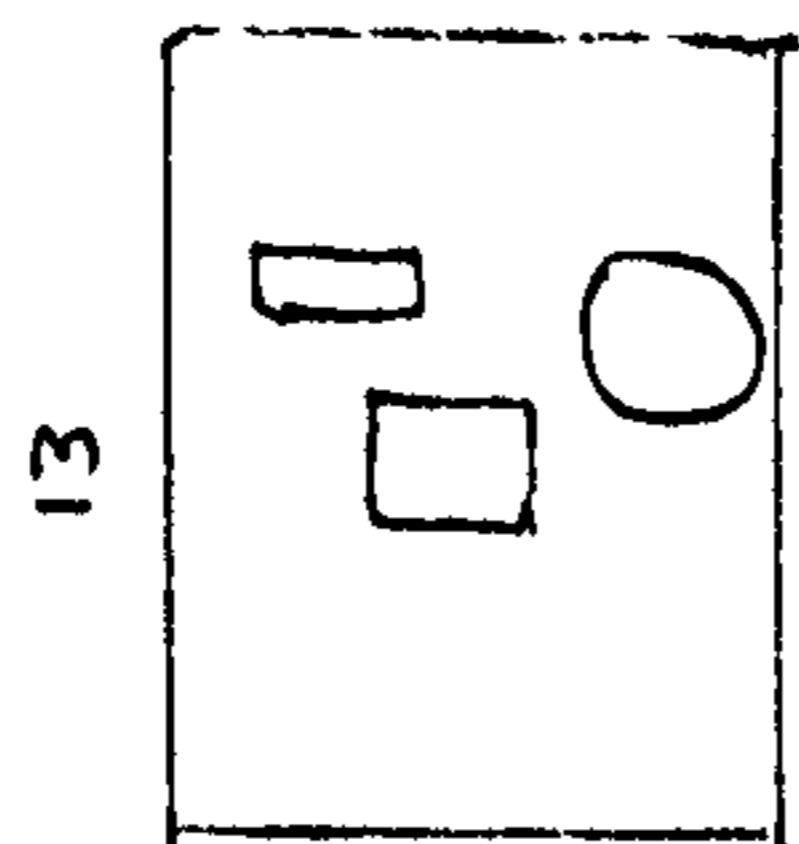
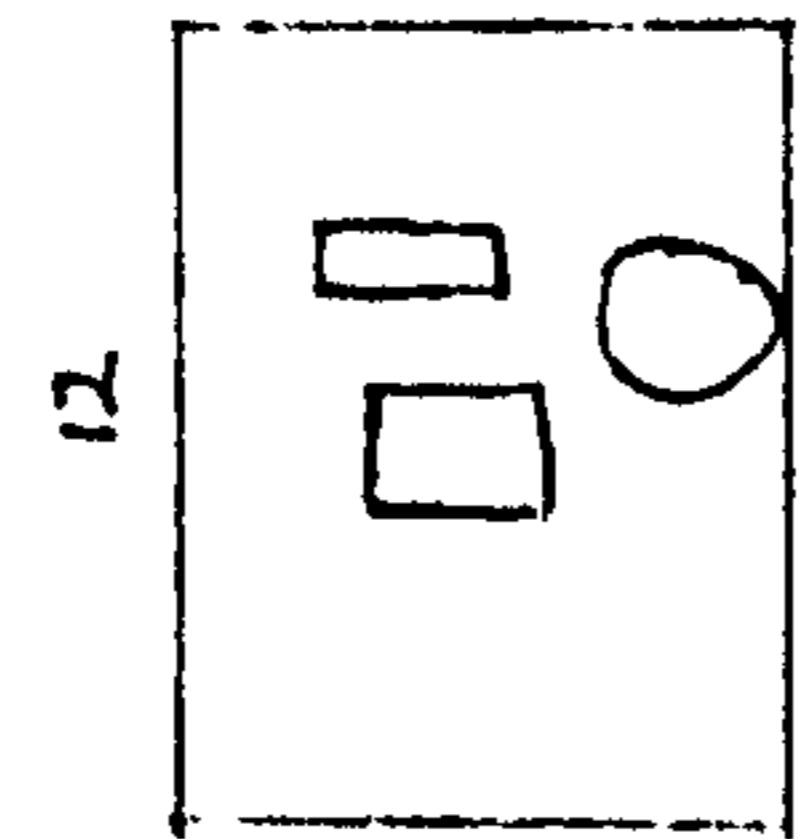
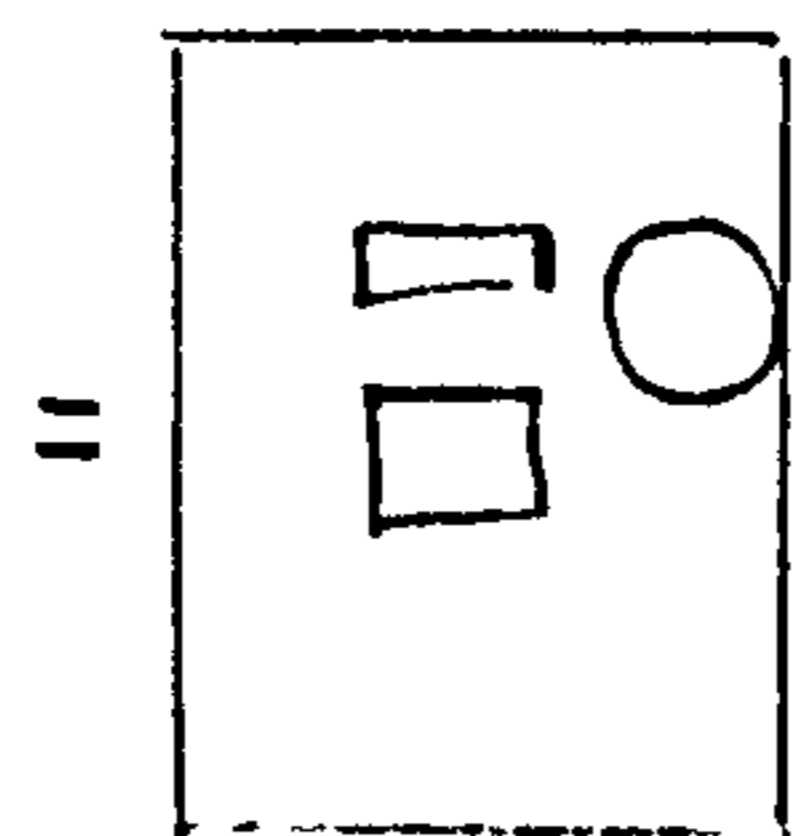
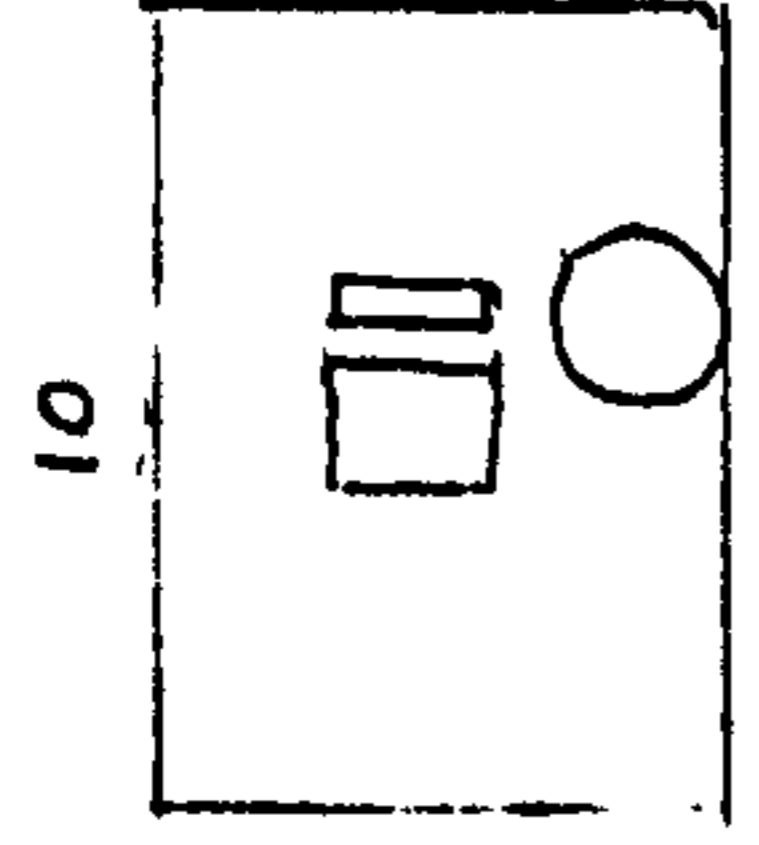
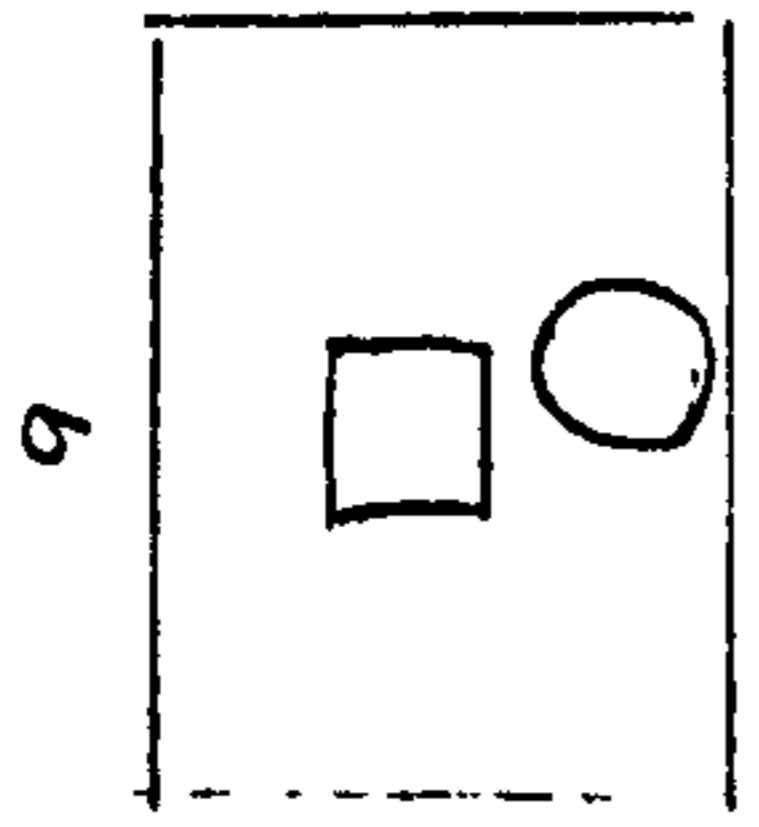
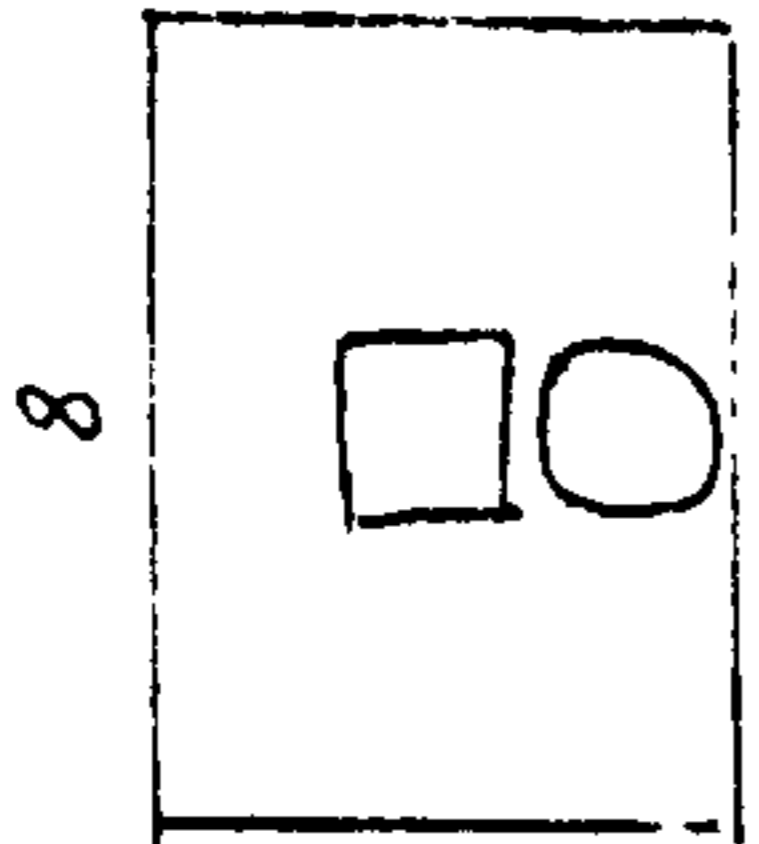
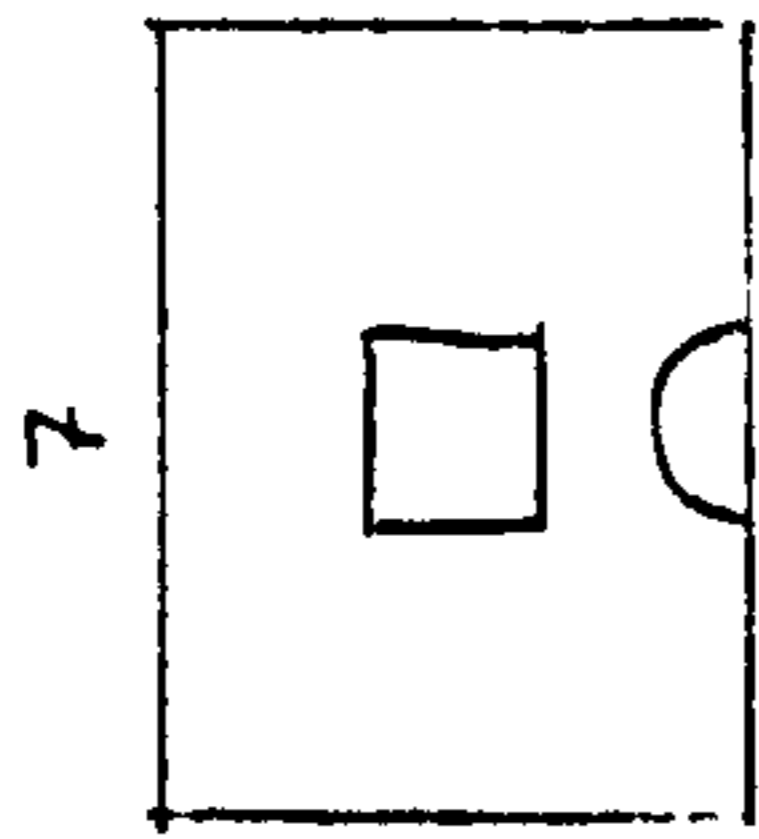
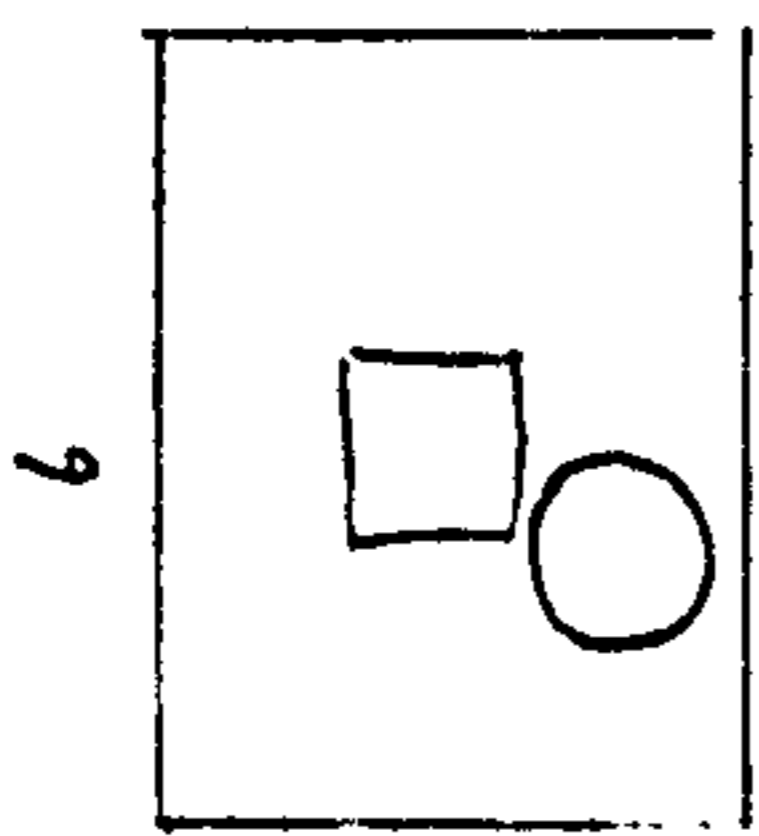
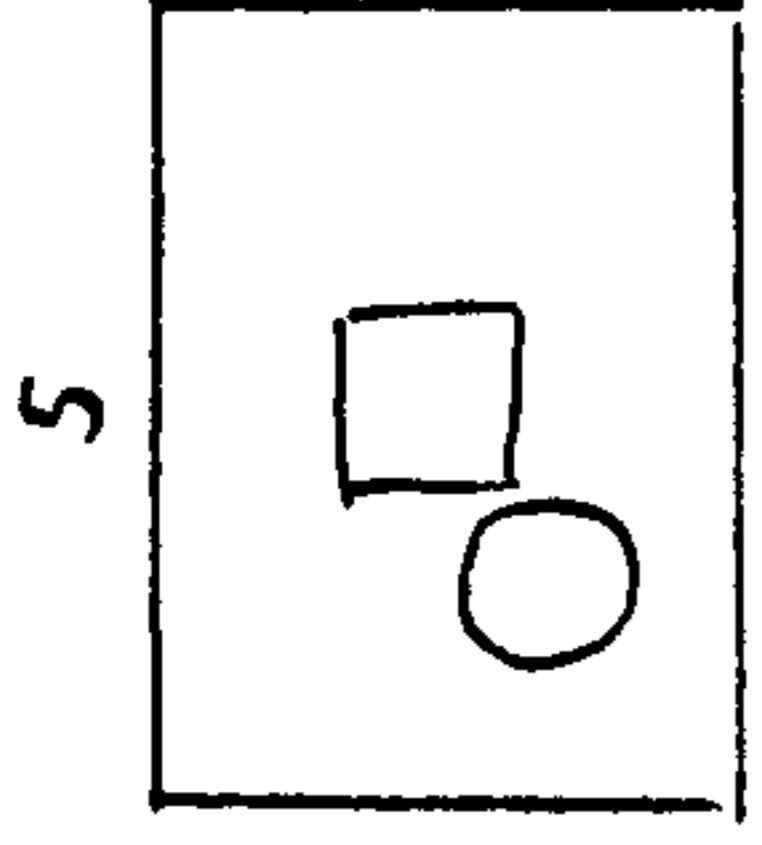
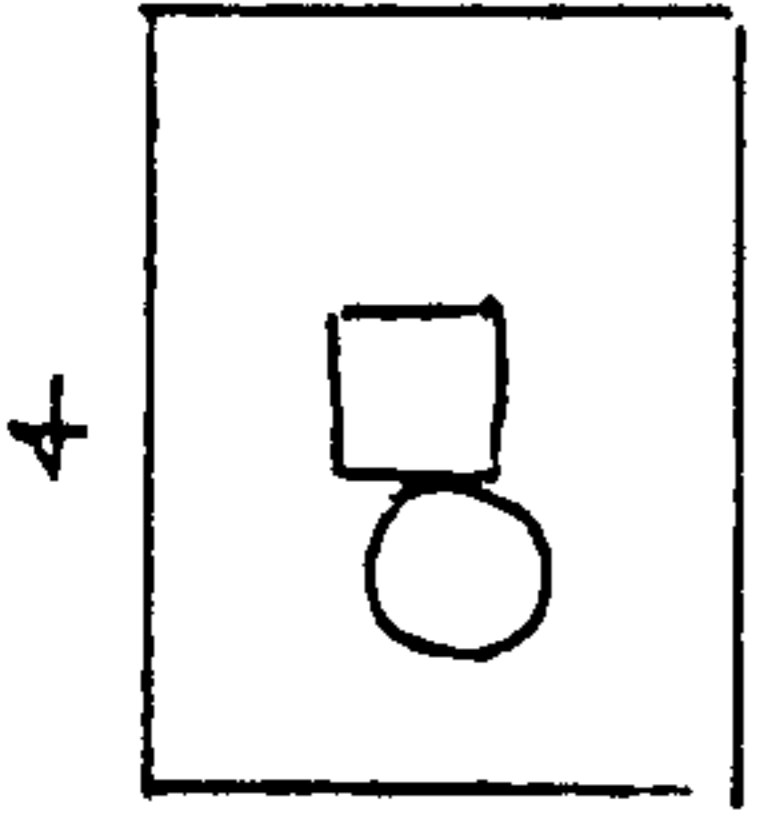
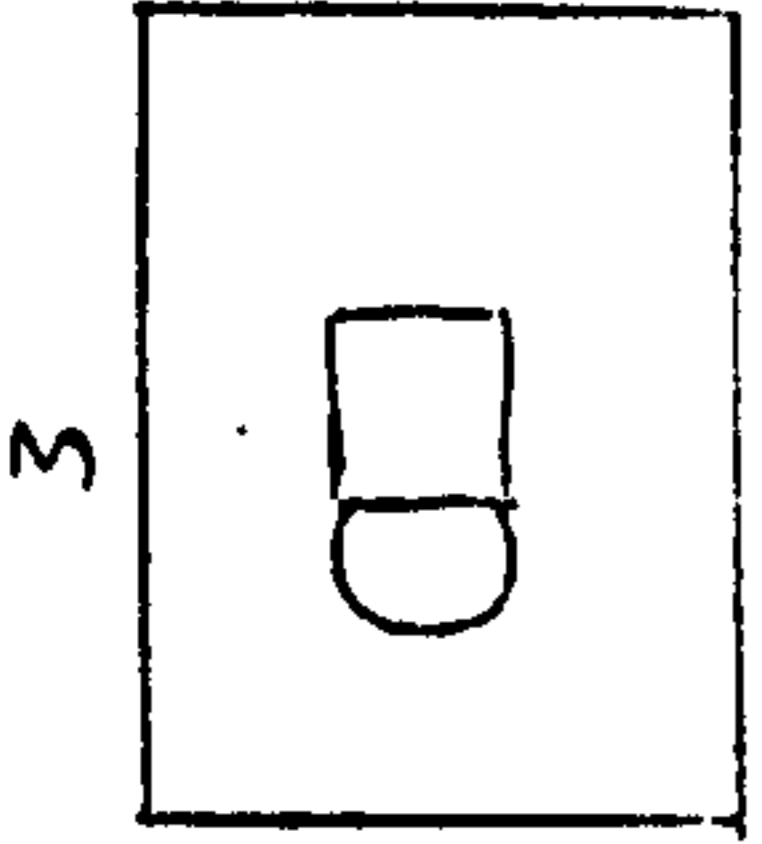
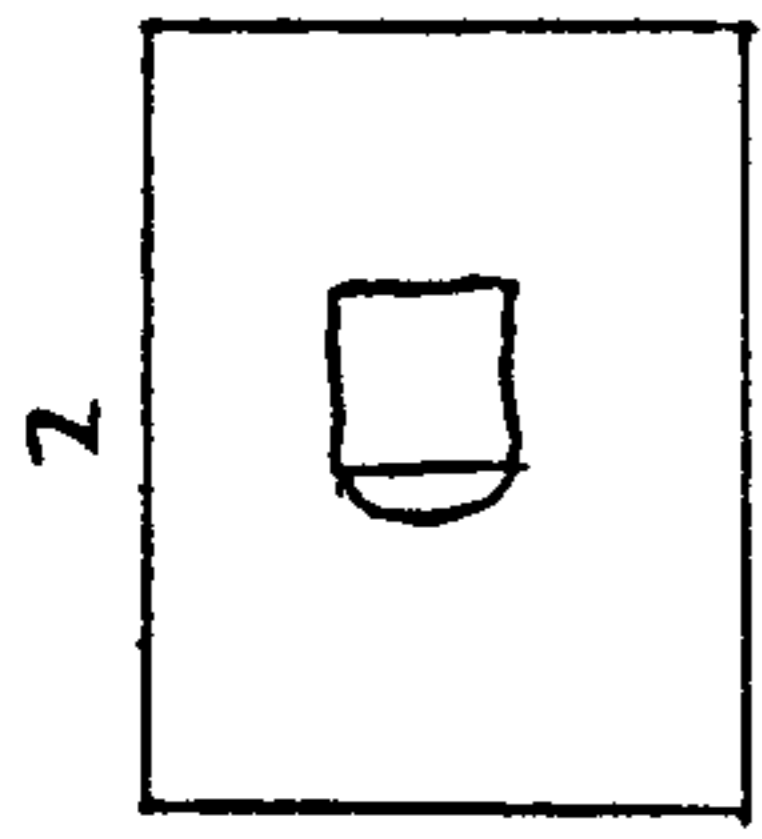
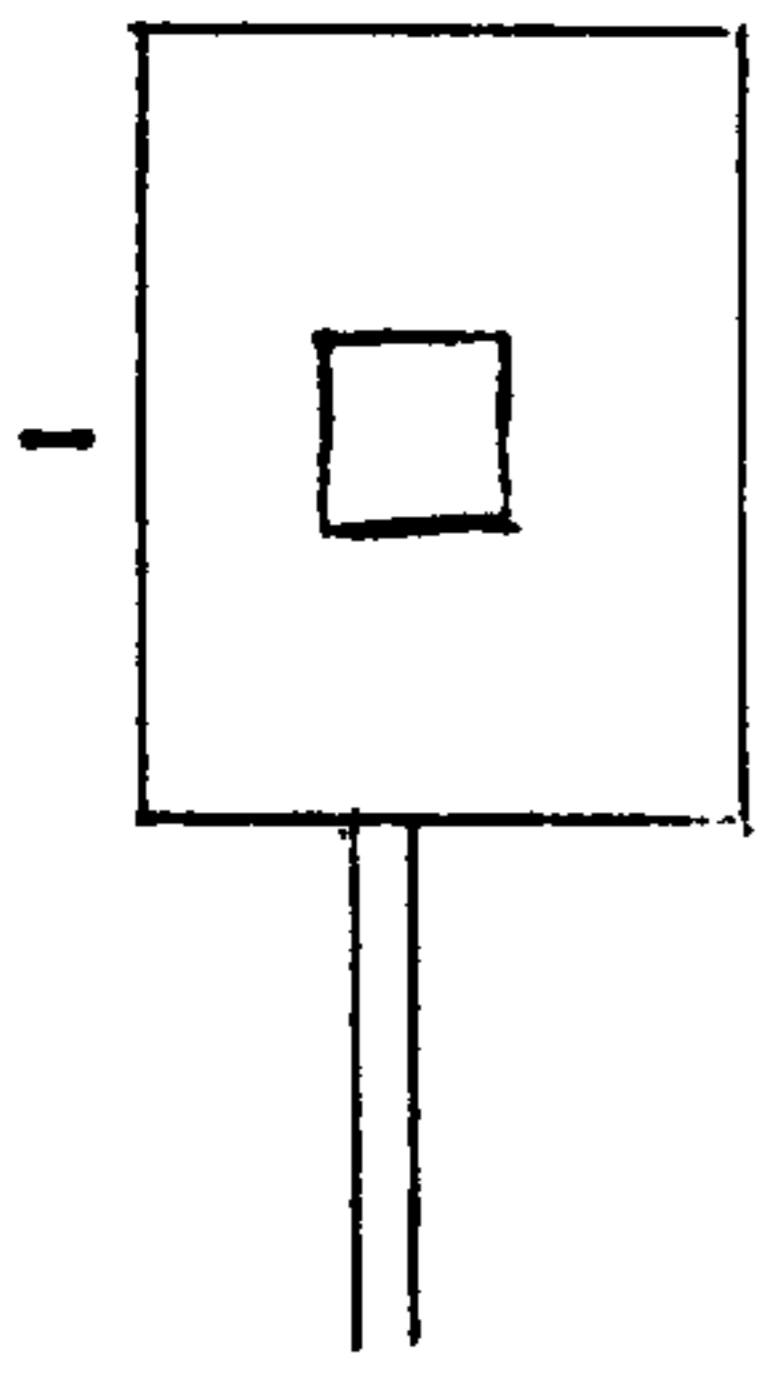


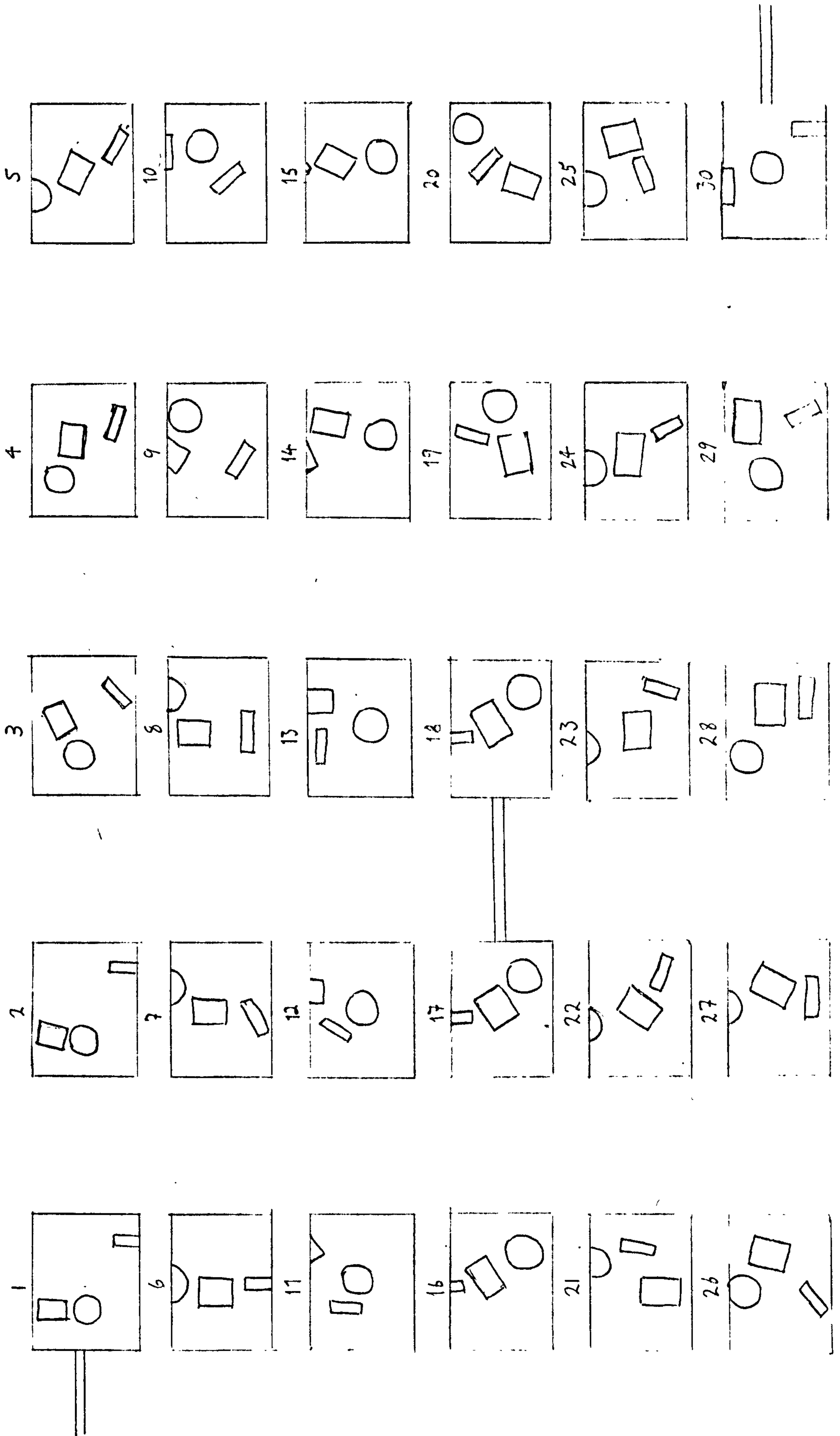
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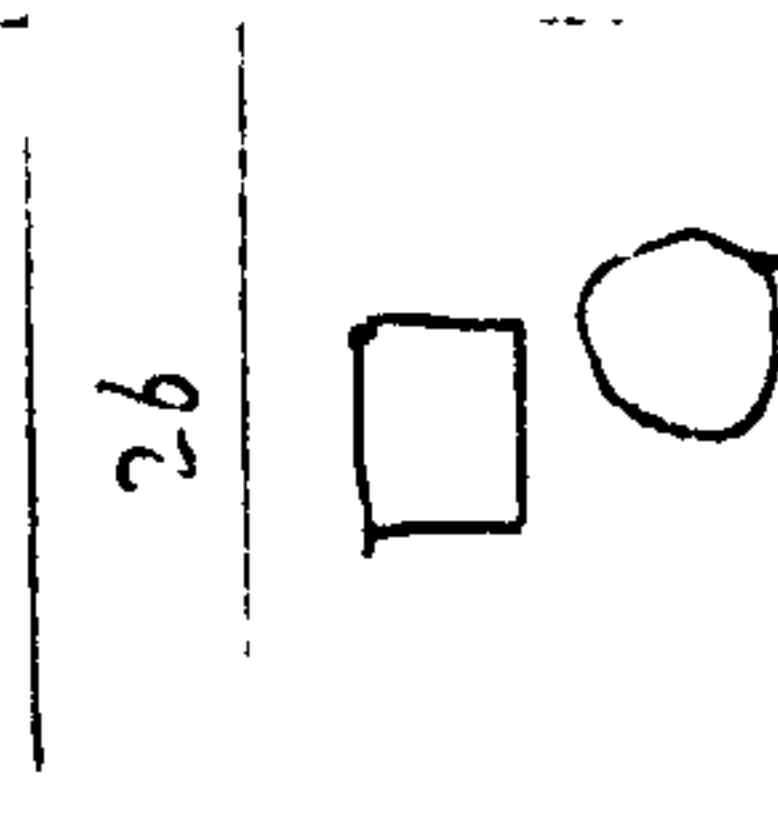
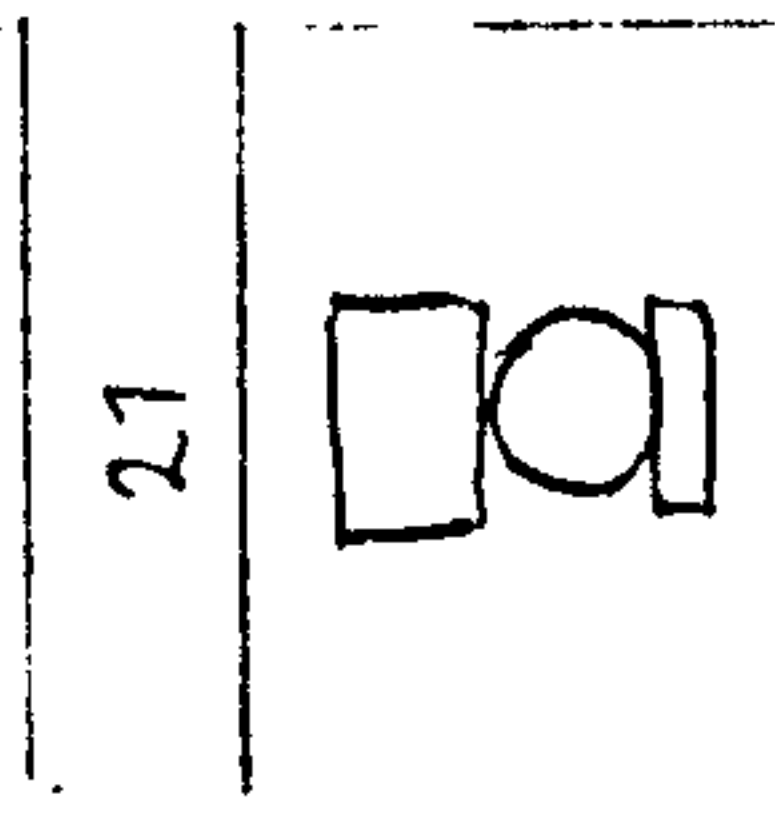
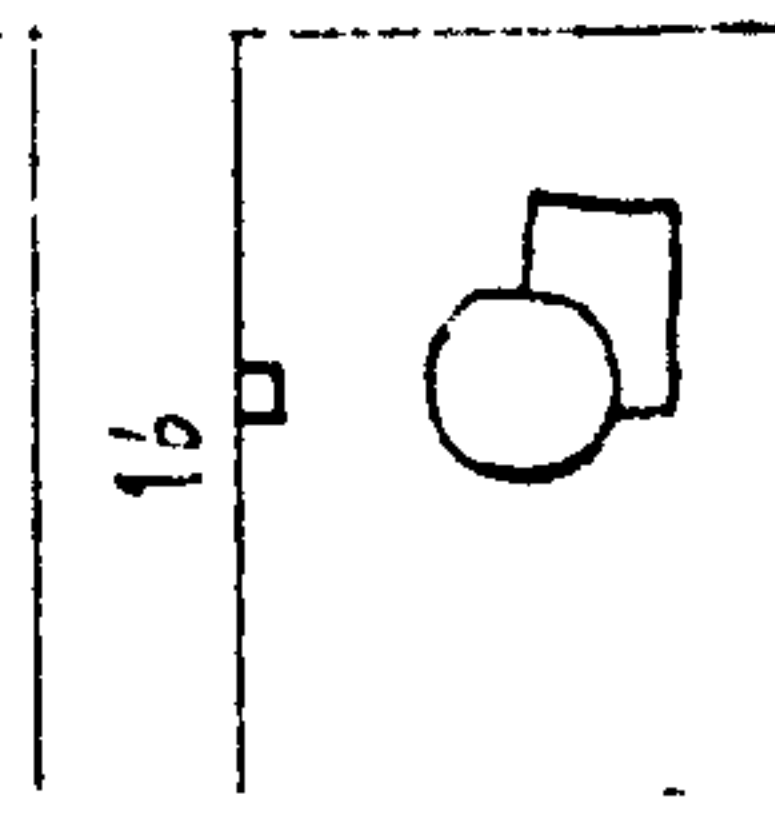
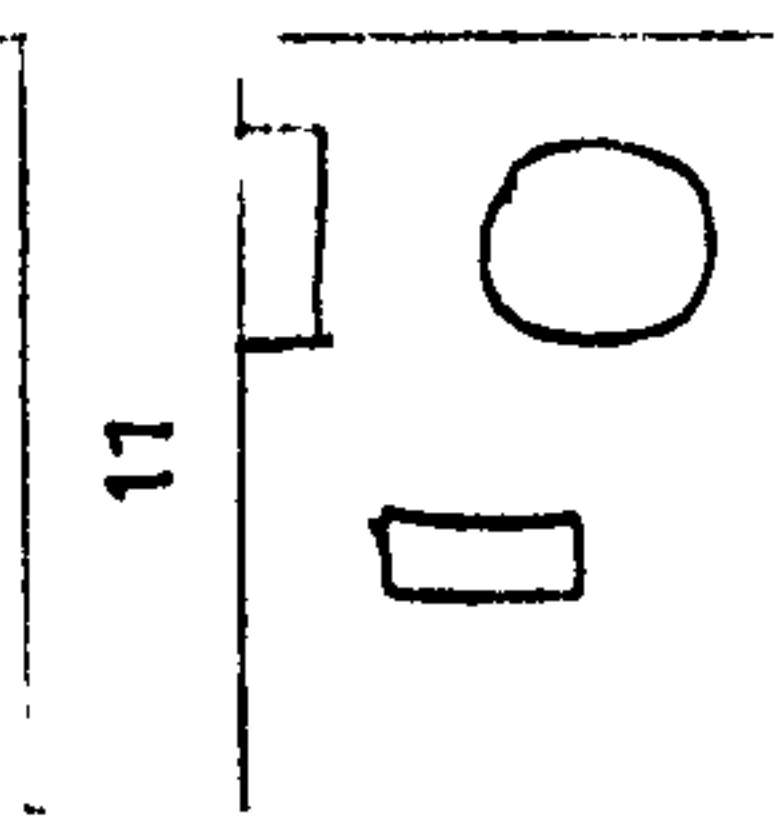
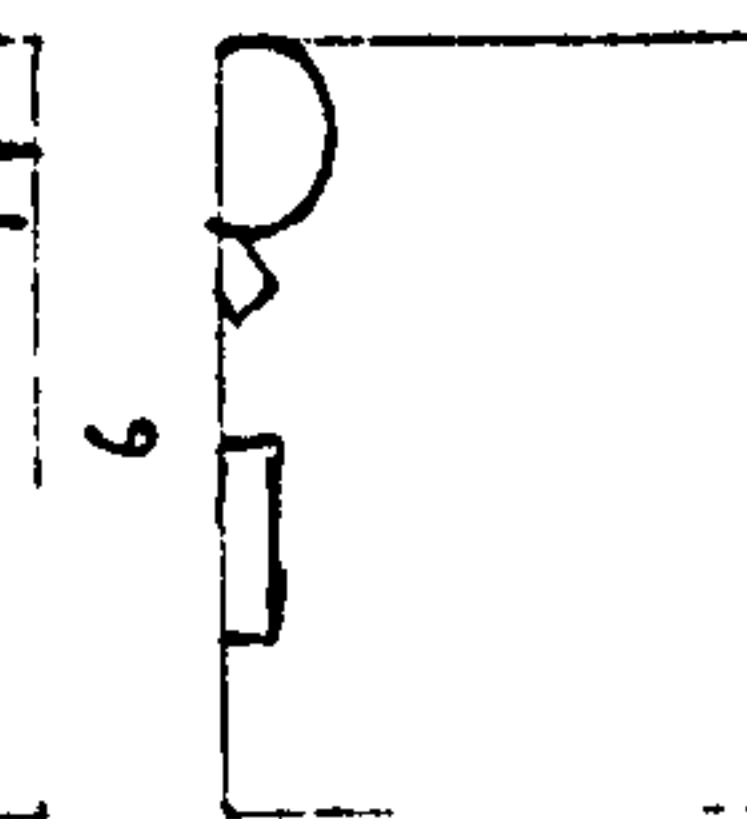
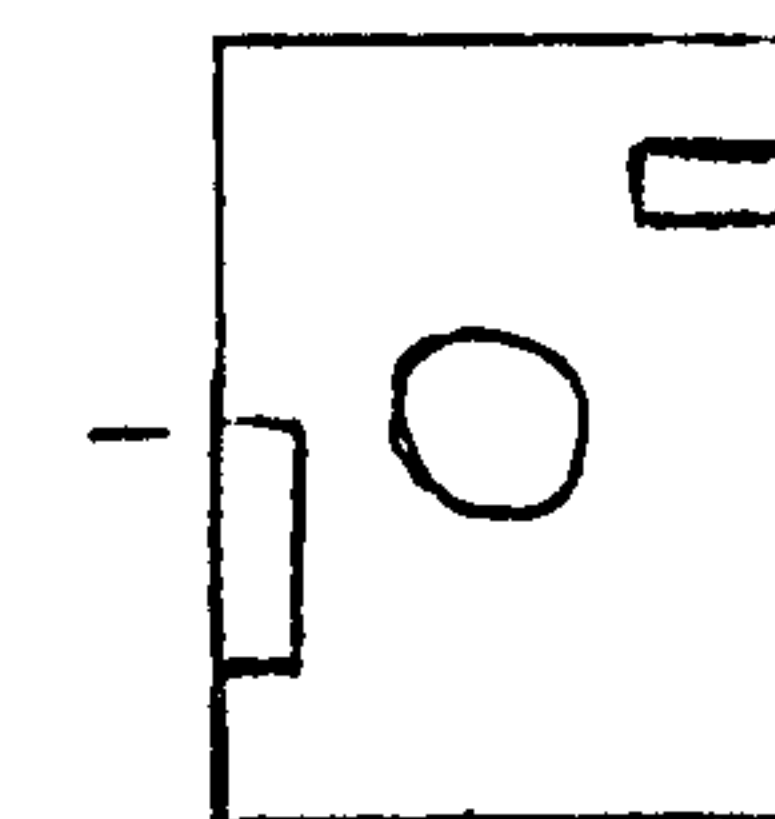
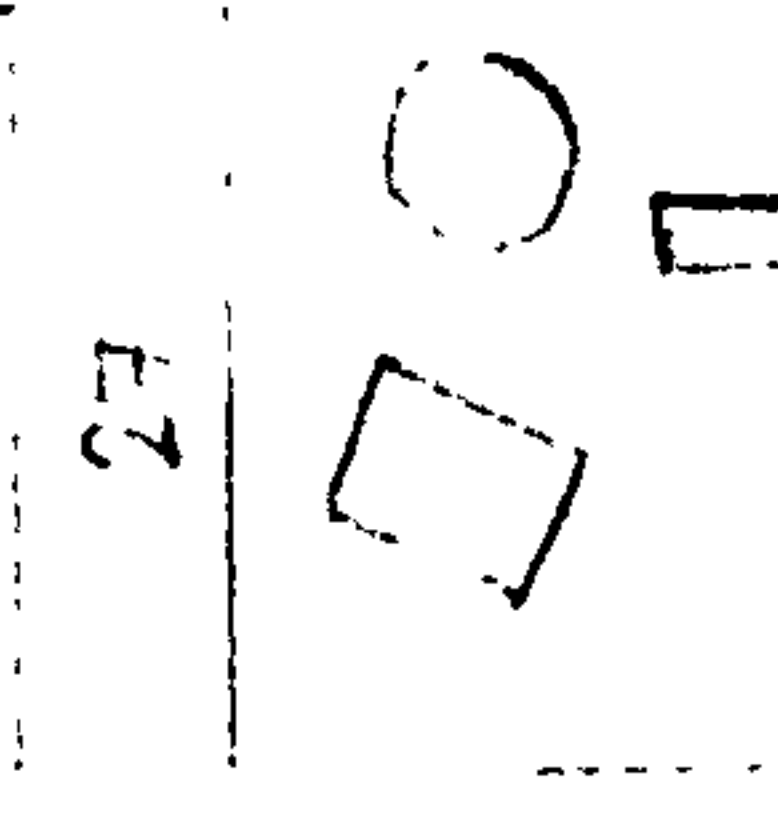
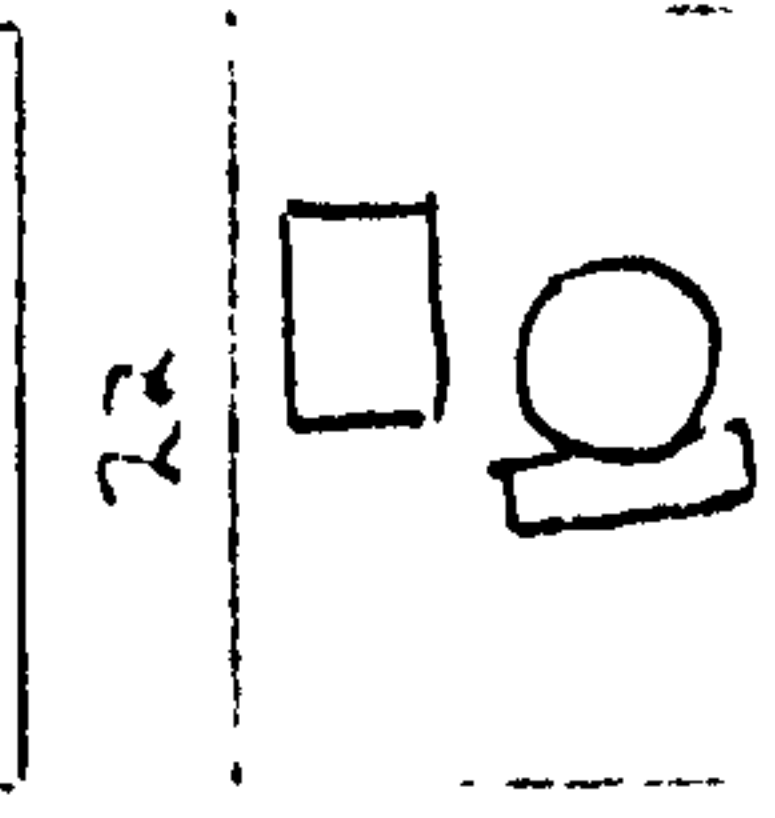
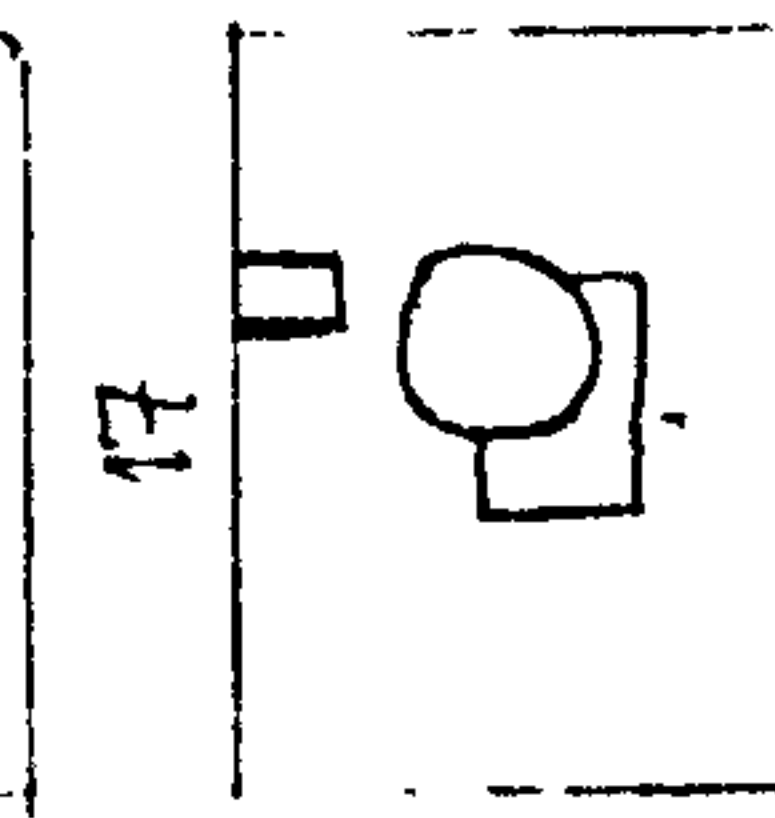
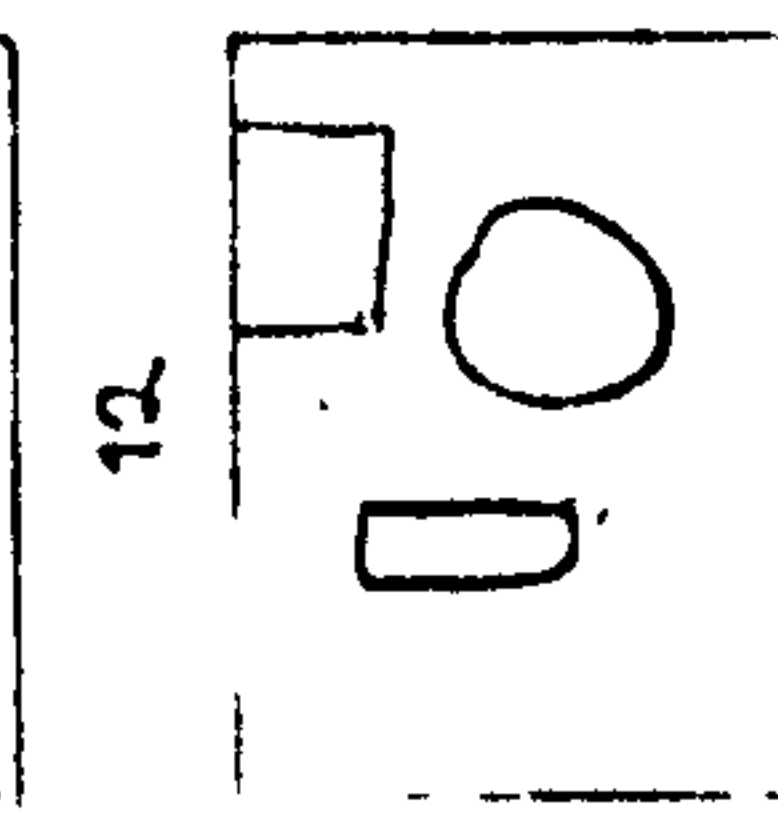
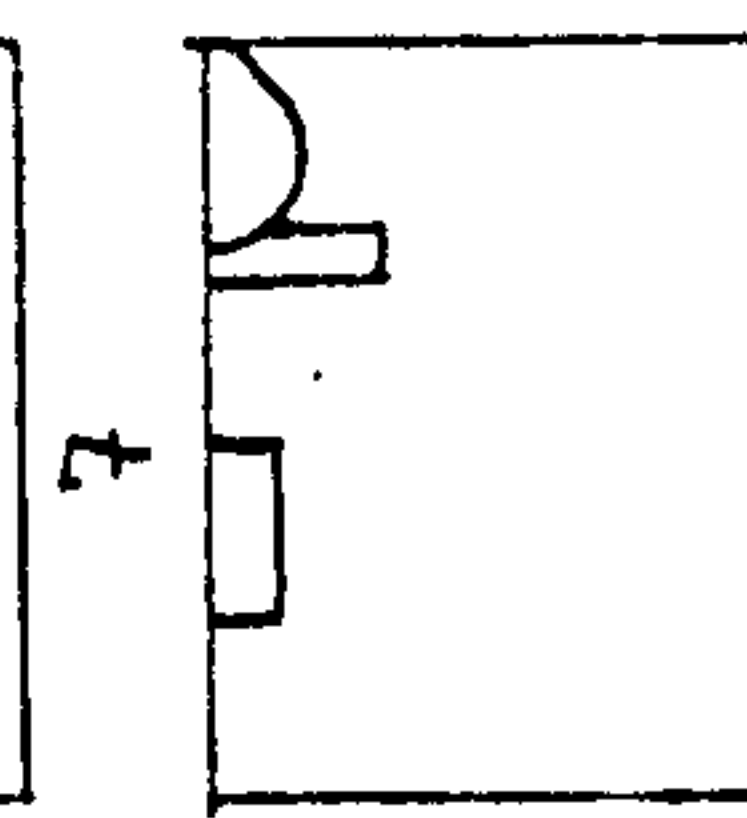
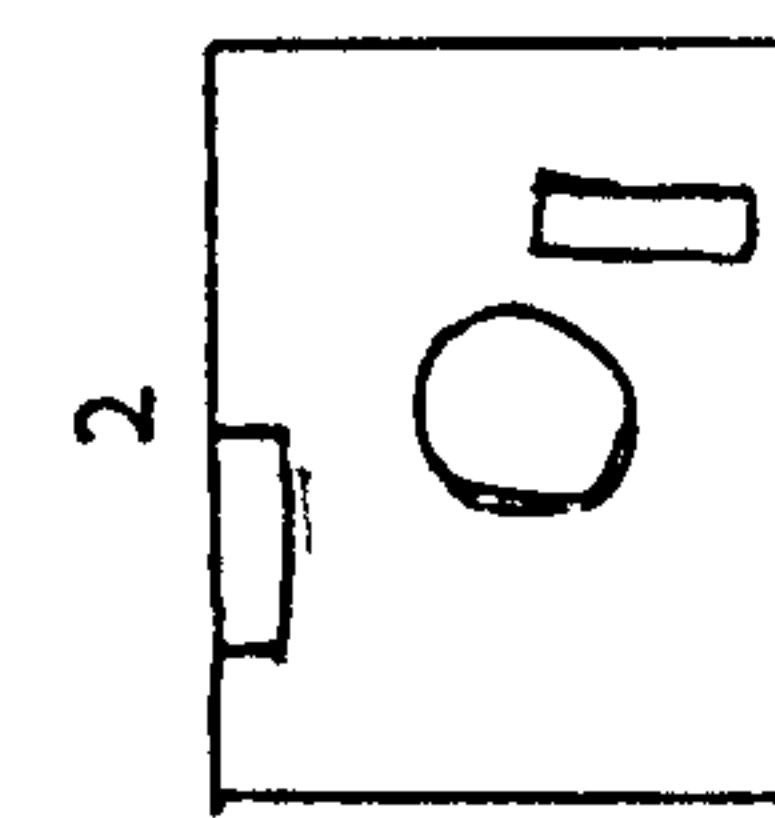
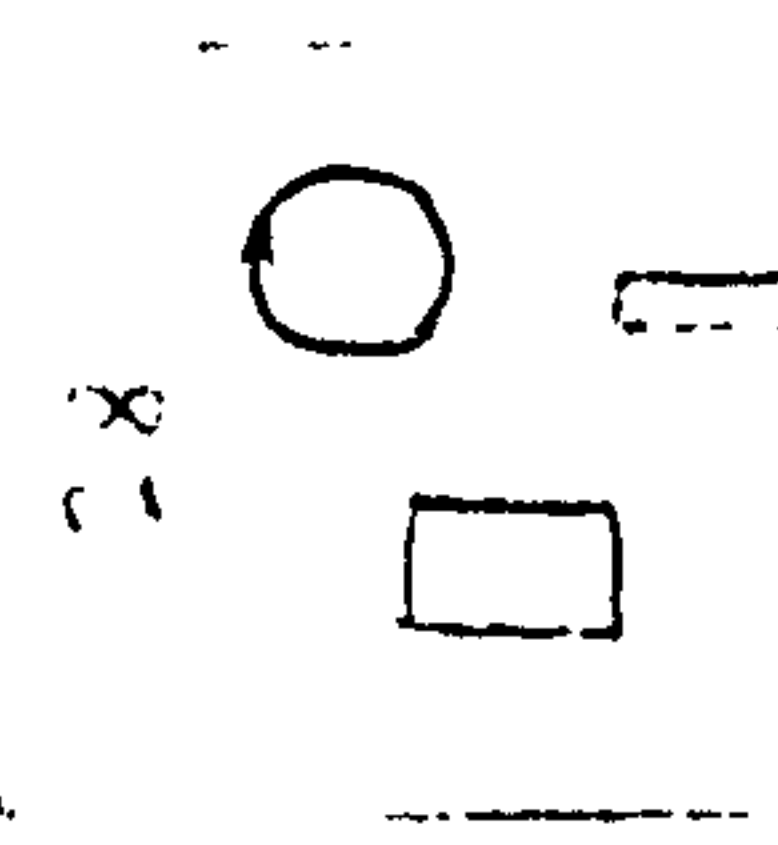
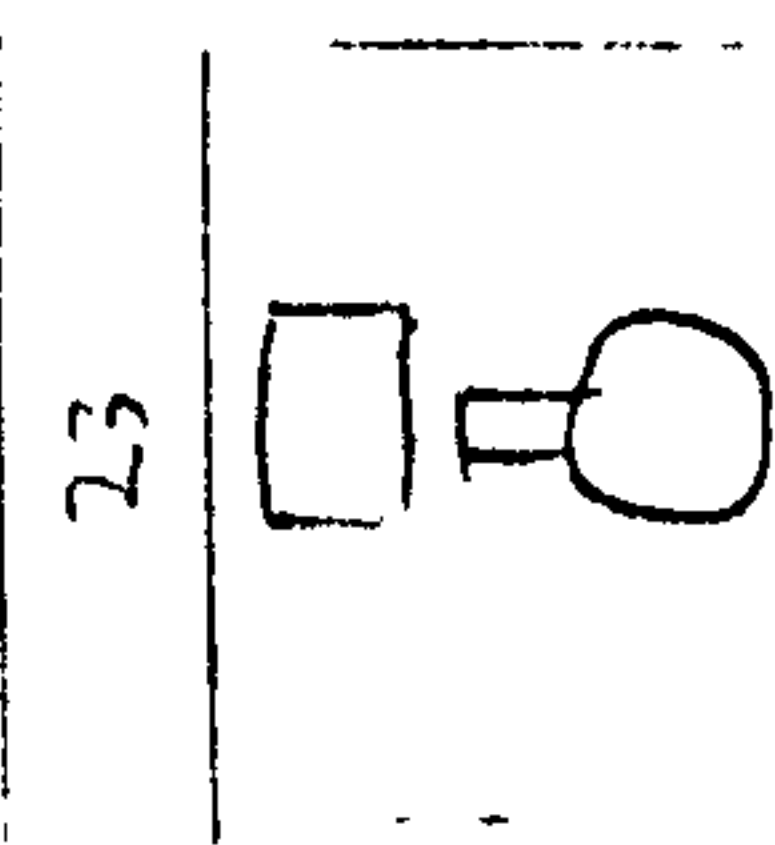
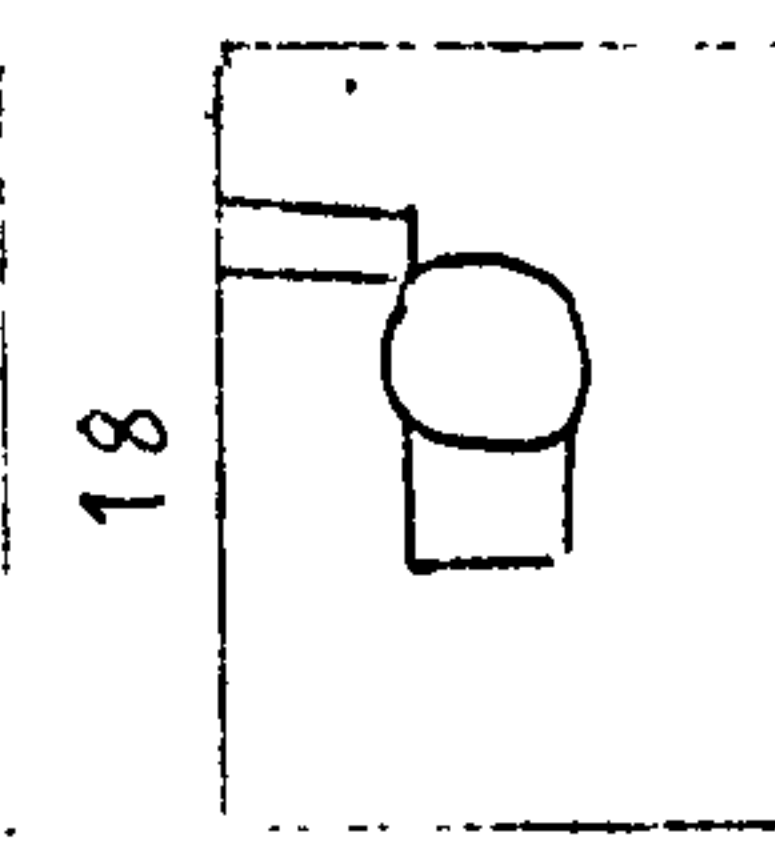
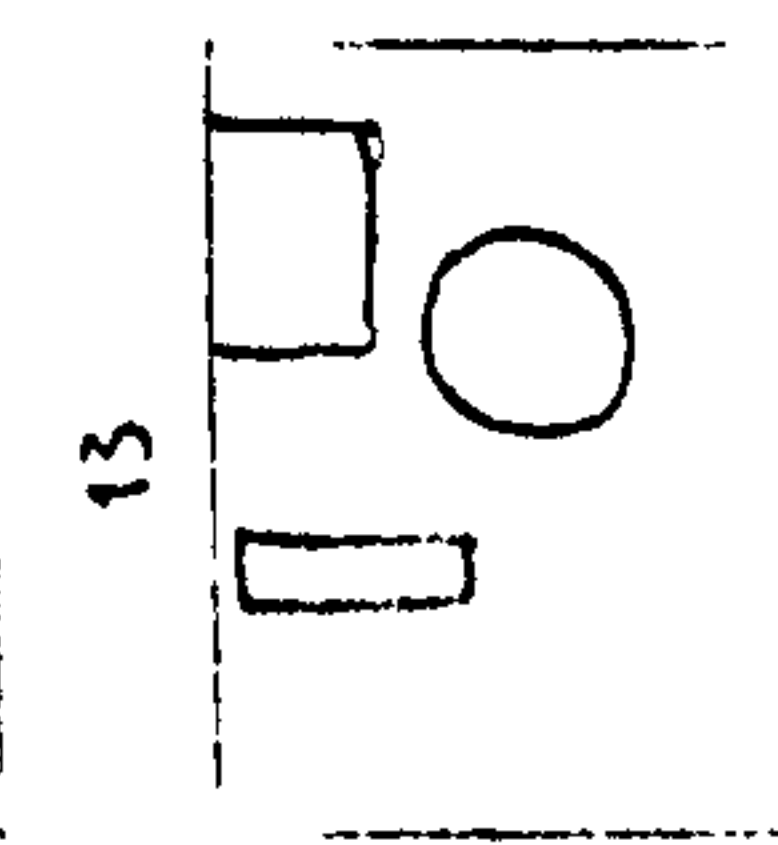
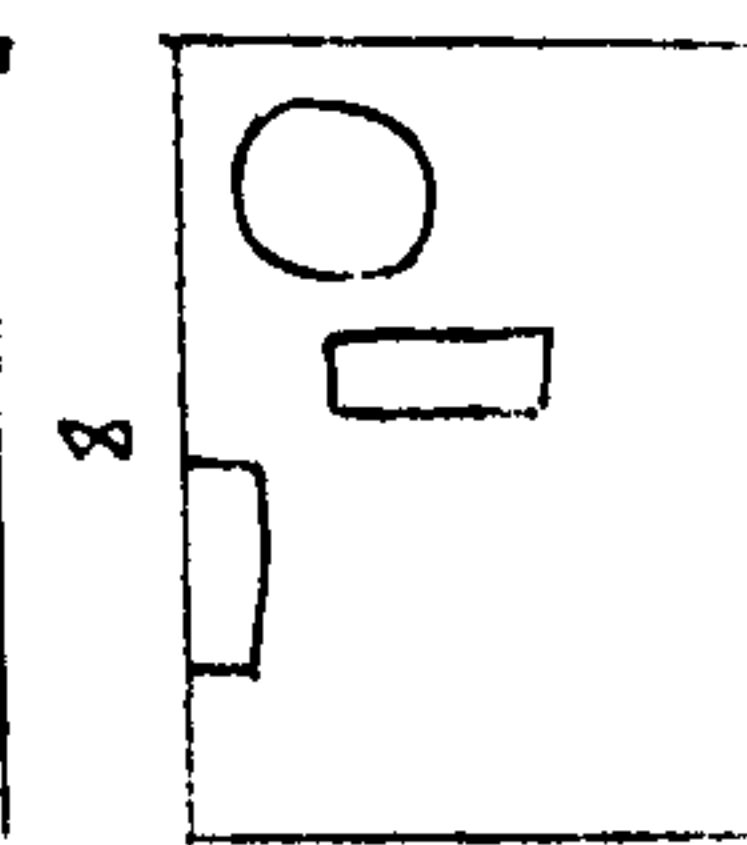
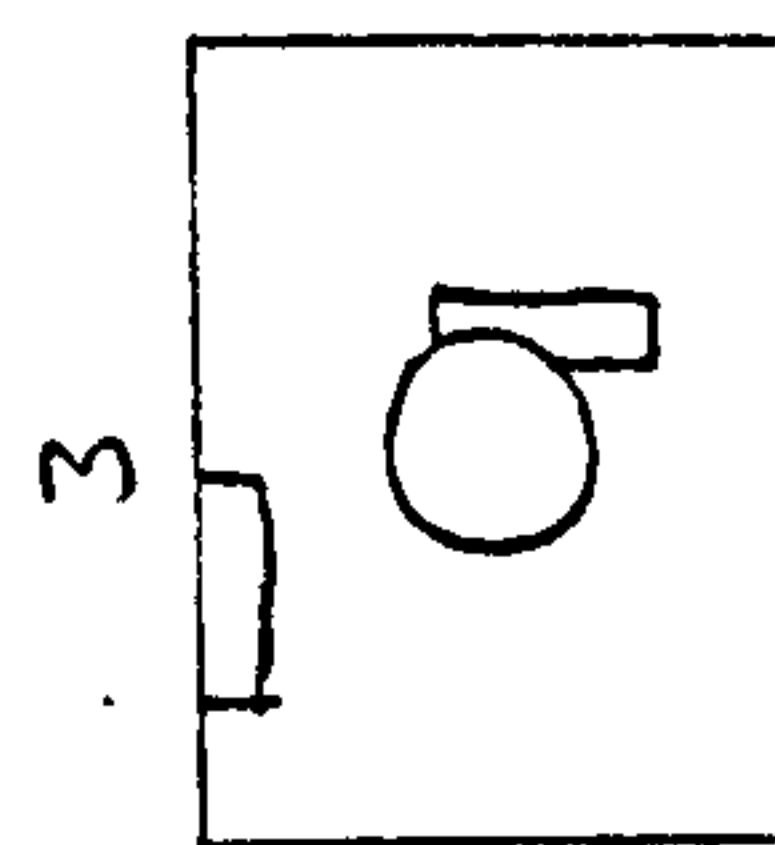
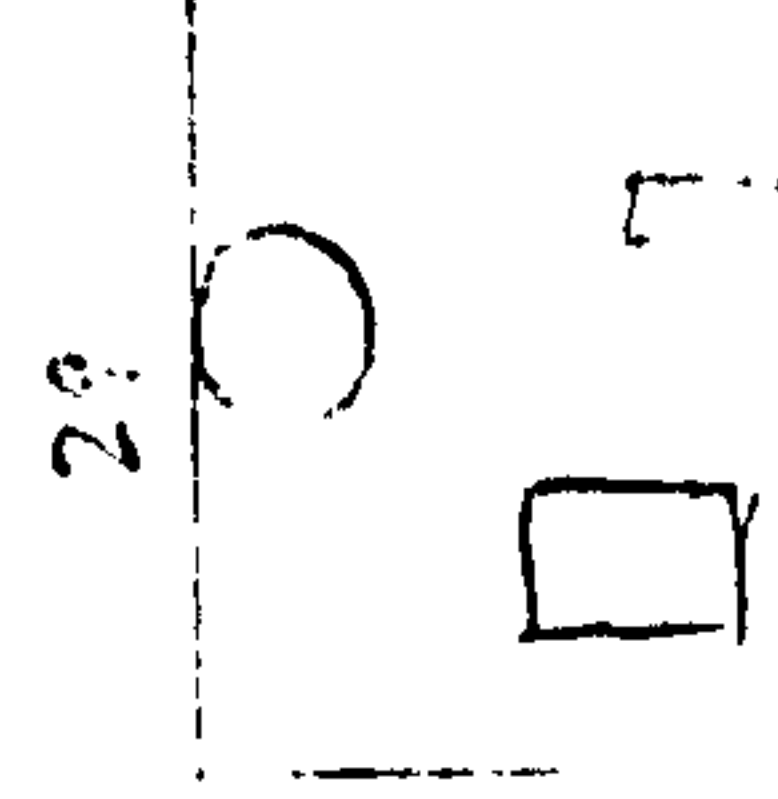
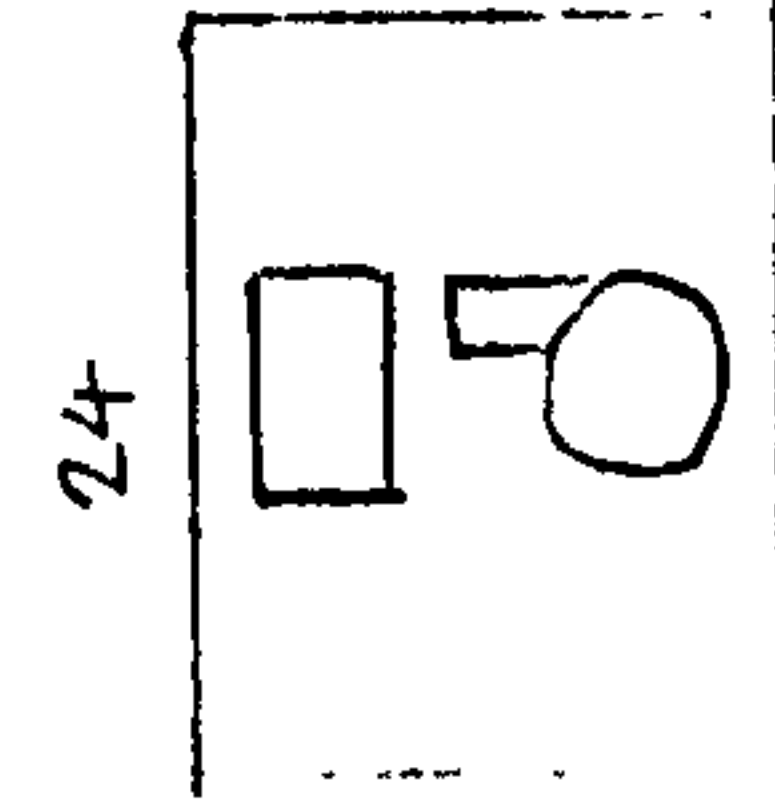
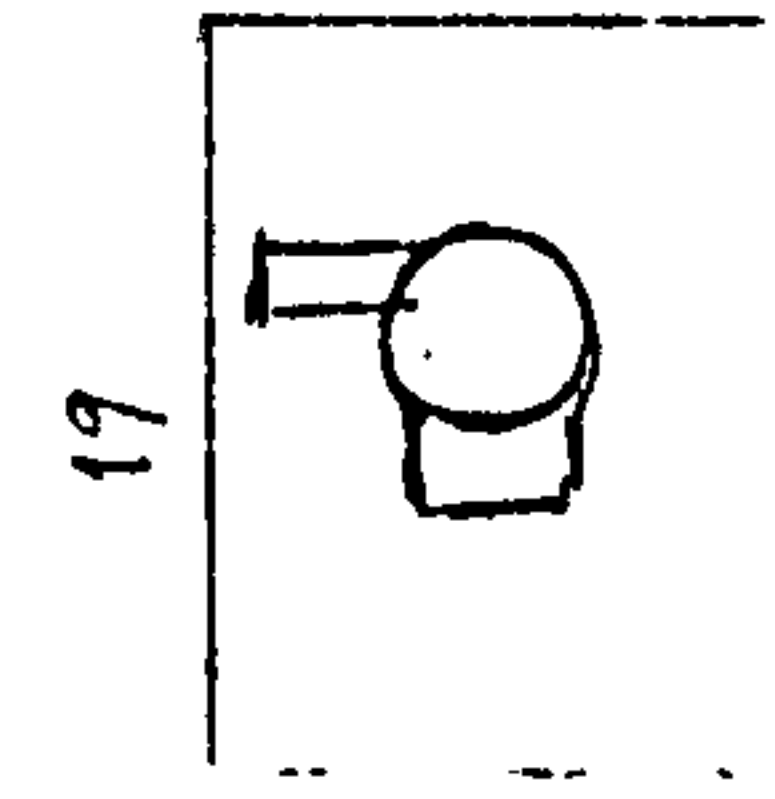
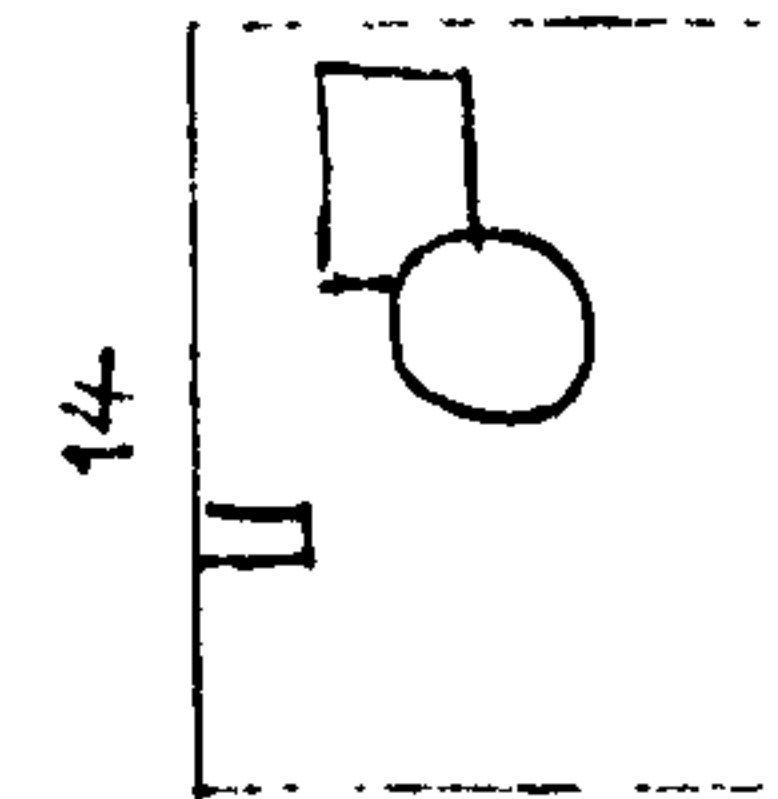
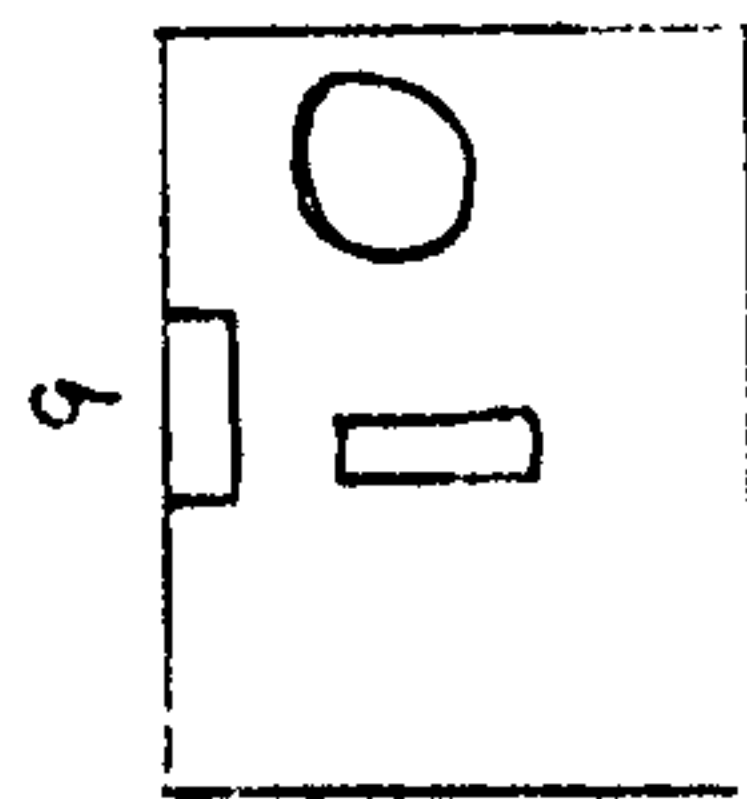
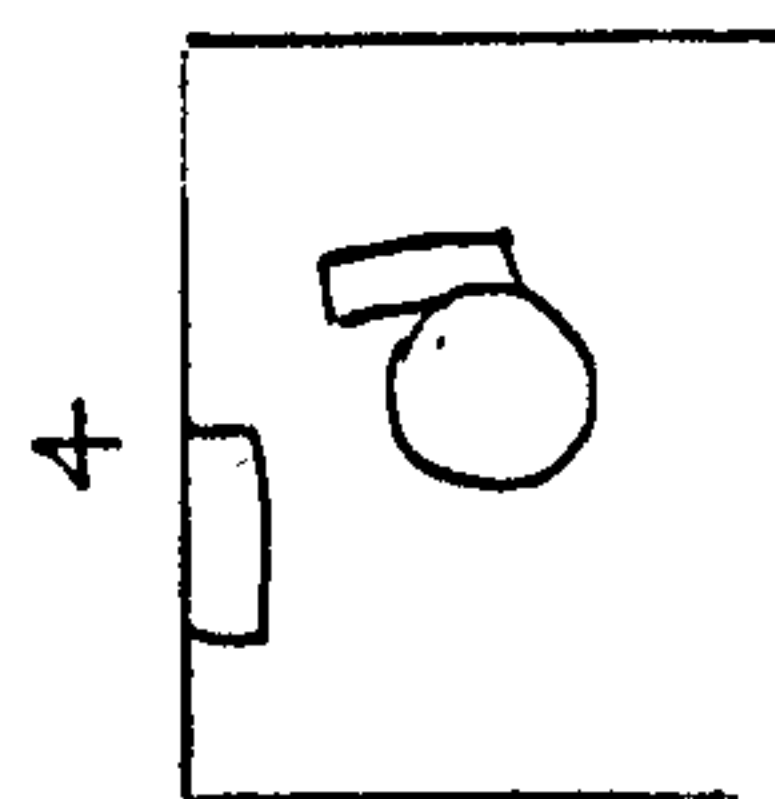
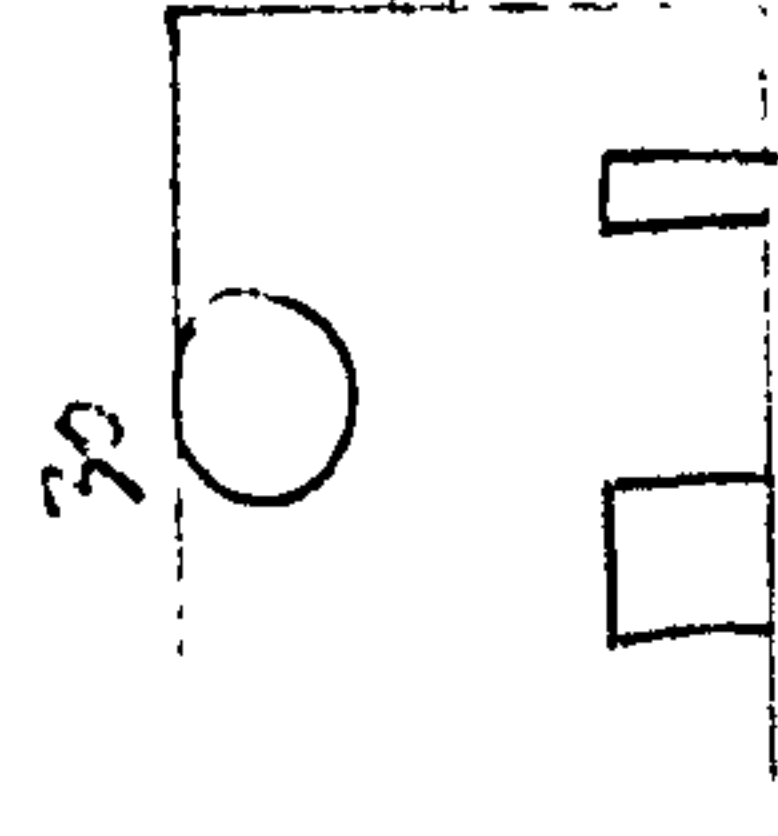
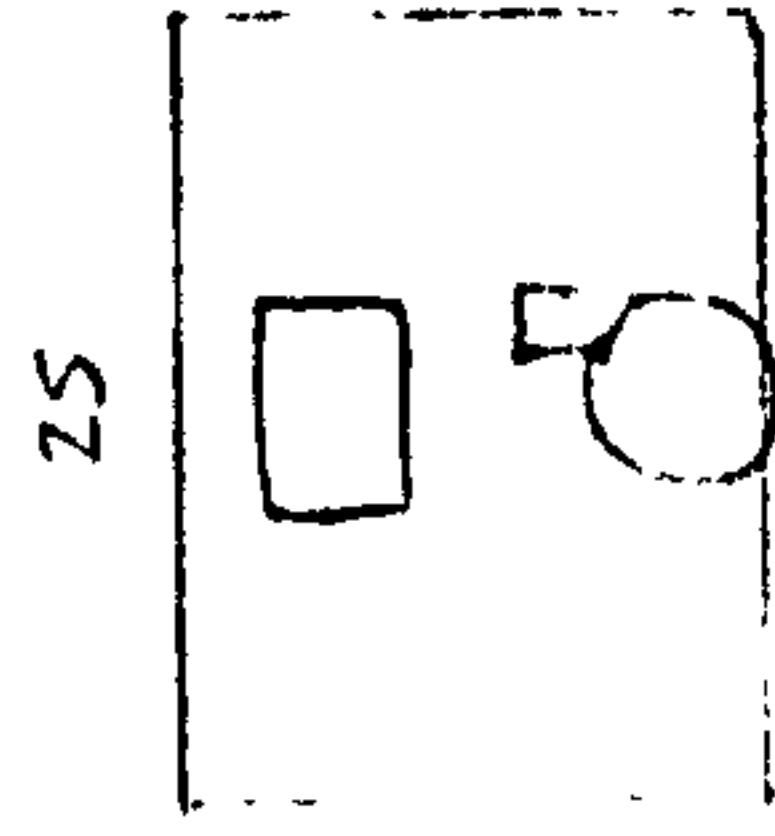
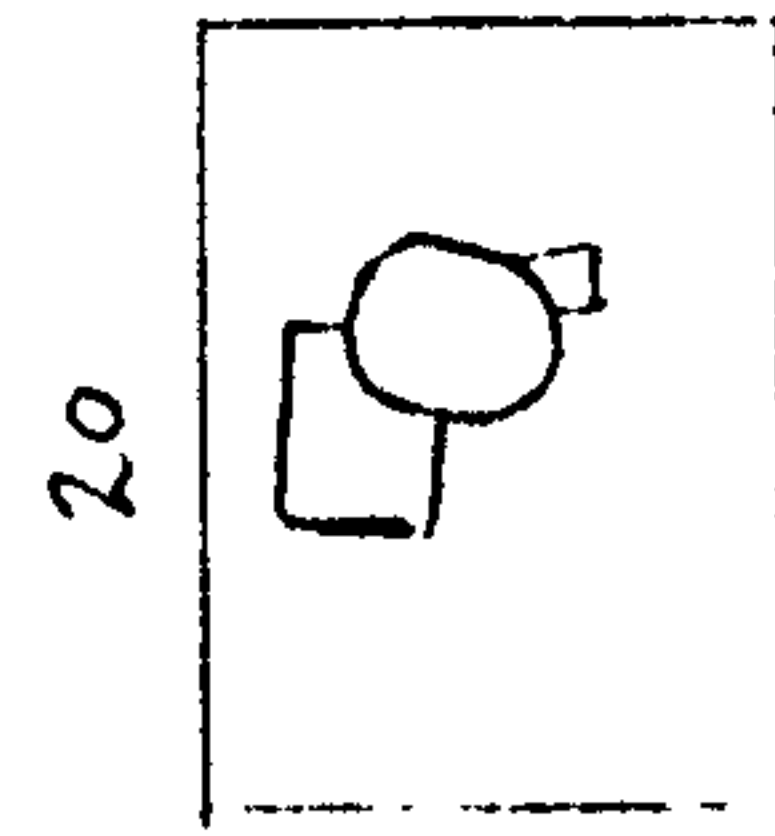
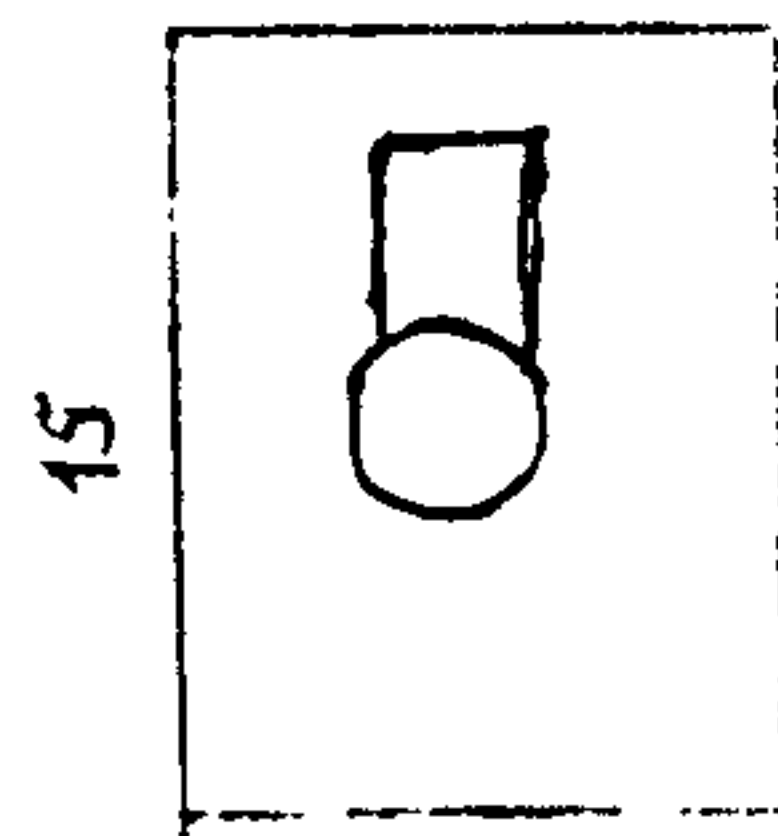
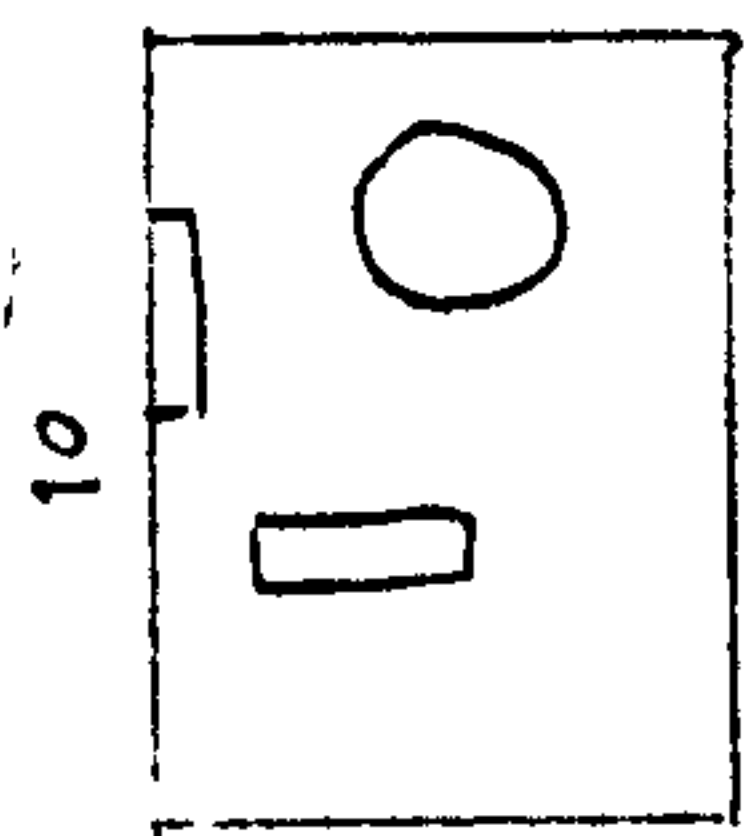
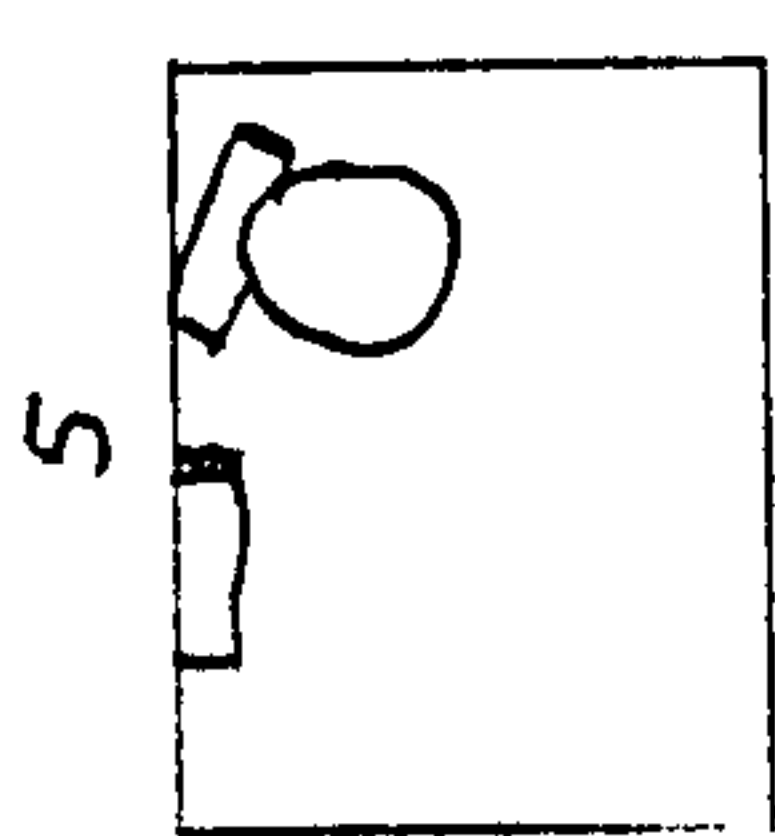


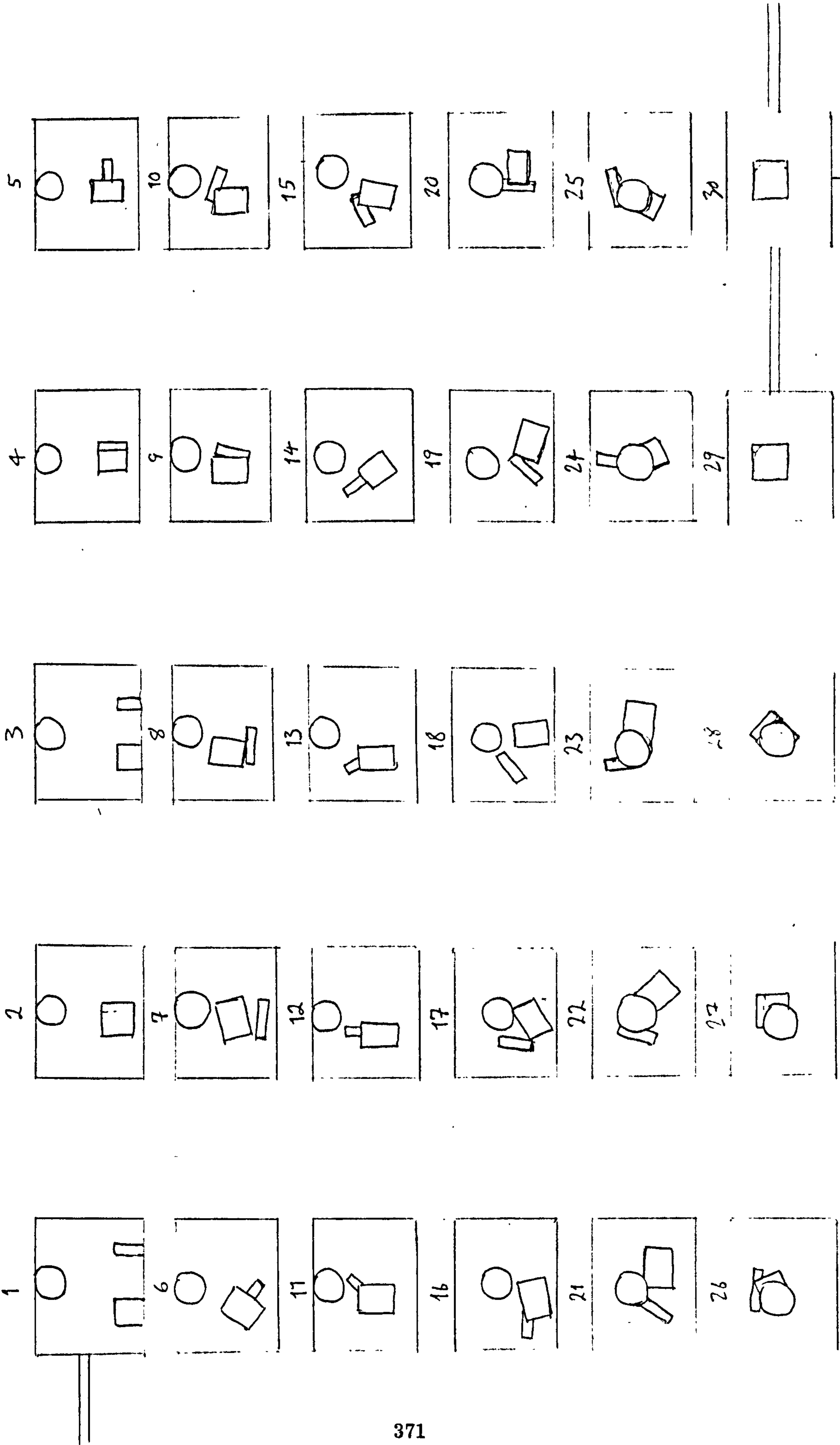
II; 4" Flis position, but parts re-arrange
So:-

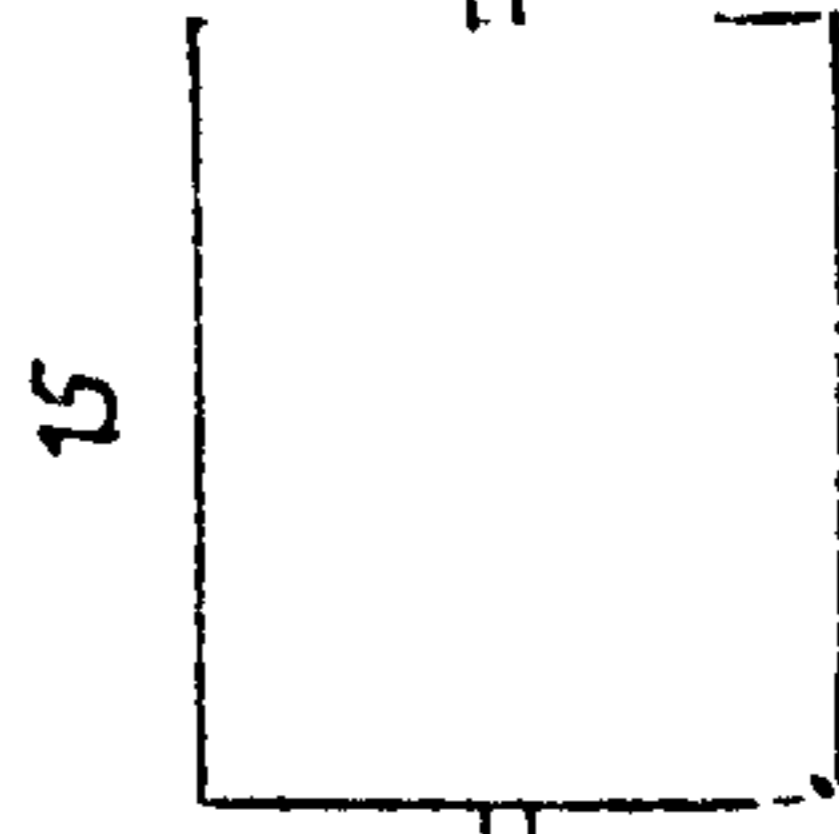
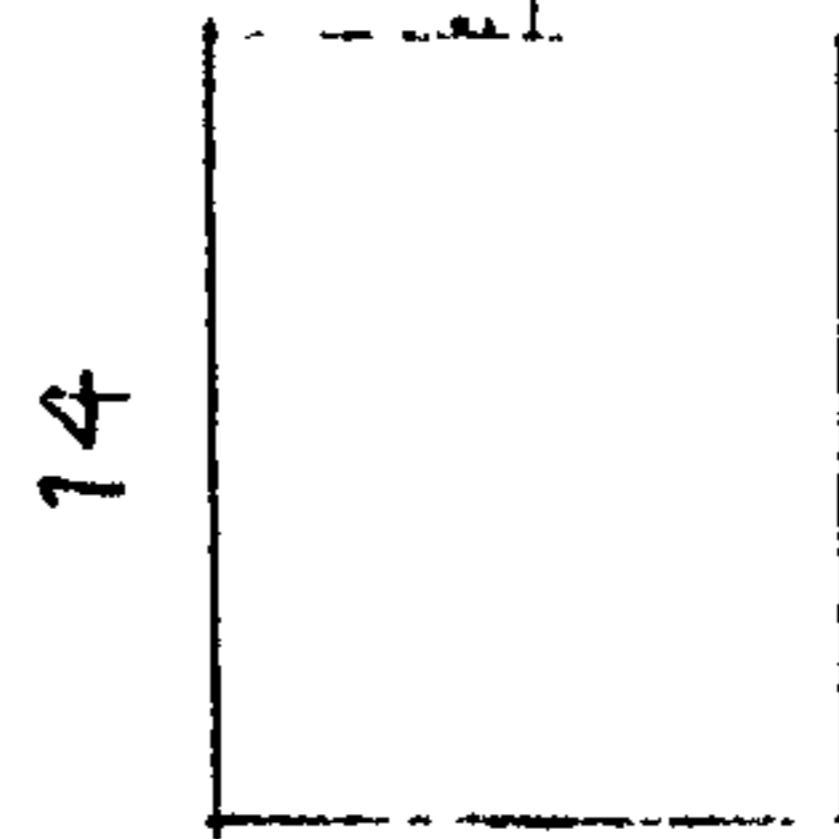
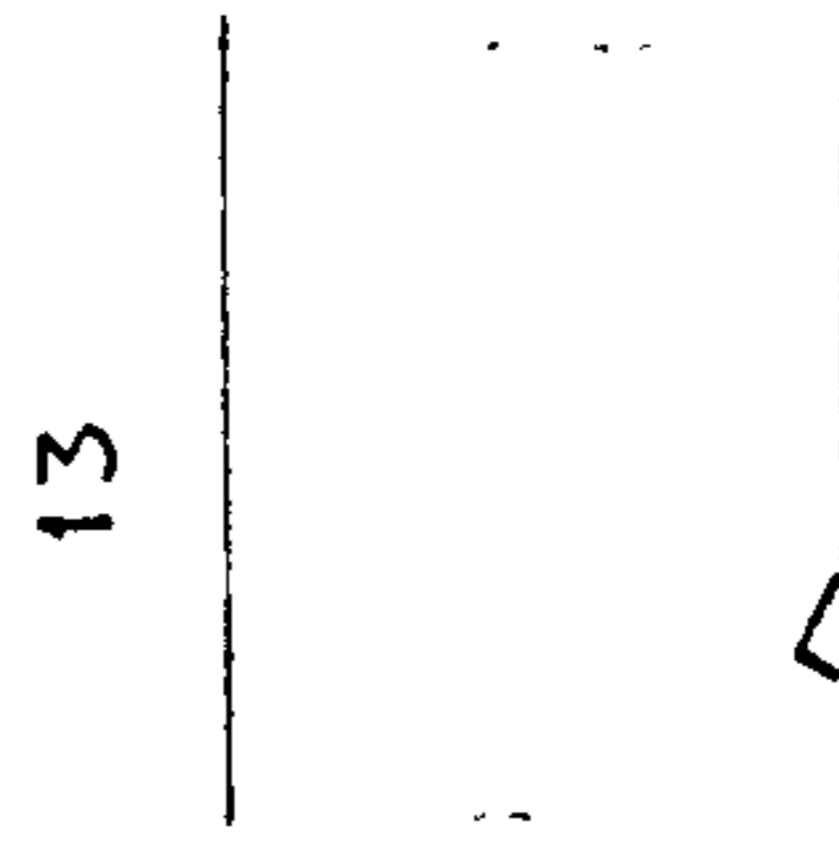
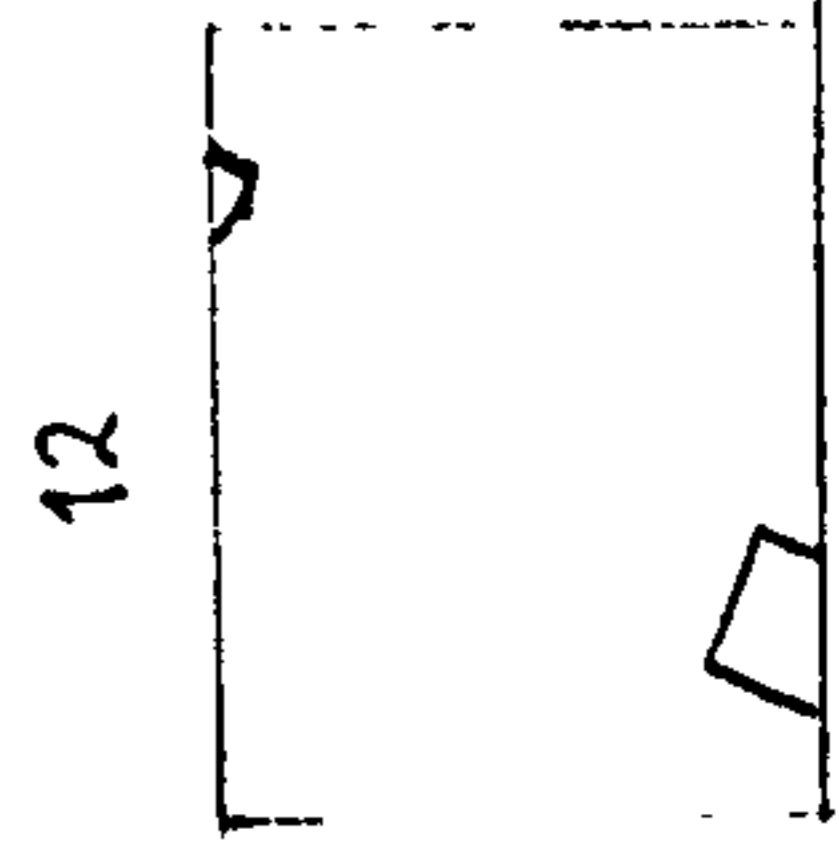
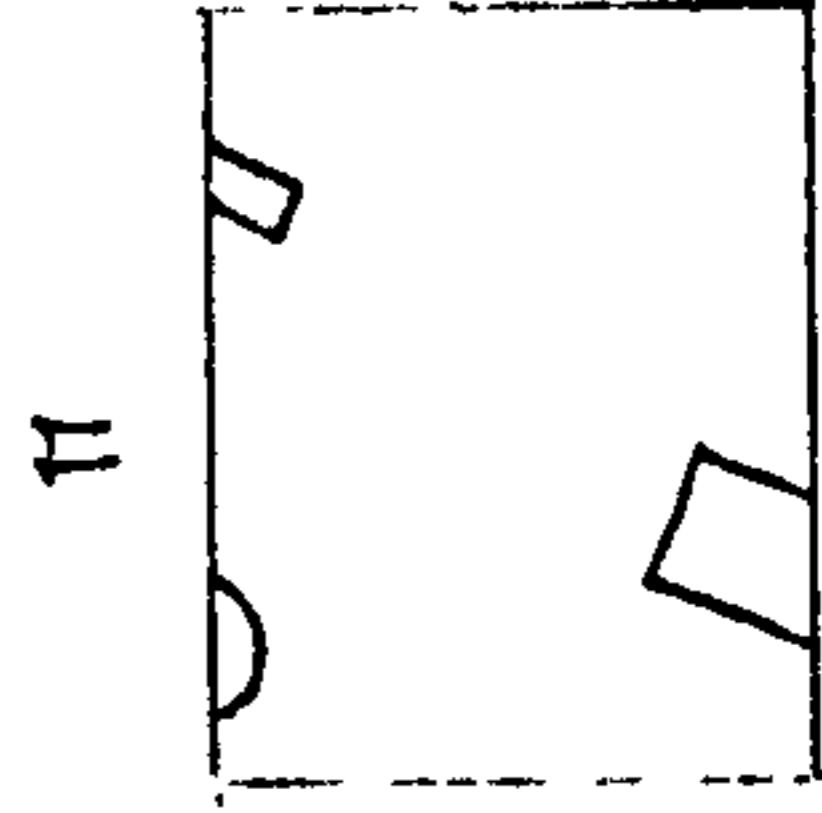
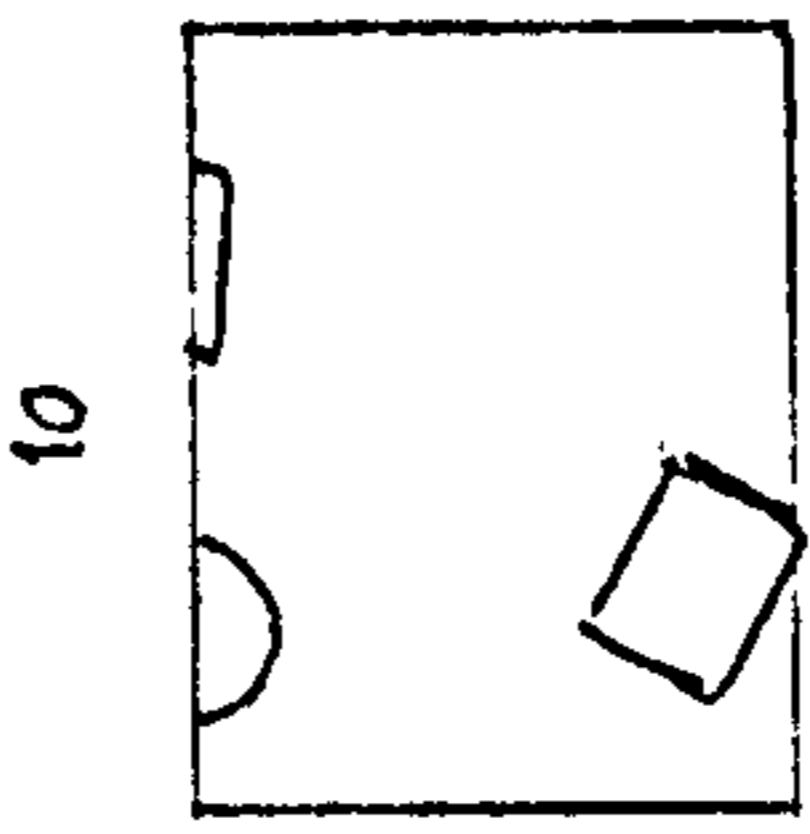
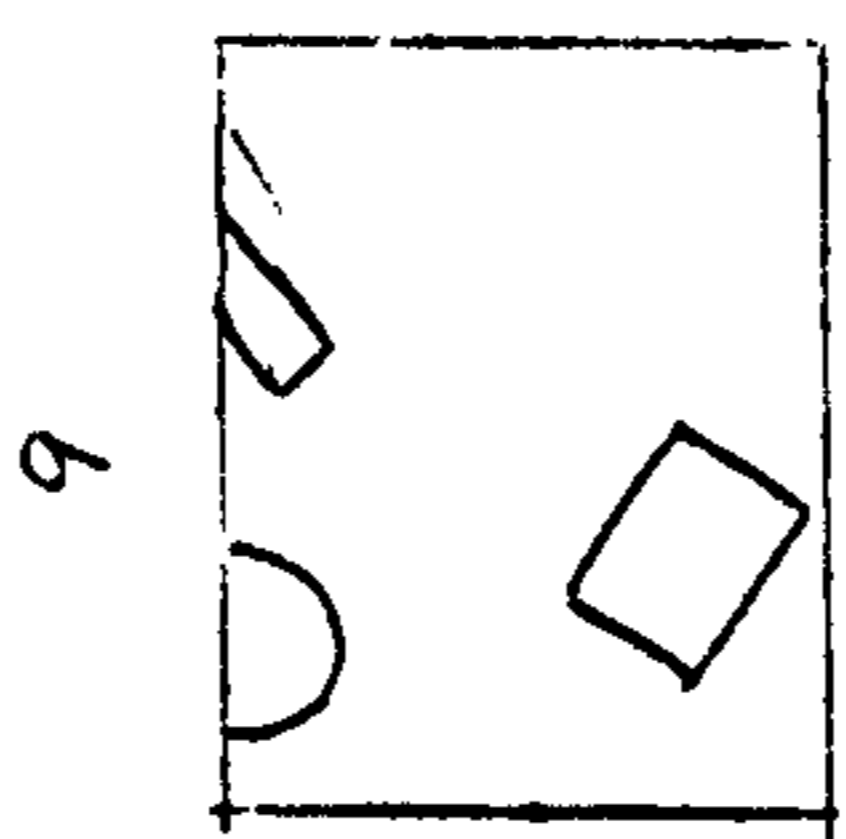
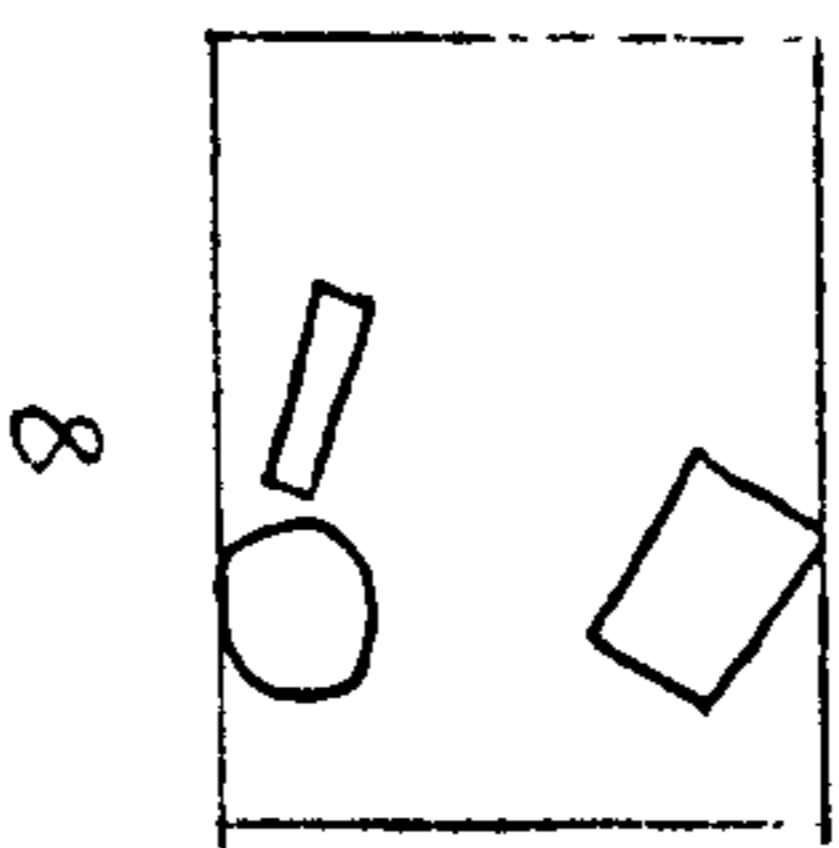
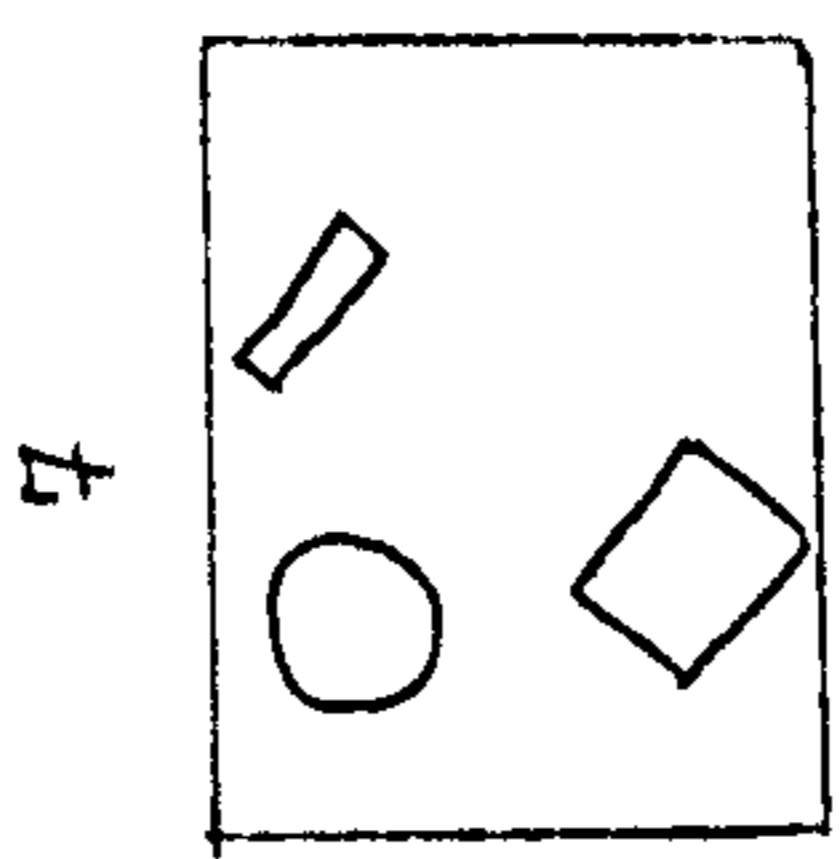
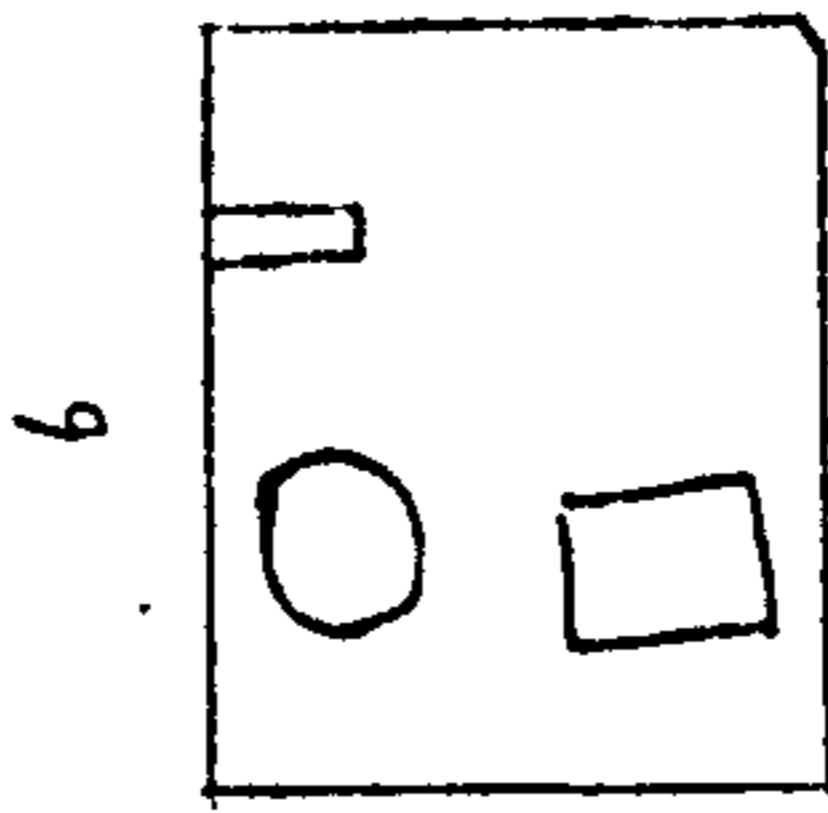
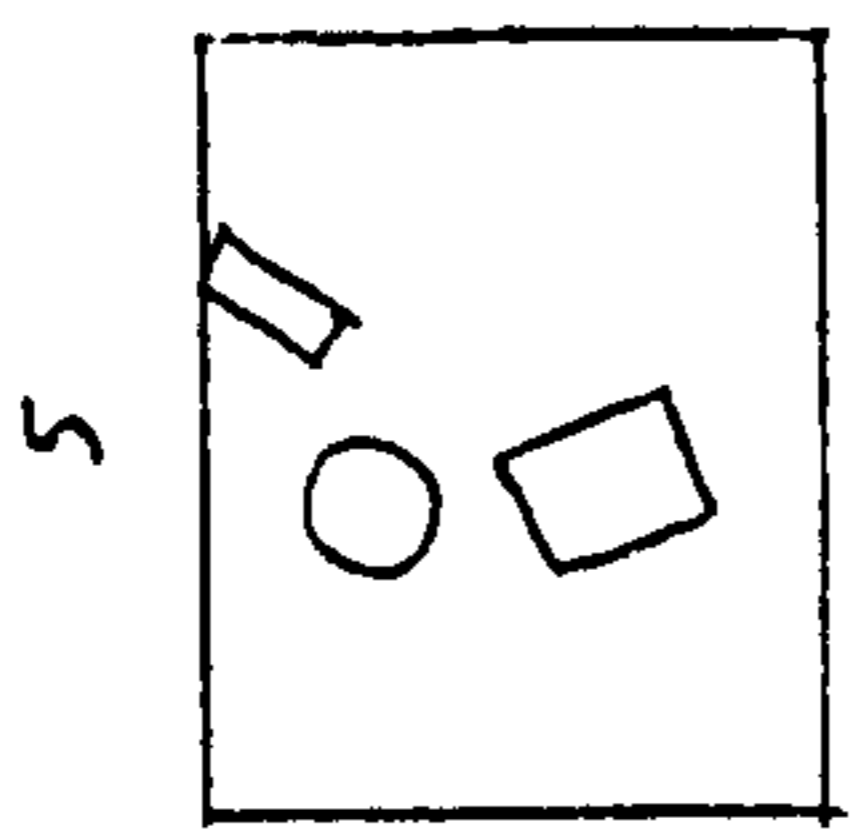
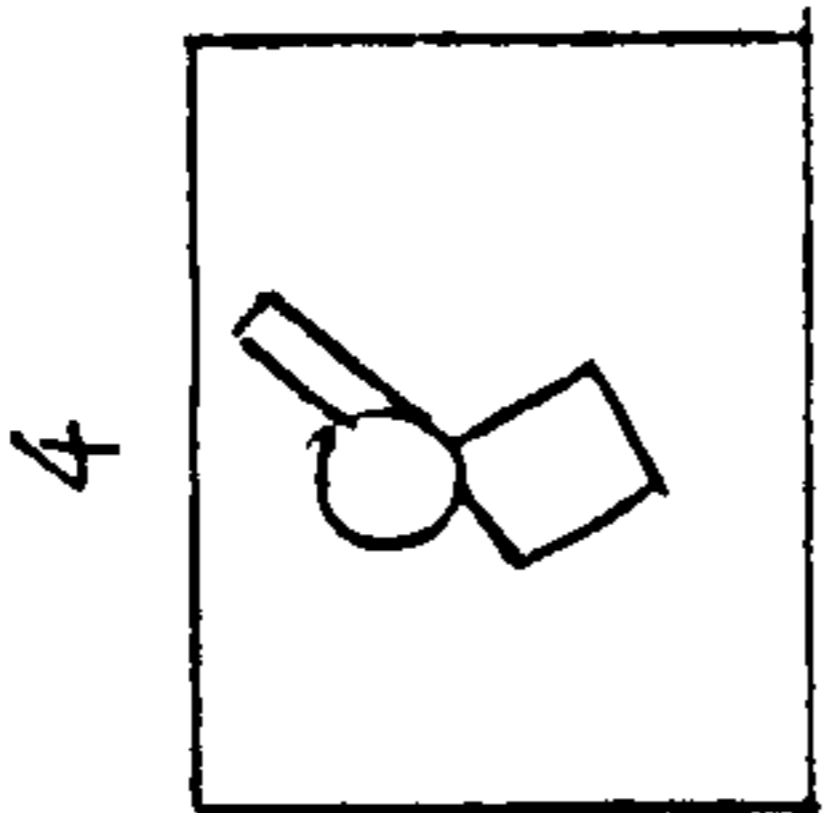
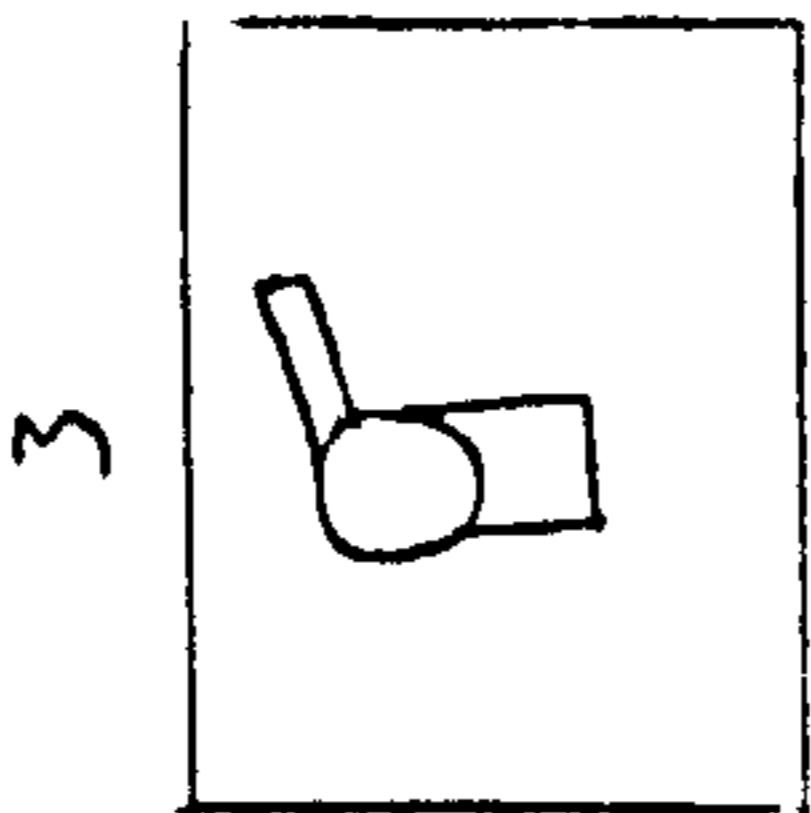
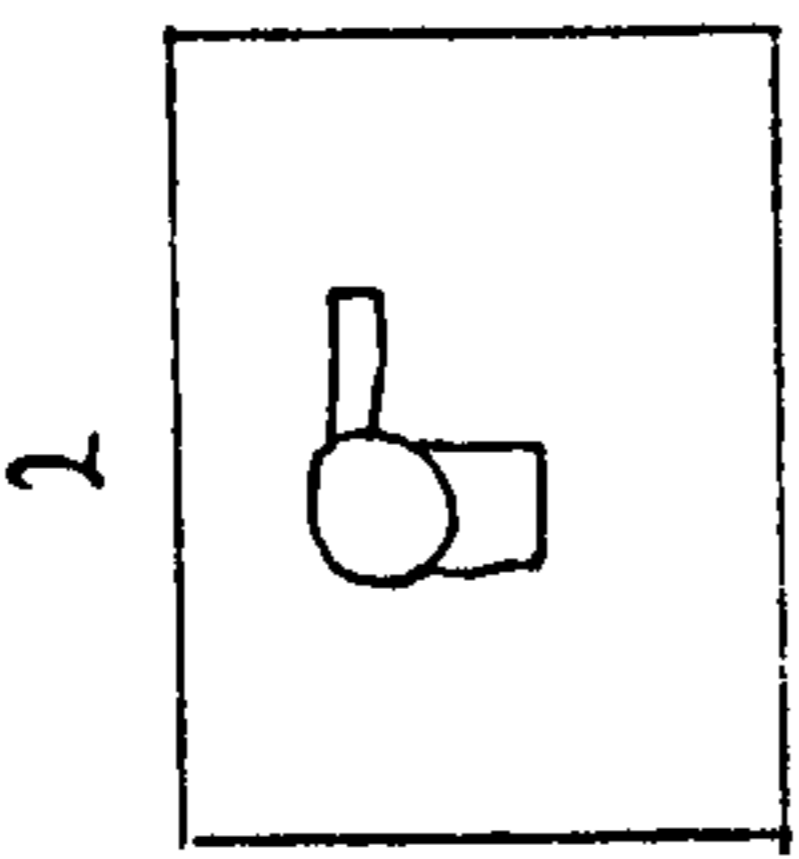
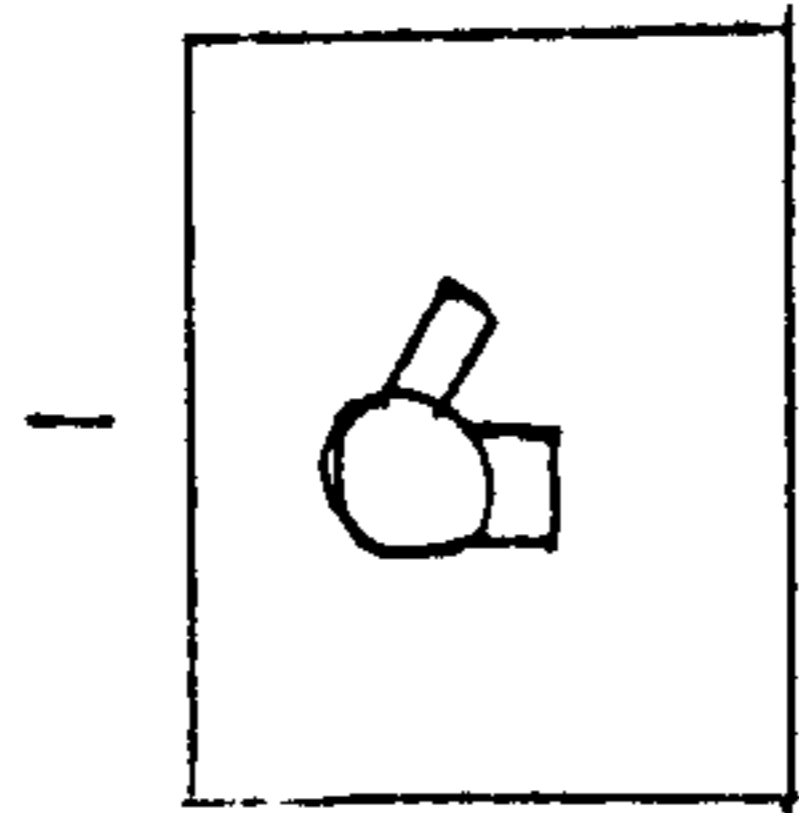
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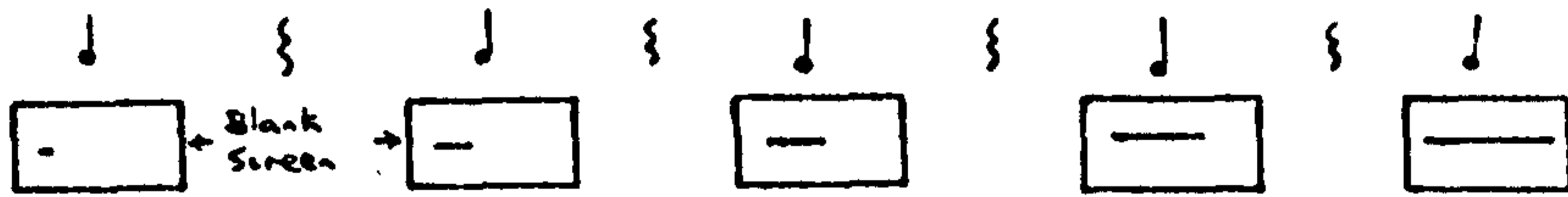




followed by 4" white screen &
6" "END".

APPENDIX 3.8 : Speculative chart of audio-visual relationships

[$\text{♩} = 120$]



Set out below are alternative parallel sound-tracks to the image-sequence.

1. [ar, reversed dynamics, starting ff]

2. [and sim, by other equal 'steps']

3. [and sim, by additive intervals]

4,5,6. As for 1,2,3 above, but displaced by a crotchet (hence 'echoic' of the visuals).

7. [ar, reversed]

8. As for 7 above, but displaced by a crotchet...

9. (Melody; developing from rhythm in 7. above.) 3 5

10. As for 9 above, but displaced by a crotchet

11. Counter-rhythm... 6 'notes'; 5 images. 3 5

12. Non-aligned sound-track (at e.g. $\text{♩} =$)



A

$\text{♩} = 60$

5

10

15

20

25

30

B

35

40

45

50

55

60



Printed in England

The image displays a handwritten musical score for piano, organized into six systems. Each system consists of a grand staff with a treble clef on the upper staff and a bass clef on the lower staff. The notation includes various note values, rests, and dynamic markings such as *p* (piano) and *f* (forte). Chord symbols are written below the bass staff, including *C*, *F*, *D*, *G*, *B*, *A*, and *D*. Fingerings are indicated by numbers 1-5. Performance instructions like *arco* and *tr* are present. Measure numbers 65, 85, and 90 are clearly visible at the end of the first, third, and fifth systems, respectively. A circled letter 'C' is written in the left margin of the first system.

D

95

100

105

110

R.V.

115

120

 R.G.S.
Printed in England

	8	9	10	11	12	13	14	15	16
SOUNDS	1		A Bb			A Bb	A Bb		
	2			C B		C B	C B	C: B:	
VISUALS	a	Nz		Nz	Nz		Nz →	N4	
	b	Wz	Sz	Wz →	W4		W4	W4	
		Nz →	Sz	Sz →	S4			S4	S4
		d		d				d	
		Ez	Ez	Ez	E2	E2		E2 →	E4

	16	17	18	19	20	21	22	23	24
SOUNDS	1	A	Bb	A	Bb	A	Bb	A	Bb
	2	C	B	C	B	C	B	C	B
VISUALS	a			N4	N4	N4	N4	N4	N4
	b	S4		S4	S4	S4	S4	S6	
	E4			W4	W4	E4	E4	E6	
				J	J	J	J	J	
				E4	E4	W4	W4	W4	

Bi

	24	25	26	27	28	29	30	31	32
SOUNDS	1		A	Bb		A Bb		ABb	A
	2	C	B	C		C			C
VISUALS	a	N4→ ↓	N6 ↓	N6→ ↓	S2 ↓	S2 ↓	S2 ↓	S2 ↓	S2 ↓
	b	E6	E6	E6	E6	E6→	E5→	E5→	E2
		S6 ↓	S6 ↓	S6 ↓	S6	S6→	S5	S5	
		W4→	W4→	W6→	E2	E2	E2	E2→	

	32	33	34	35	36	37	38	39	40
SOUNDS	1	Bb	A	Bb	ABb	ABb	A Bb	A Bb	Bb
	2	B	Ci Bi	C	C B	C B	C B	C B	C B
VISUALS	a			S2 → E2	N2 E2		N2 E2 →	N2 W2	
	b	S5 W2	S5 → W2		S2 W2		S2 W2 →	S2 E2	

Bii

	40	41	42	43	44	45	46	47	48
SOUNDS	1	ABb	A Bb	A Bb	A Bb	Bb	ABb	A Bb	A Bb
	2	C B	C B	C B	C B	C	C B	C B	
VISUALS	a	Nz → J Wz	Sz Wz			Sz J Wz →	Sz Ez	Sz → J Ez	Ni Ez
	b	Sz → J Ez	Nz Ez		Nz J Ez →		Nz Wz	Nz → J Wz	N4 Wz
	40	41	42	43	44	45	46	47	48

7

*

	48	49	50	51	52	53	54	55	56
SOUNDS	1	A Bb	A Bb	A Bb	A Bb	A Bb	A Bb	A Bb	A
	2	C B	C B	C B	C B	C B	C B	C B	C B
VISUALS	a	N1 E2	N1 E2	N1 E2	N3 E4	N3 E4	N3 E4	N3 E4	S1 d
	b	N4 W2	N6 W2	N6 E1	N6 E1	N6 W2	N6 W2	N3 W2	N3 W2

* letter 1/2 of b.55 to b.56 incorrect in Visuals. Corrected in realization.

	56	57	58	59	60	61	62	63	64
SOUNDS	(A) Bb	A Bb	A Bb	A Bb	A Bb	A Bb	A Bb	A Bb	A Bb
	C B	C B	C B	C B	C B	C B	C B	C B	C B
VISUALS	S1 W1 N3 W3	S1 W1 N3 W3	S1 W1 N3 W3	S1 W1 N3 W3	S1 W1 N3 W3	S1 W1 N3 W3	S1 W1 N3 W3	S1 W1 N3 W3	S1 W1 N3 W3
	S1 W1 N3 W3	S1 W1 N3 W3	S1 W1 N3 W3	S1 W1 N3 W3	S1 W1 N3 W3	S1 W1 N3 W3	S1 W1 N3 W3	S1 W1 N3 W3	S1 W1 N3 W3

C

	64	65	66	67	68	69	70	71	72
SOUNDS	1	A	Bb	A Bb		A	A Bb	A	
	2	C	B	C B	C	B		C	C
VISUALS	a	N4		N4 →	S2	S2 →	S4	S4	
	b	E6 →	S2	S2 →	W3	W3	W3	W3 →	
		E1 →	E3	E3		N4	N4		
						E3 →	E5		

	72	73	74	75	76	77	78	79	80	
SOUNDS	1									
	A	A	A	A	A	A	A	A	A	Bb
	Bb	Bb	Bb	Bb	Bb	Bb	Bb	Bb	Bb	Bb
		C	C	C	C	C	C	C	C	B
		B	B	B	B	B	B	B	B	B
VISUALS	a									
				S4	S4 → S2					S2
				E5	E5 → E3					W4
				N4	N4	N4		N4	N4	
				W3 →	W3 →			W1 →	W1 →	E2

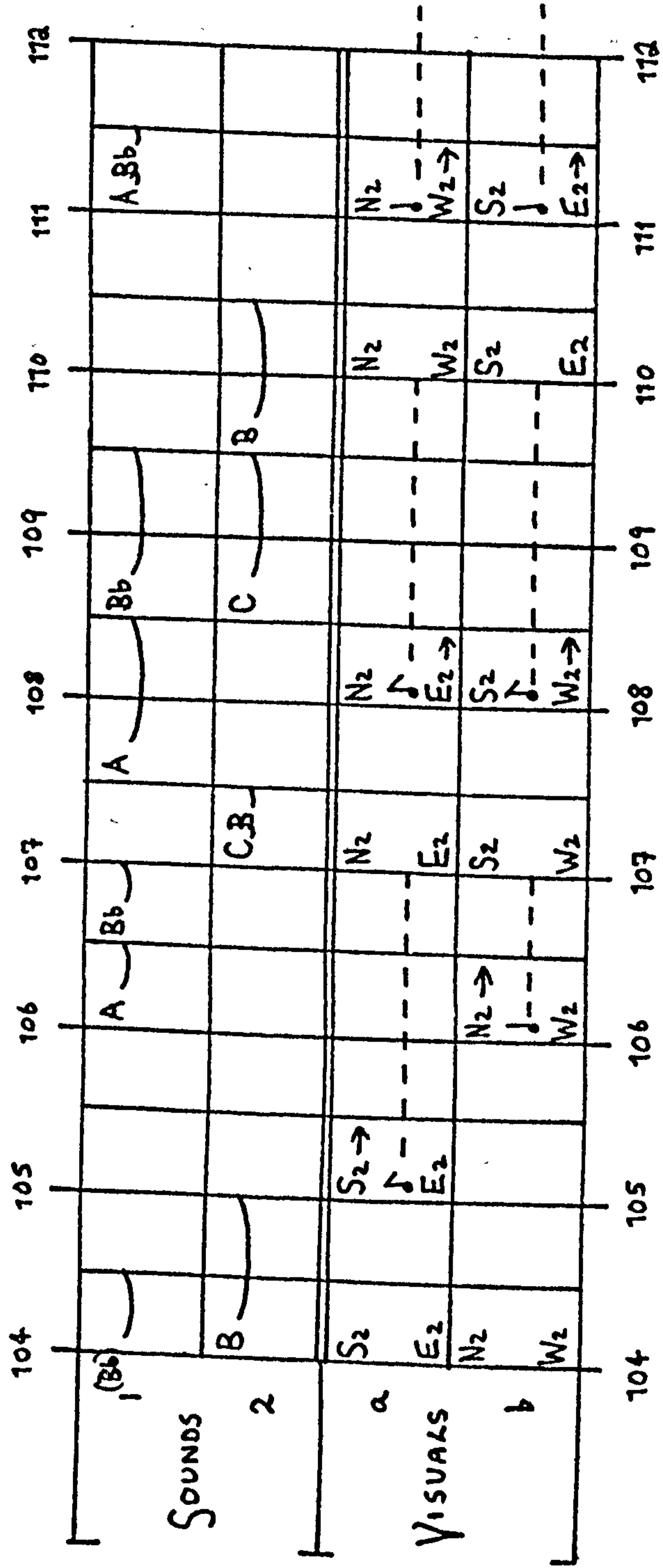
	80	81	82	83	84	85	86	87	88	
SOUNDS	(Bb) 1	A Bb	A Bb	A Bb	A Bb	A Bb	A Bb	A Bb	A Bb	
	(B) 2	C B	C B	C B	C B	C B	C B	C B	C B	
VISUALS	a	S ₂ → J W ₄	S ₄ → J W ₄ →	S ₄ → J E ₄	S ₄ → J E ₄	S ₄ → J E ₄	S ₄ → J E ₄	S ₄ → J E ₄	S ₄ → J E ₄	N ₄ → J E ₄
	b	N ₄ → J E ₂	N ₄ → J E ₄	N ₄ → J E ₄	N ₄ → J E ₄	N ₄ → J E ₄	N ₄ → J E ₄	N ₄ → J E ₄	N ₄ → J E ₄	N ₄ → J E ₄

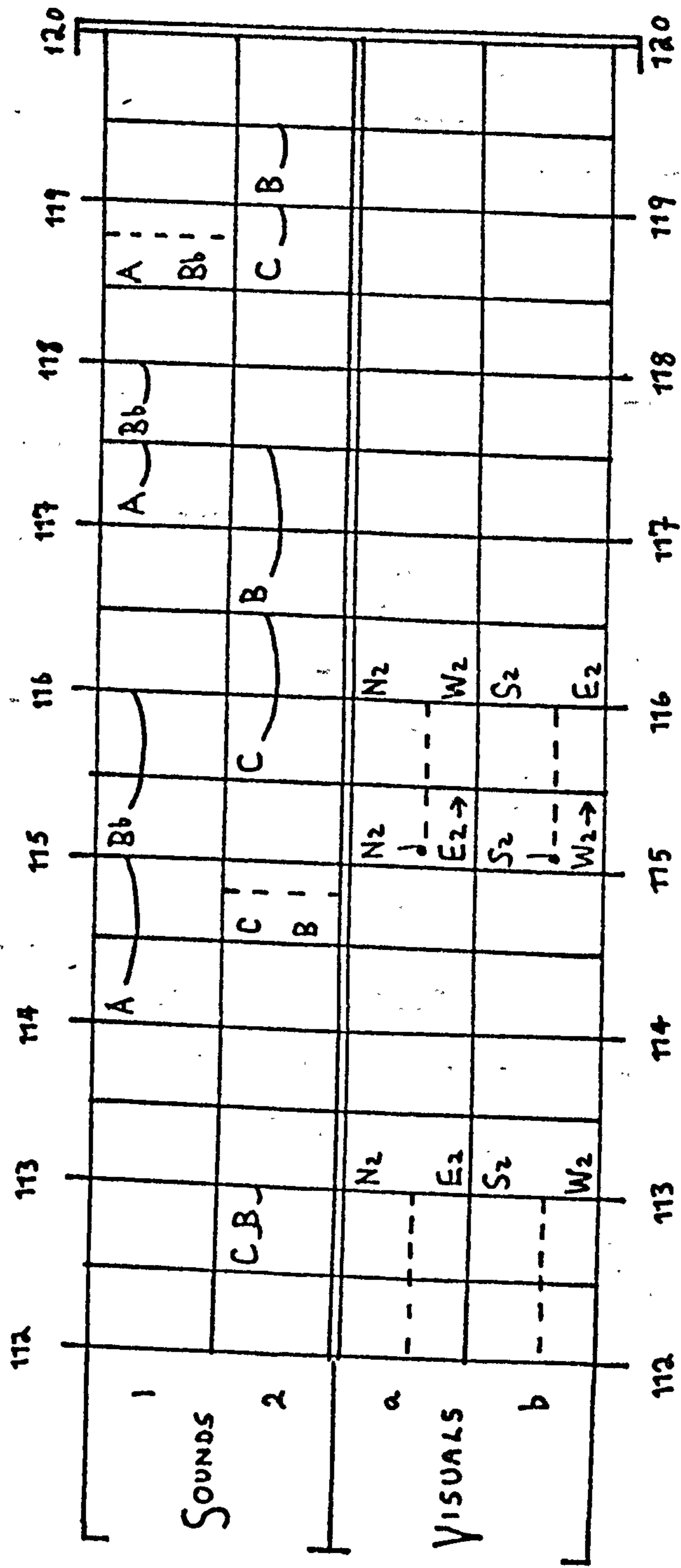
	96	97	98	99	100	101	102	103	104
SOUNDS	1	A Bb	ABb	A Bb	ABb	ABb	A	A Bb	
	2	C	B	C	B	C	B	C	
VISUALS	a	S1→ d---	N4 W1→	N4 E2	N2 E2→	N2 W2	N2→ W2	S2 W2→	
	b	S4→ d---	N1 W4	N1 W2	S2 W2→	S2 E2	S2→ E2	N2 E2→	

13

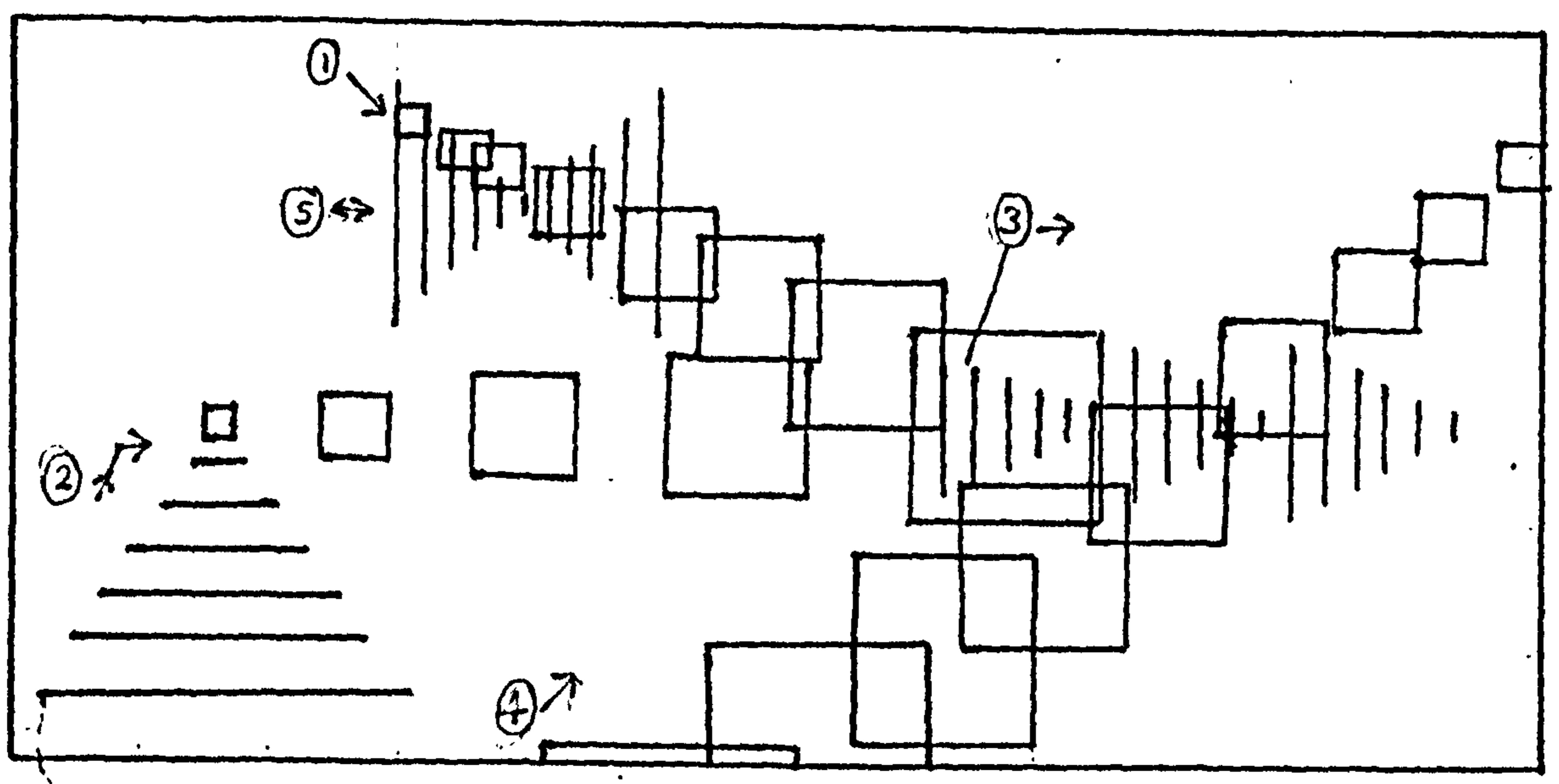
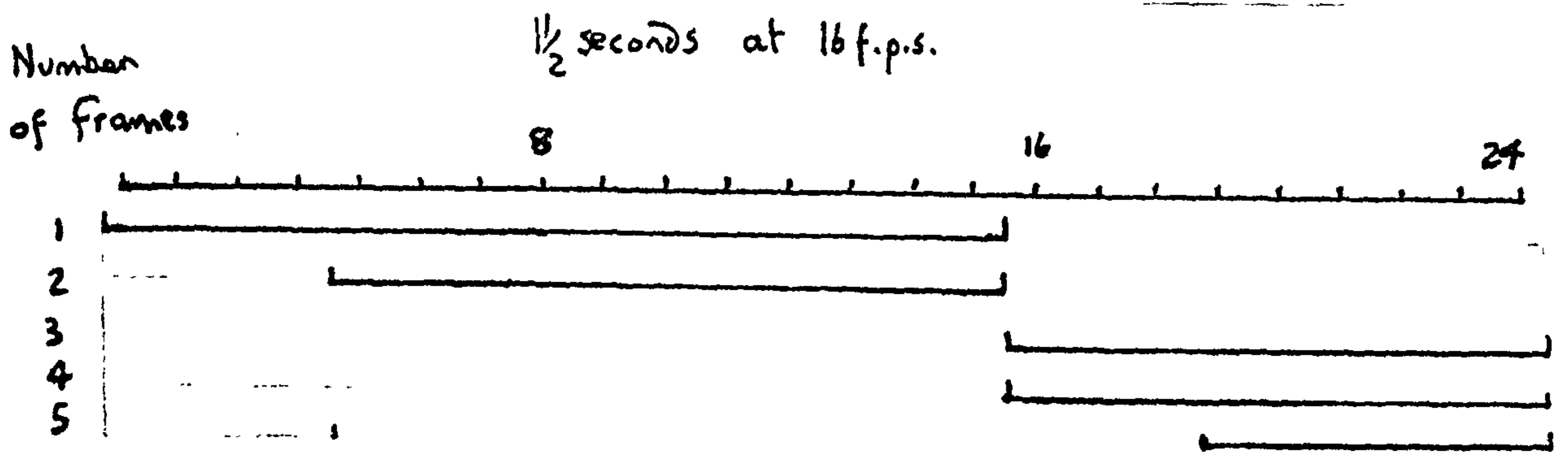
14

Dii





APPENDIX 3.28 : Audio-visual 'Instant'



④ pp \curvearrowright f

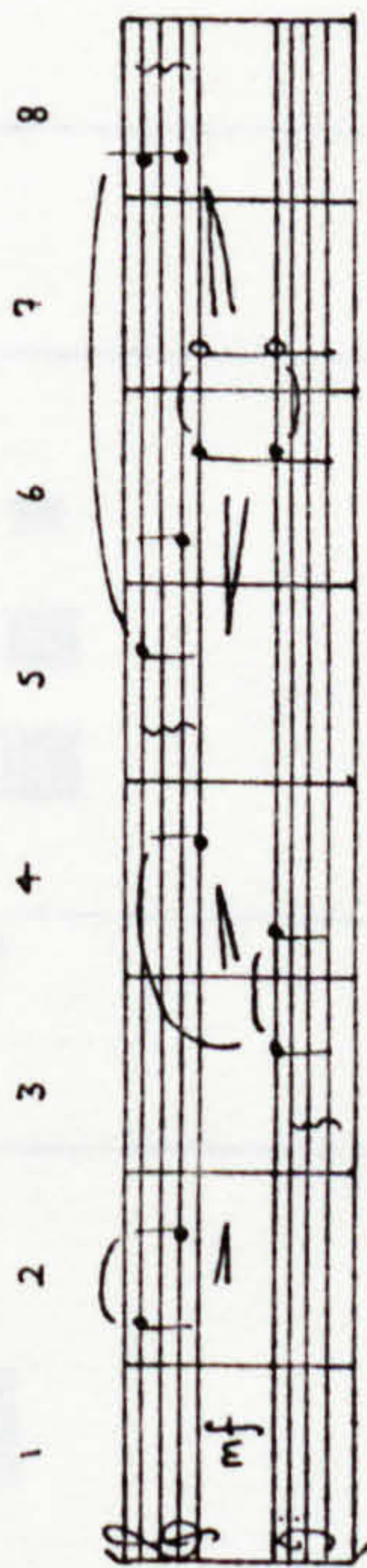
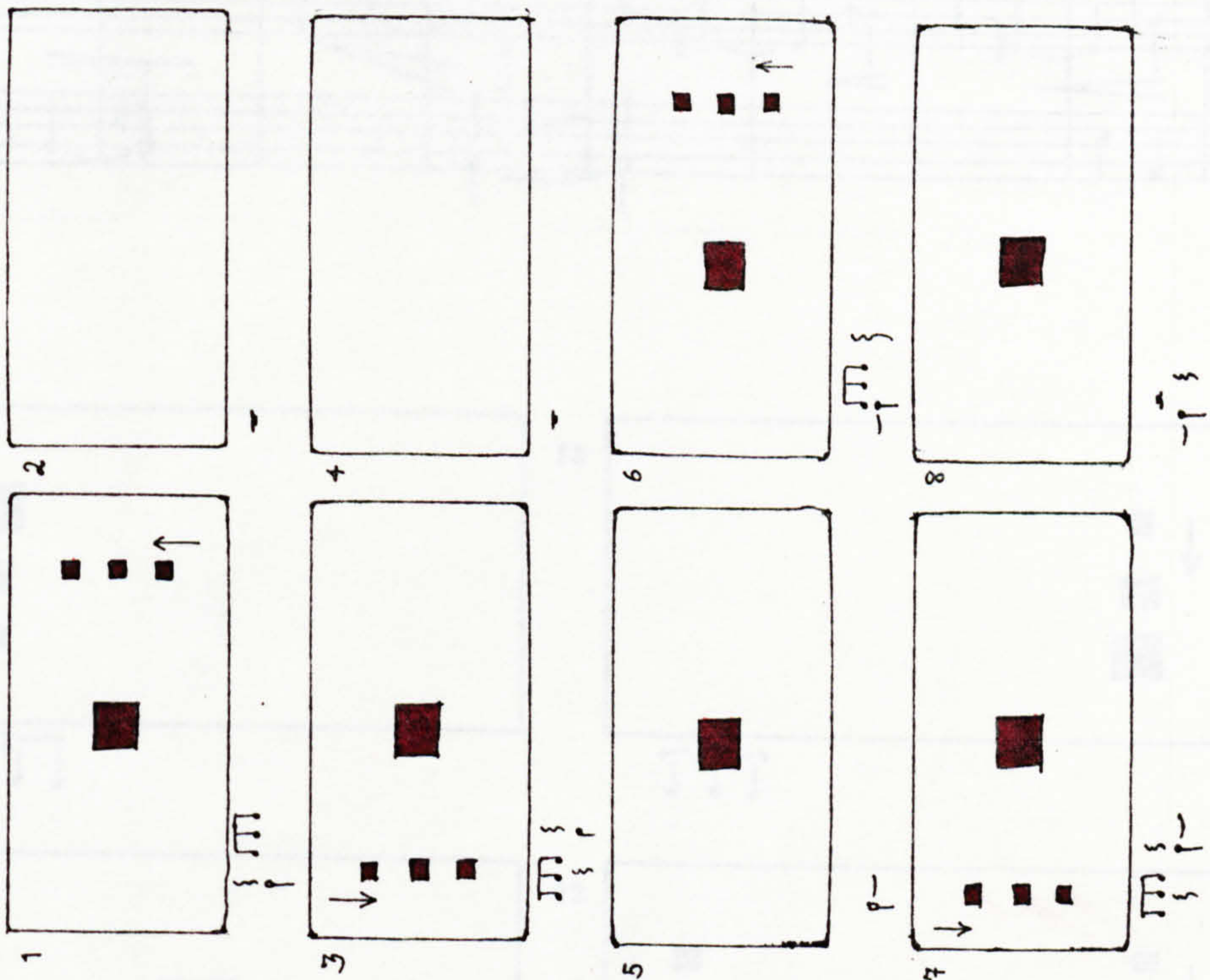
① mf/p sub.

②

③ pp

② p p p

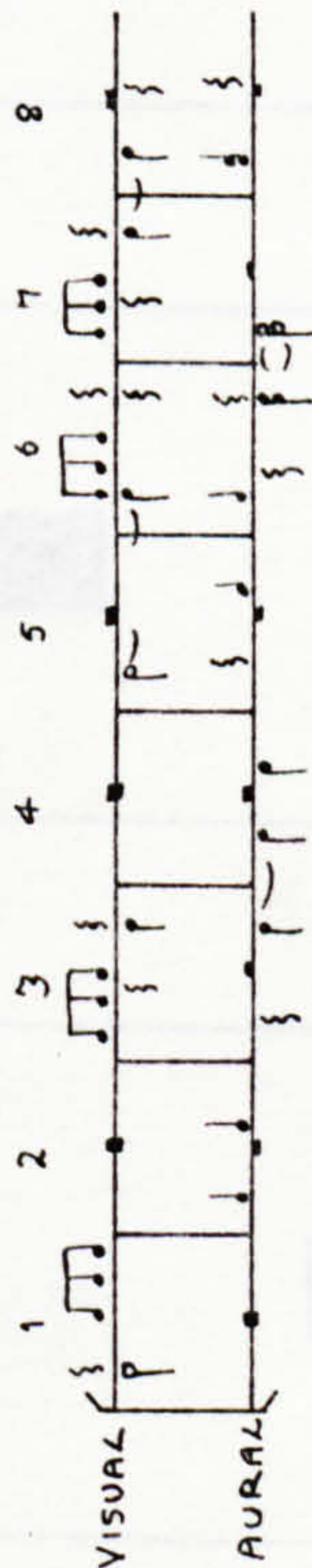
p f p p p



Analysis of first eight seconds:-

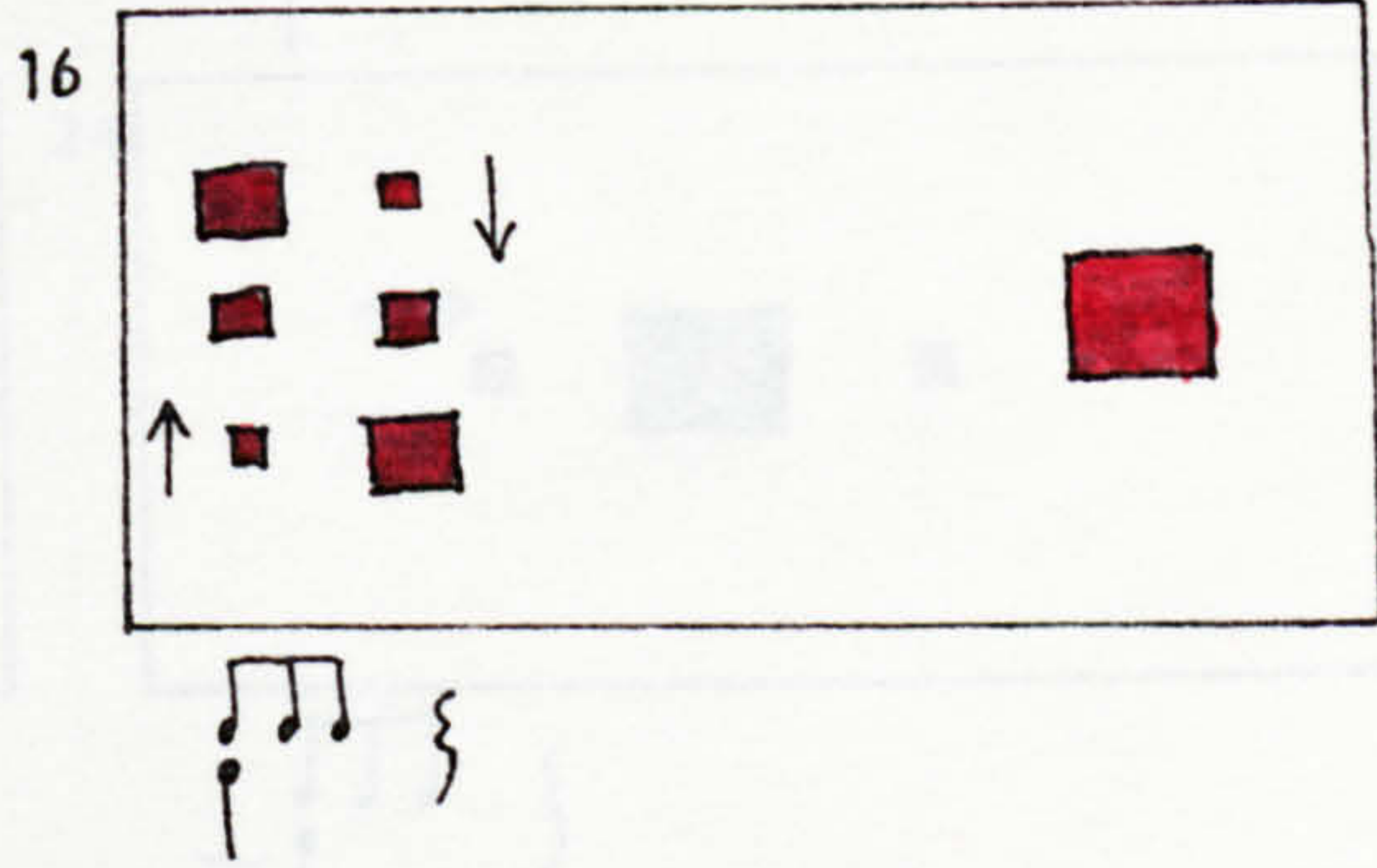
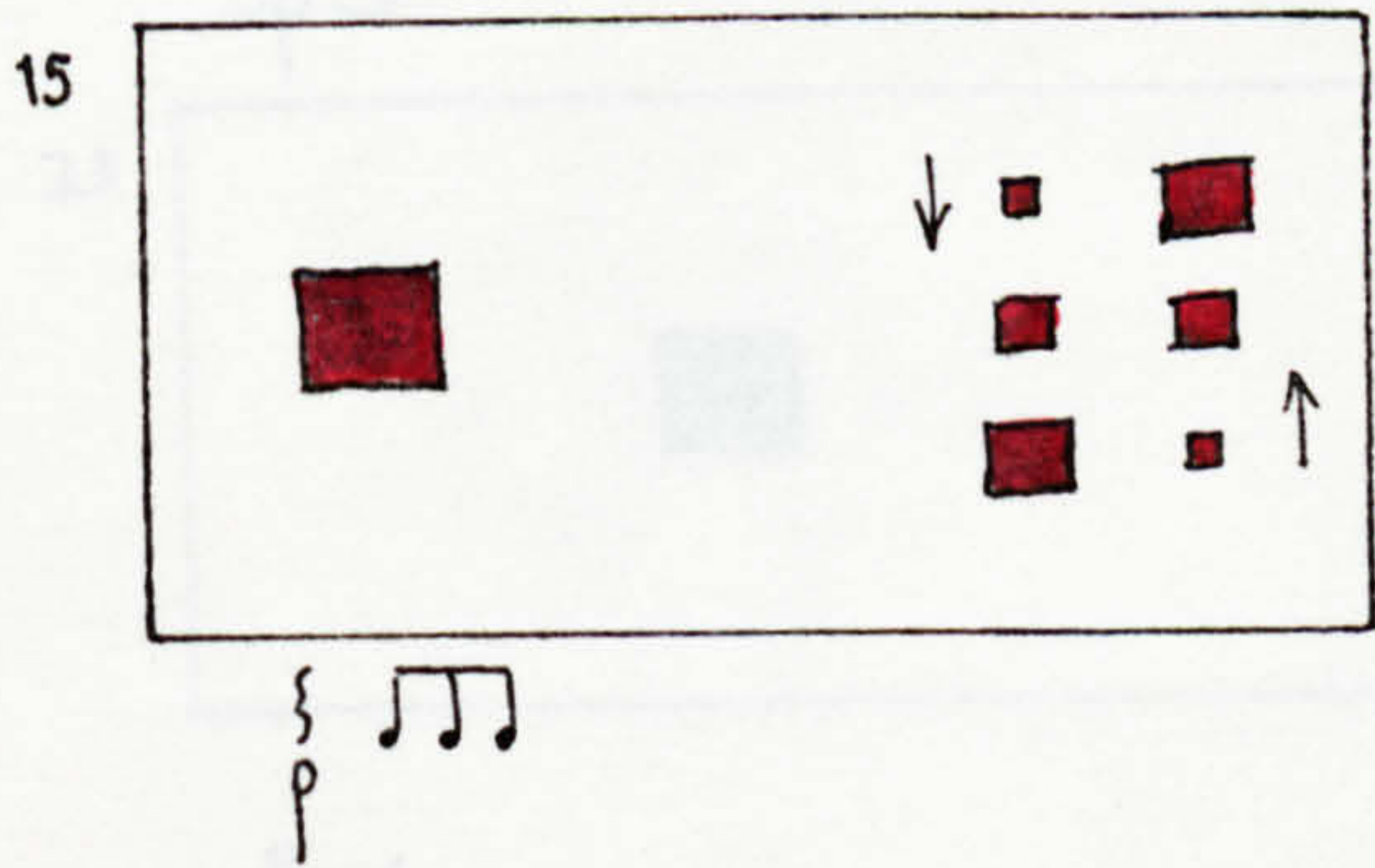
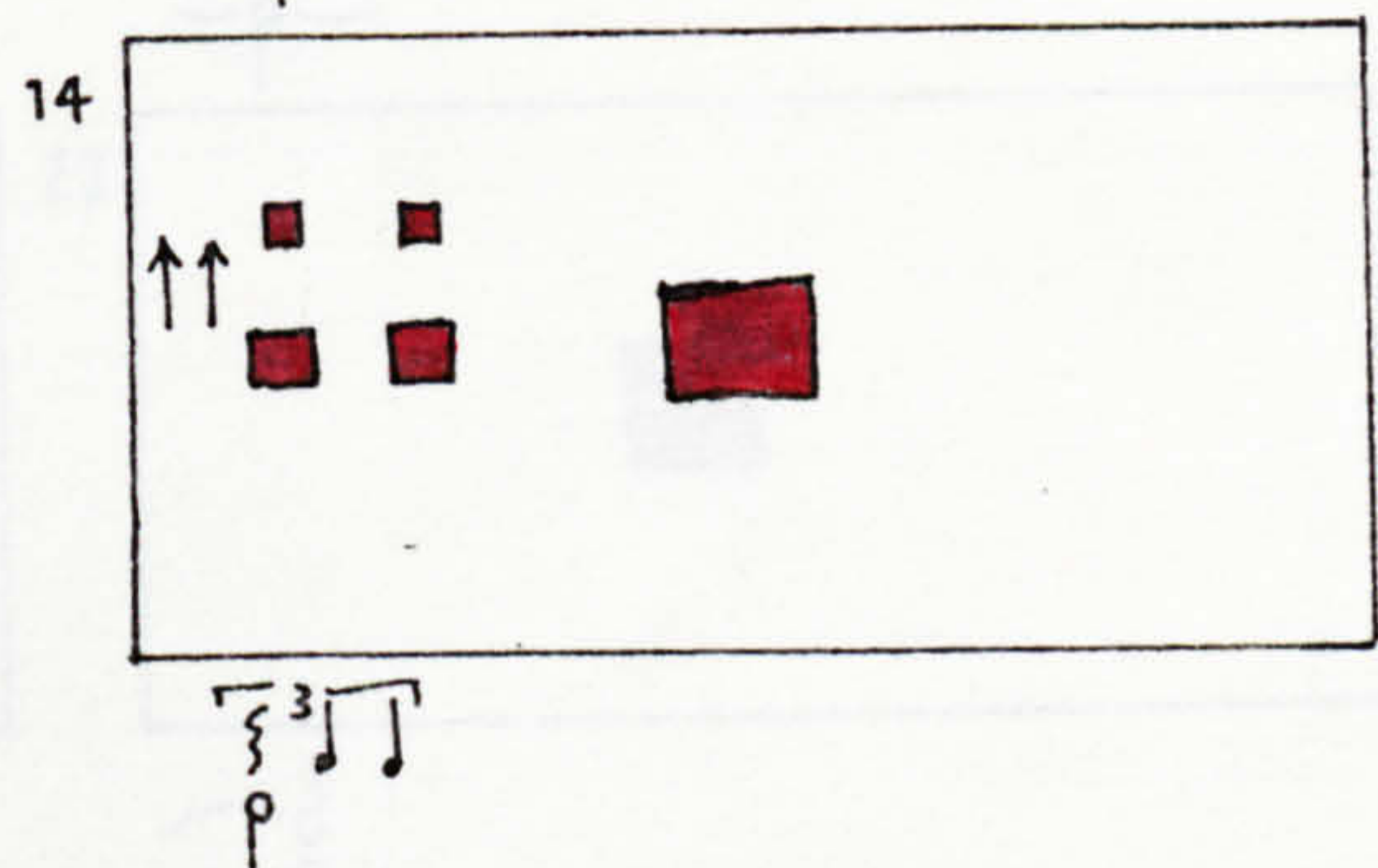
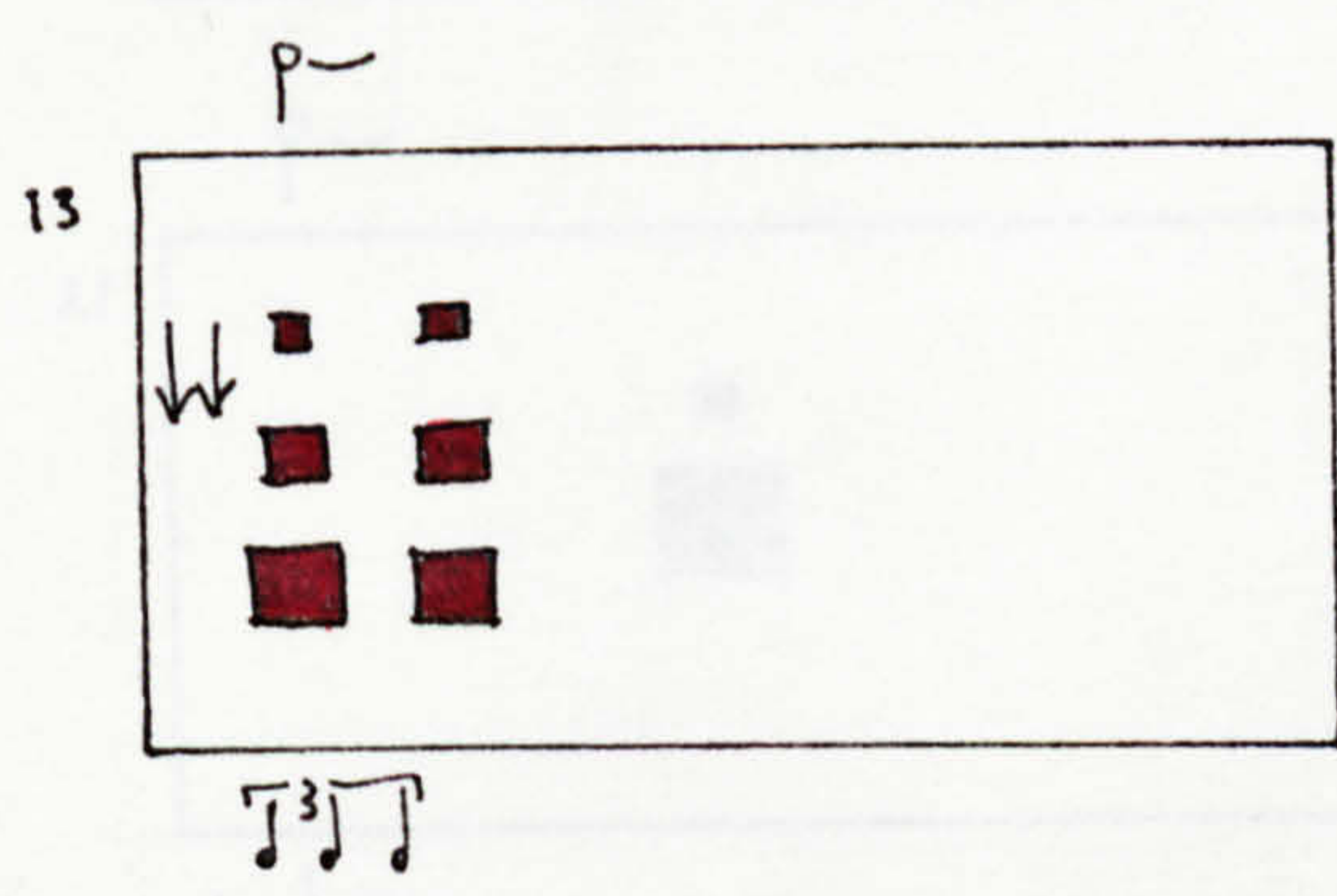
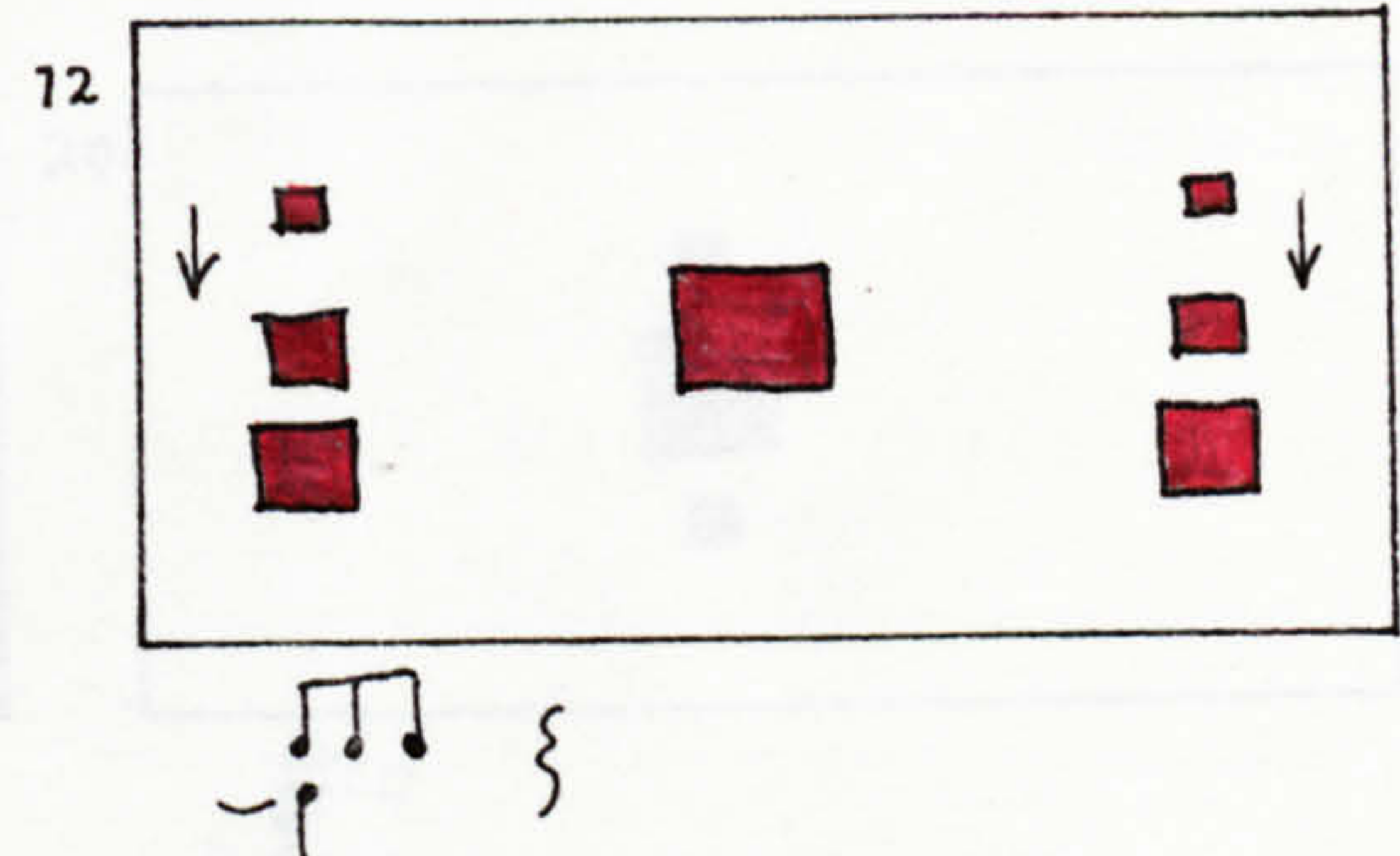
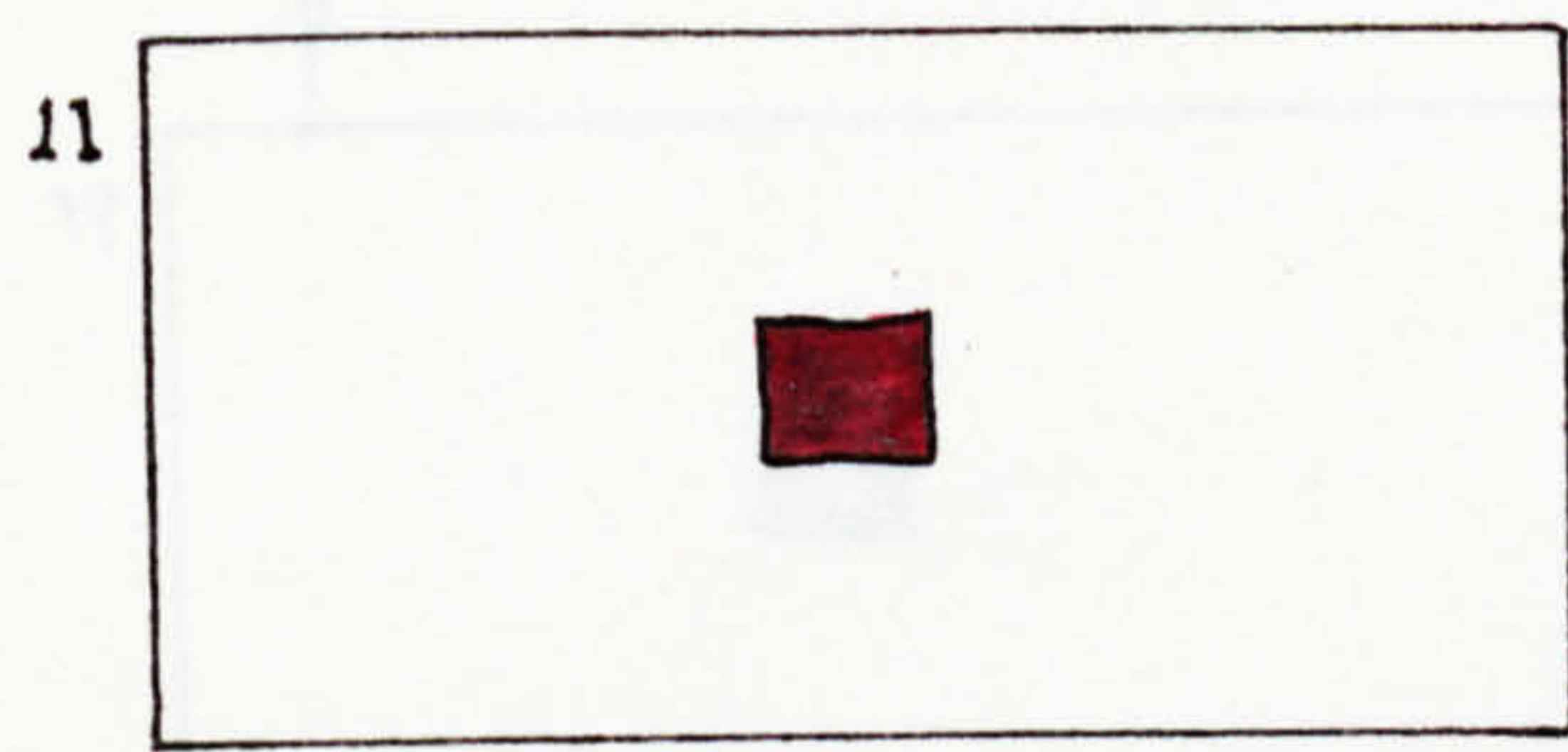
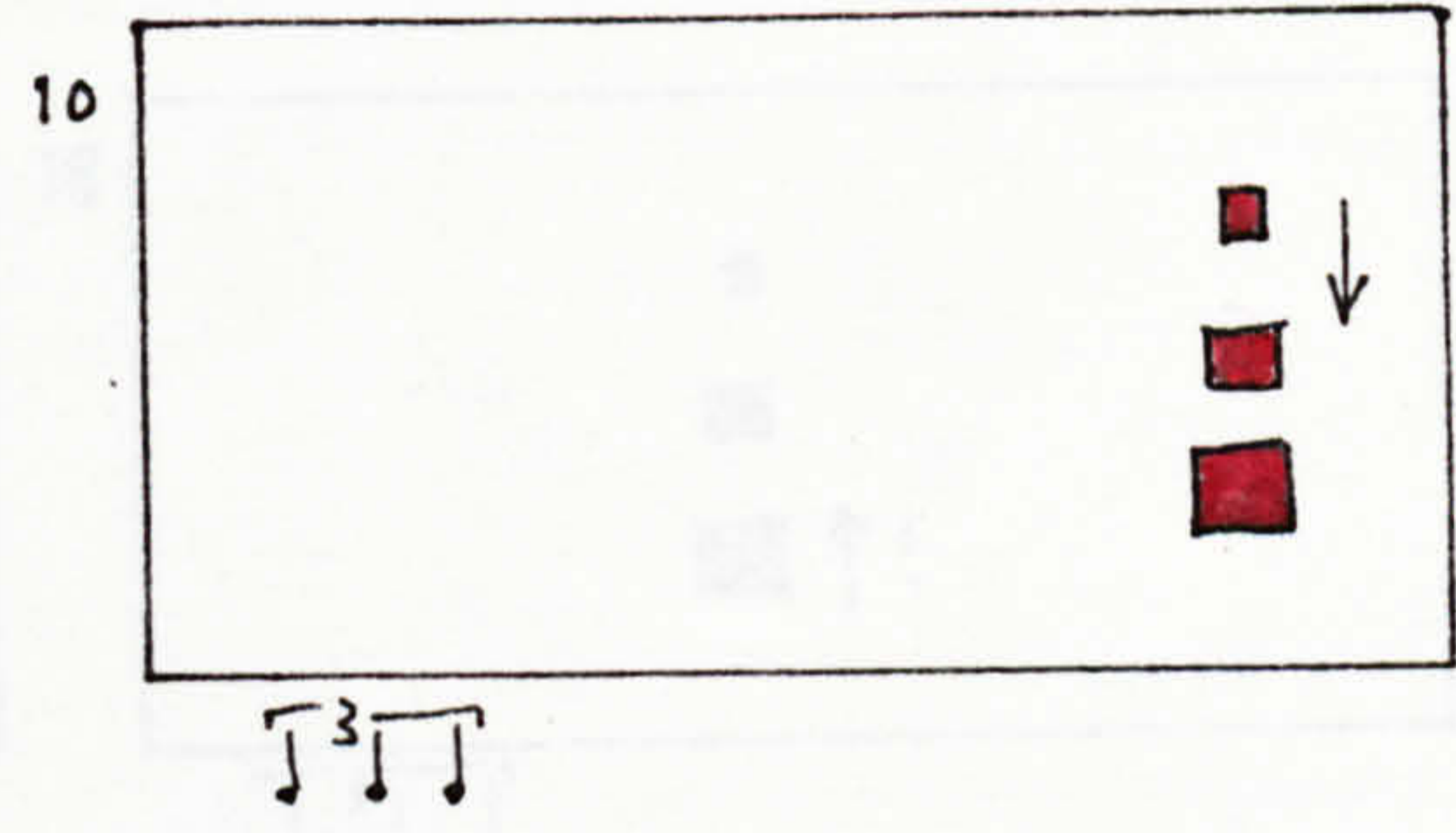
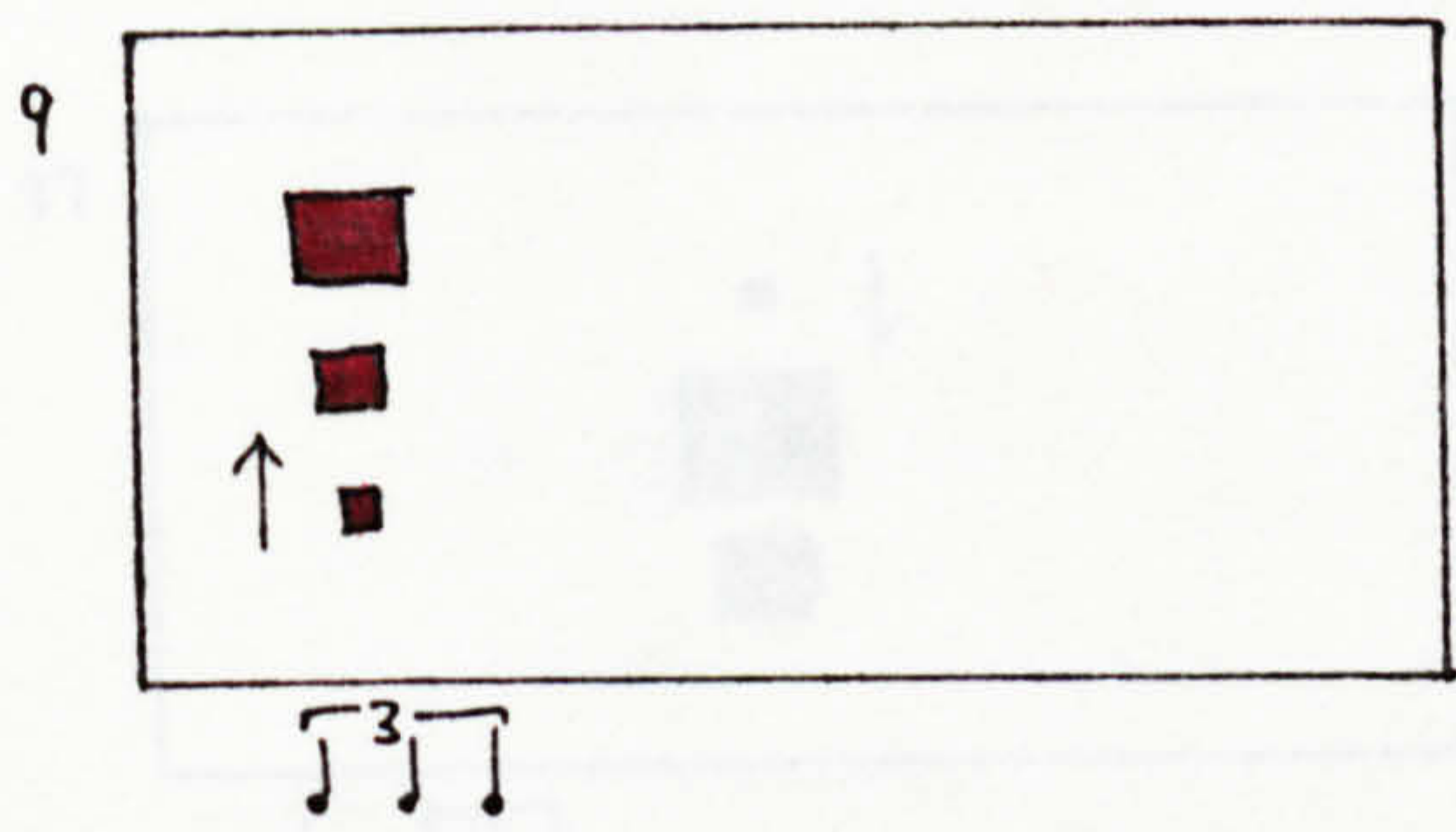
- 1 visual is anacrusis to
- 2 falling fifth - an inversion of the rising visual so:-
- 3 visual 'retro-inv.' of 1 ; vis. is anacrusis to sound entry on A,
- 4 which is a transposed inverted augmentation of the falling D G.
- 5 visual material of 1 is augmented (in time); aural enters within duration
- 6 of image this time, accenting the vis. but being simult. an anacrusis
- 7 to the A chord which links 5+6 visuals to 7+8 visuals, making the
- 8 vis 'retro-inv.' of 5+6 appear as a resolution in *diminuendo*.

* Rhythm: i.e. that rhythm proceeding from the combined visual + aural events; the attack only is considered. Below is notated the visual + aural rhythms separately on two lines:-



† cessation of visual, of sound, should be considered also; the impact of cessation in these chosen media is as strong - to 'innocent' ears + eyes at least - as attack.

9 10 11 12 13 14 15 16



17 18 19 20 21 22 23 24

17

18

19

p-

20

21

22

23

p-

24

25 26 27 28 29 30 31 32

25

26

27

28

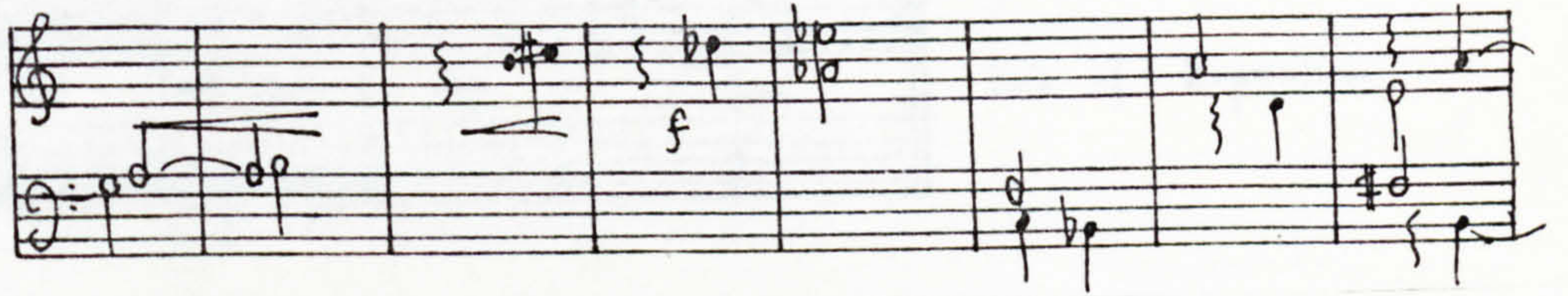
29

30

31

32

33 34 35 36 37 38 39 40



33

$\overbrace{x \ x \ x}^3$
 $\overbrace{\downarrow \downarrow \downarrow}^3$
 -p-

34

$\overbrace{x \ x \ x}^3$
 $\overbrace{\downarrow \downarrow \downarrow}^3$
 -p-

35

$\overbrace{x \ x \ x}^3$
 $\overbrace{\downarrow \downarrow \downarrow}^3$
 → (error)

36

$\overbrace{x \ x \ x}^3$
 $\overbrace{\downarrow \downarrow \downarrow}^3$

37

$\overbrace{\downarrow \downarrow \downarrow}^3$
 $\overbrace{x \ x \ x}^3$

38

$\overbrace{\downarrow \downarrow \downarrow}^3$
 $\overbrace{x \ x \ x}^3$

39

$\overbrace{\downarrow \downarrow \downarrow}^3$
 $\overbrace{x \ x \ x}^3$

40

$\overbrace{\downarrow \downarrow \downarrow}^3$
 $\overbrace{x \ x \ x}^3$ → (correcting error)

41 42 43 44 45

End of Exposition.

41

42

43

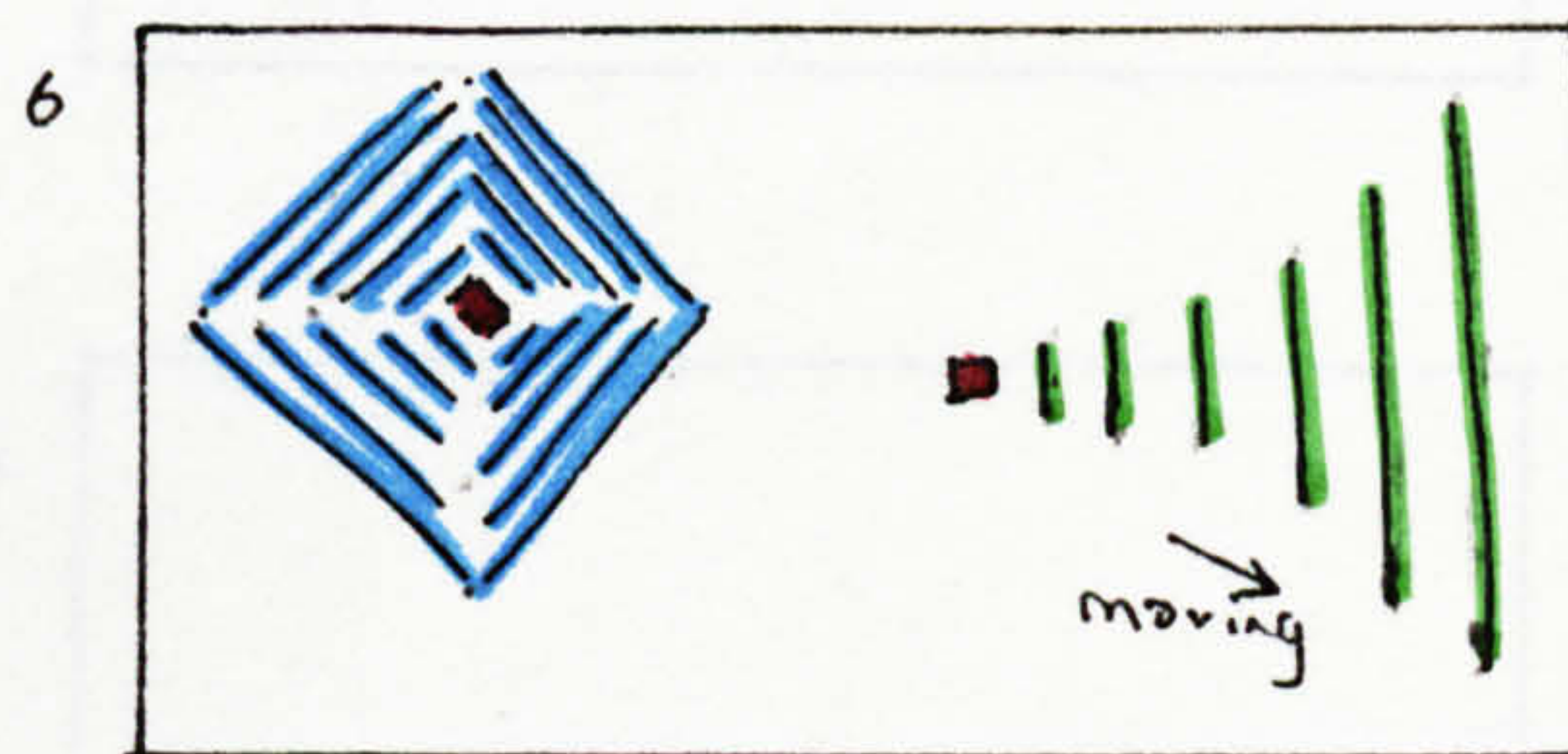
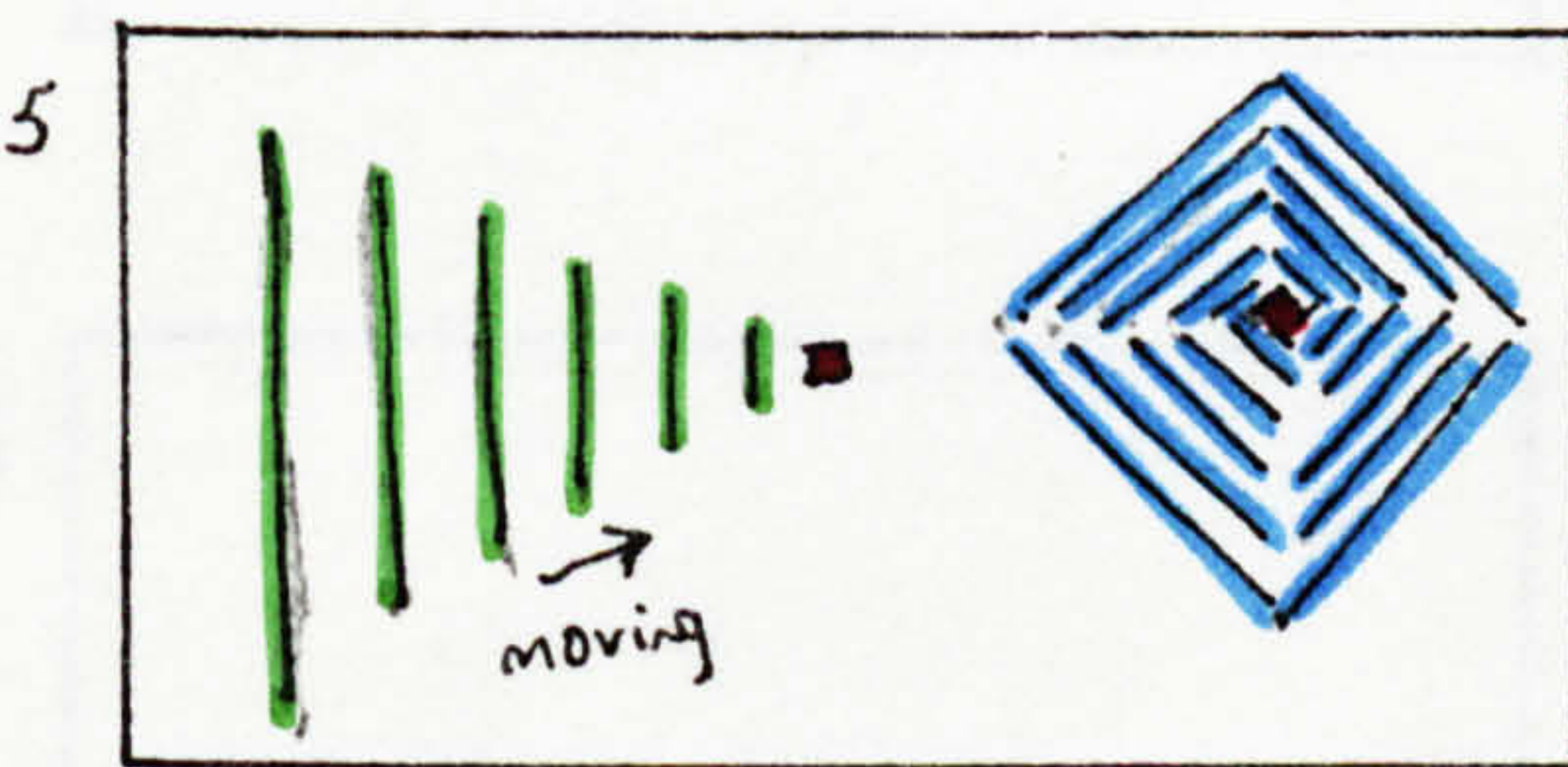
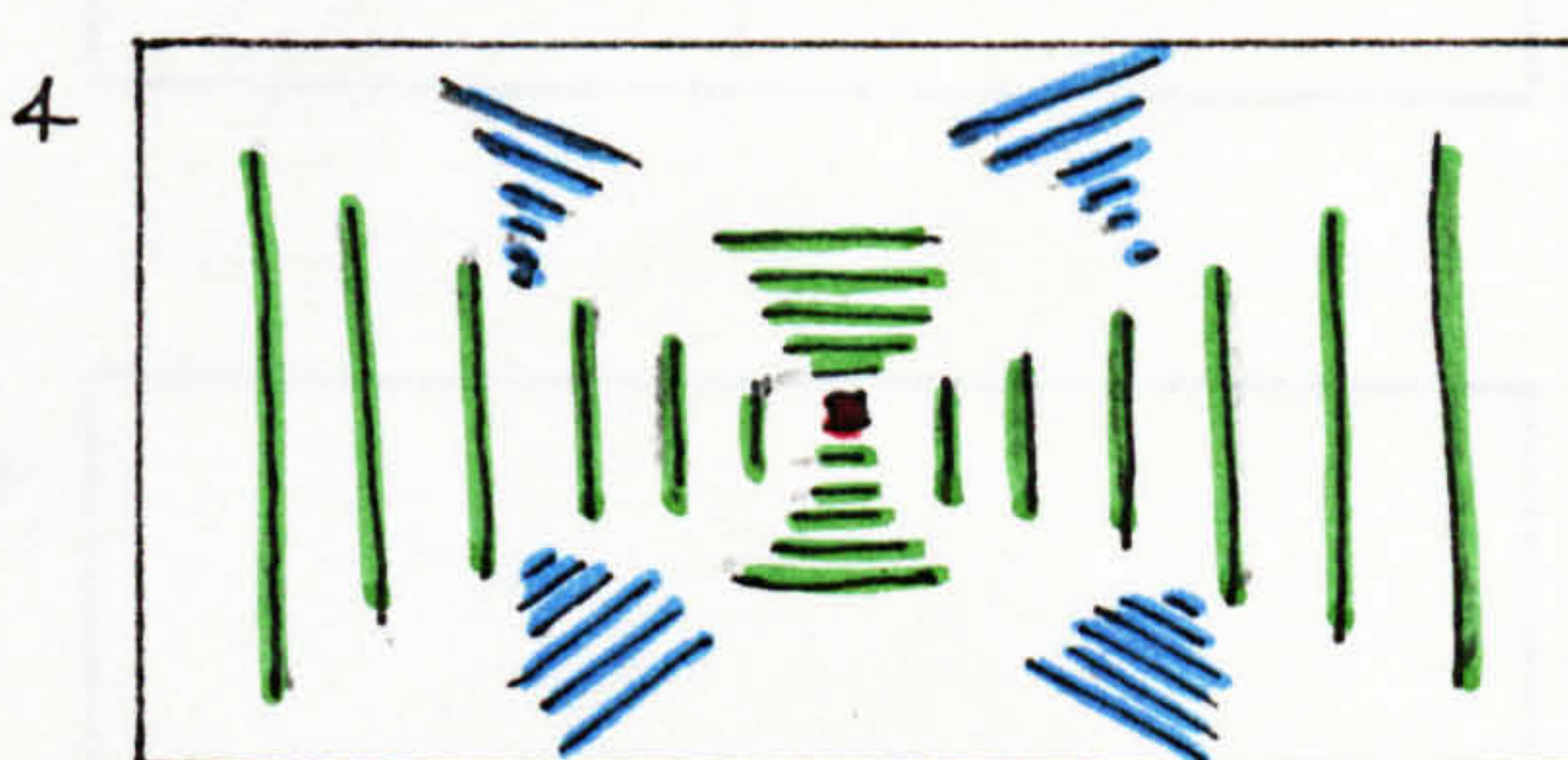
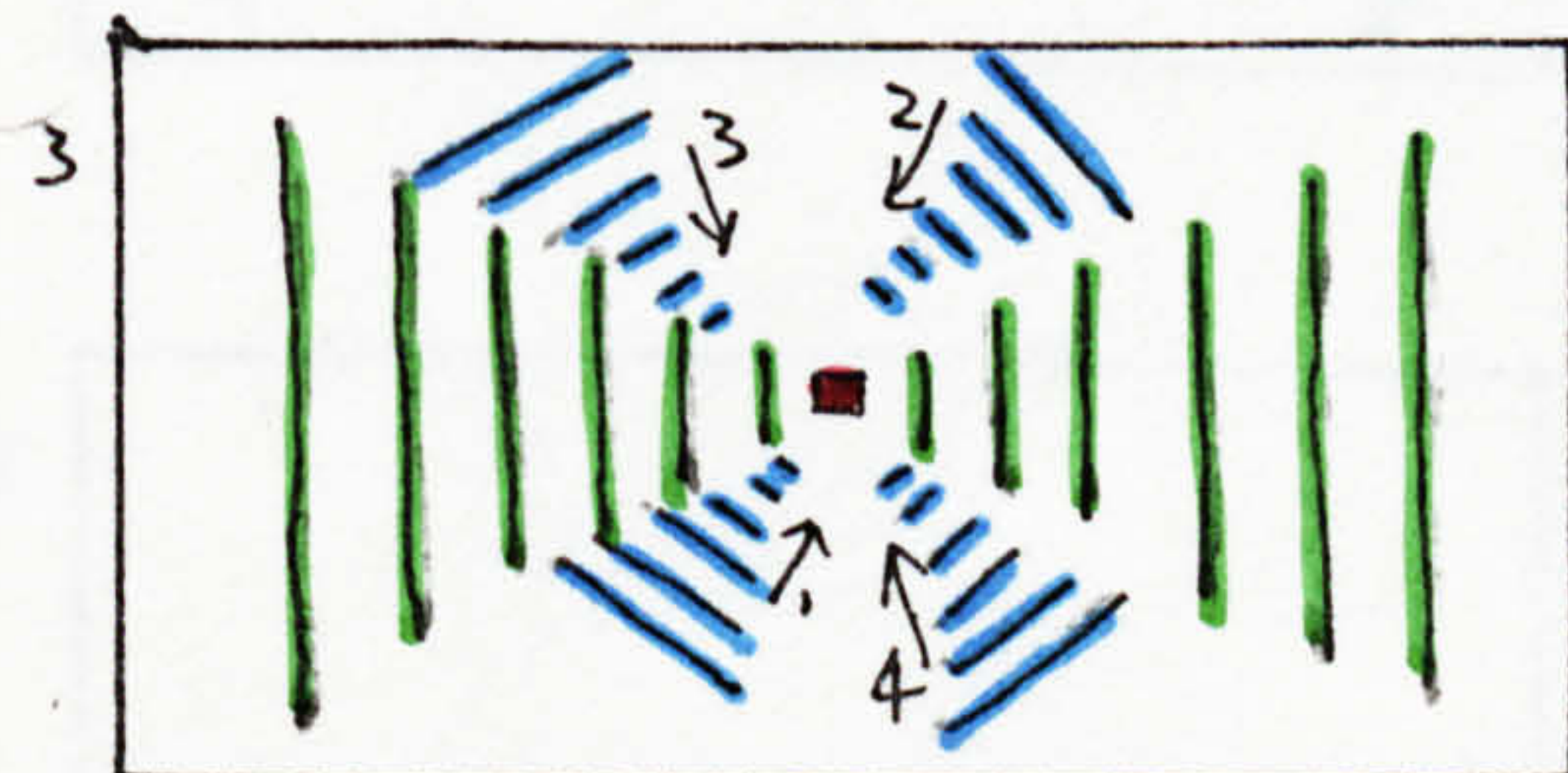
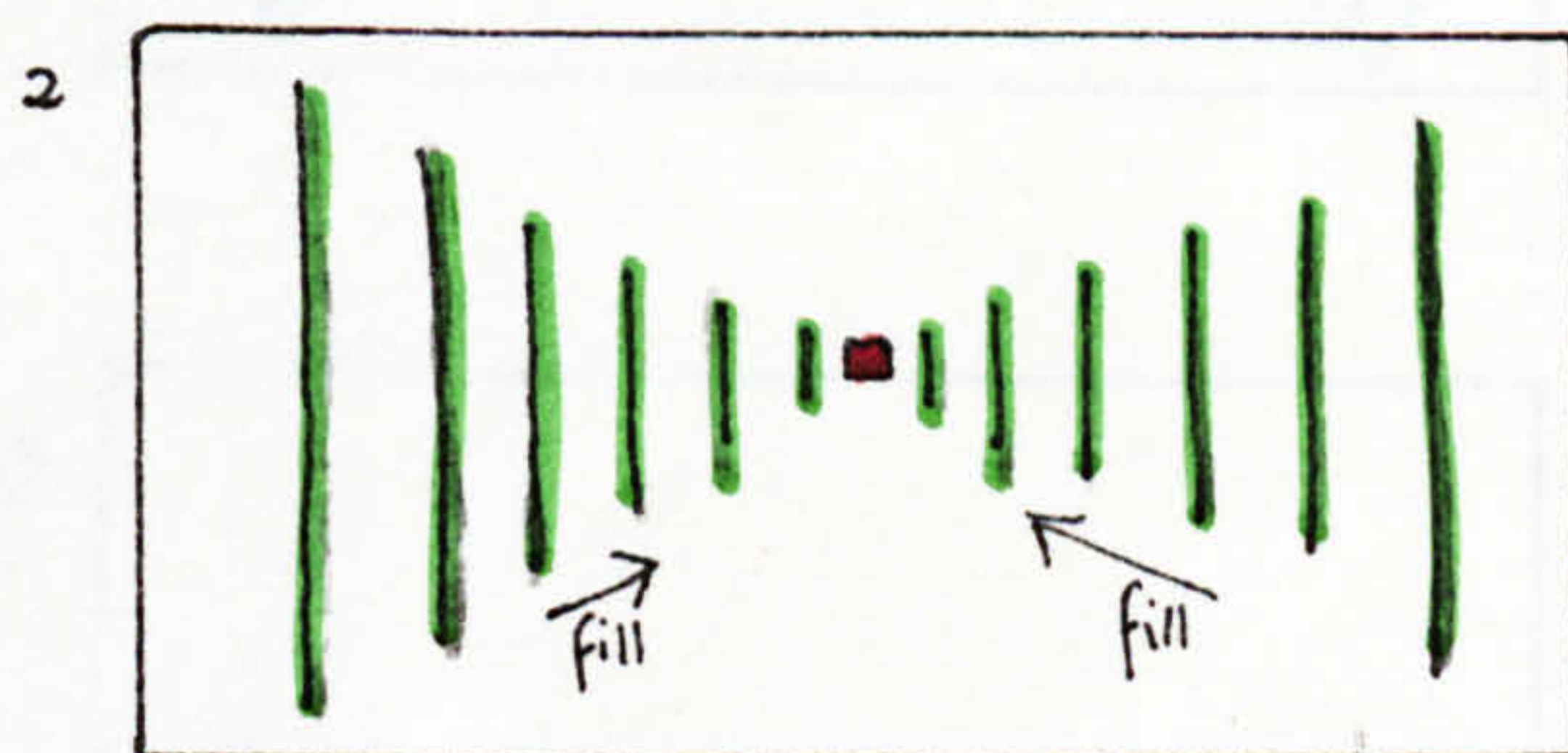
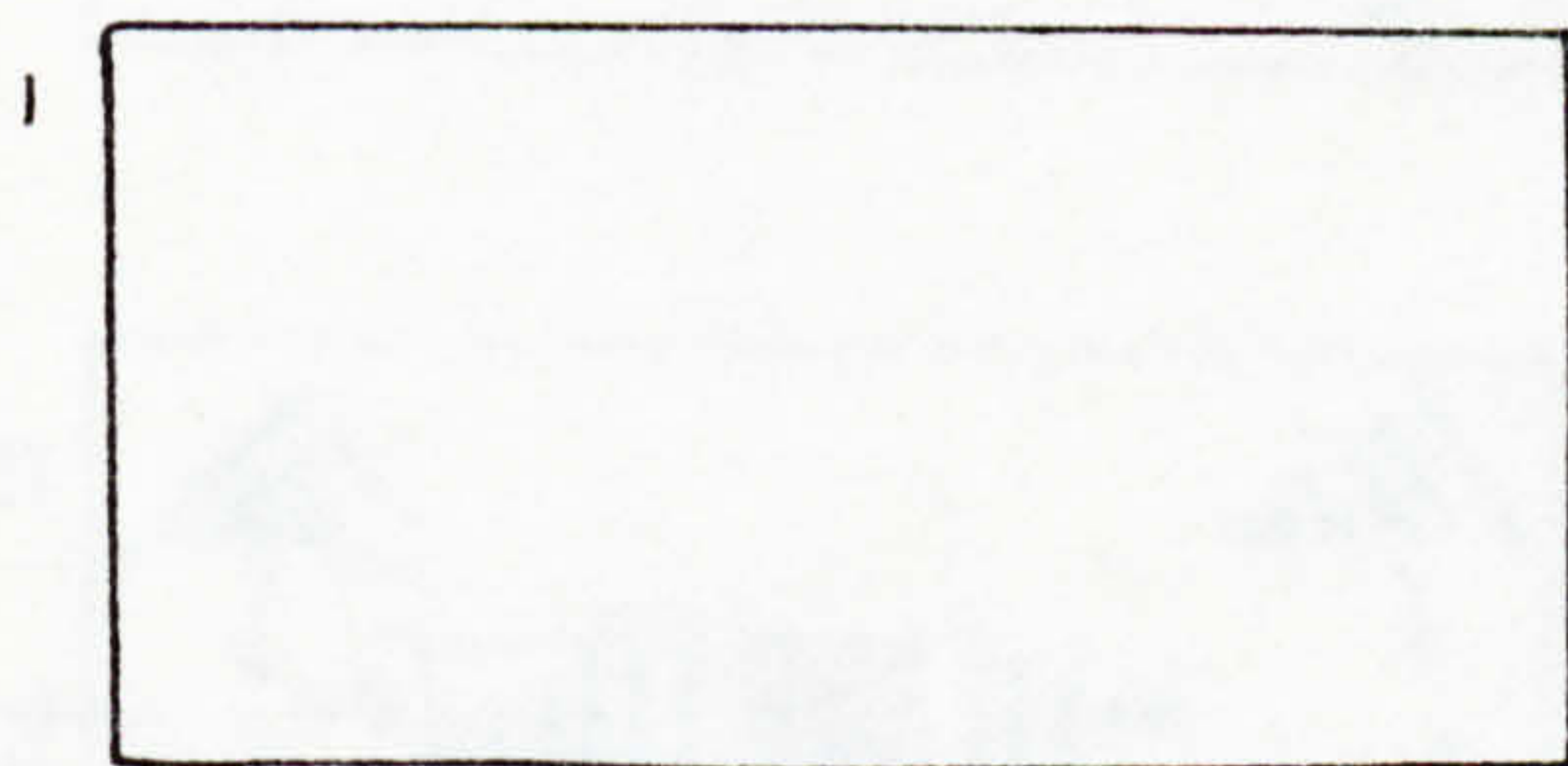
44

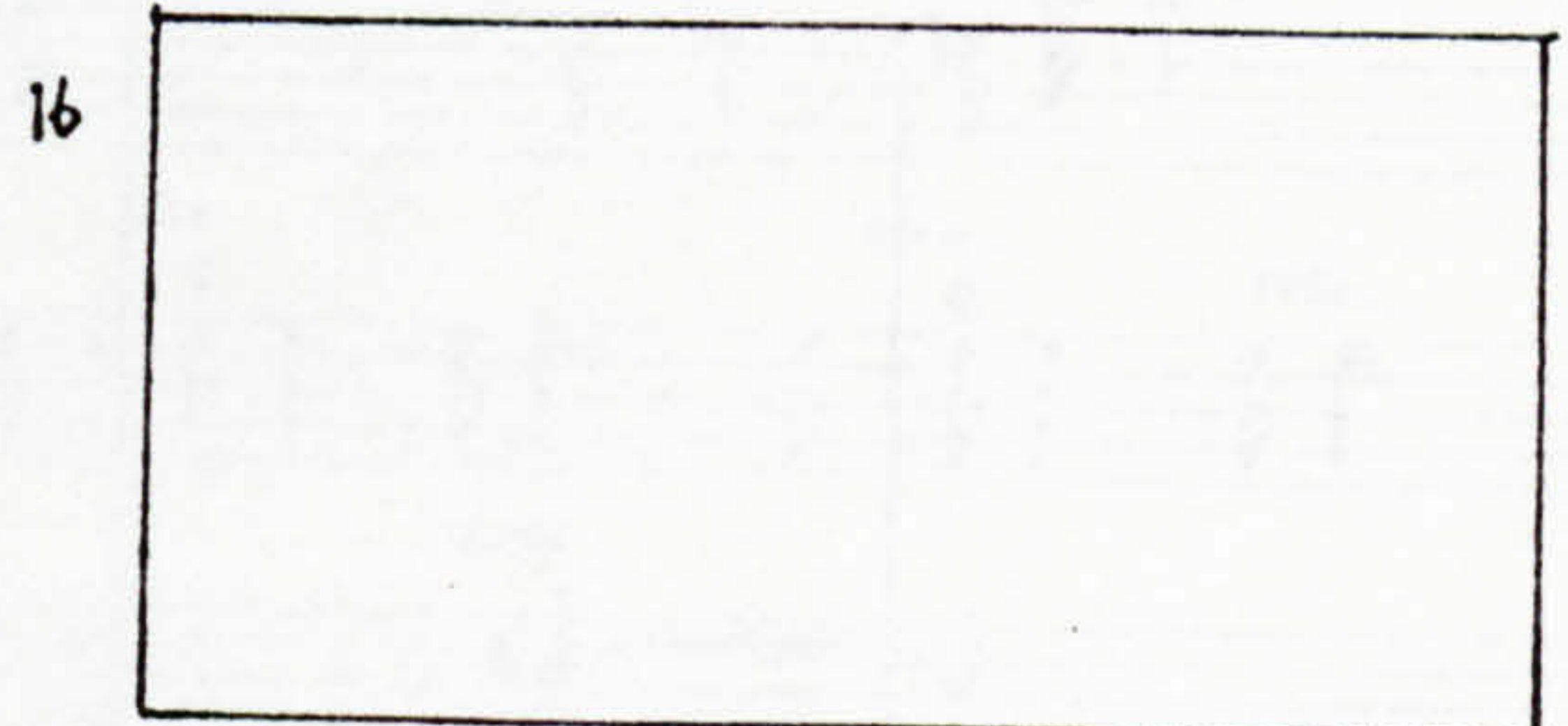
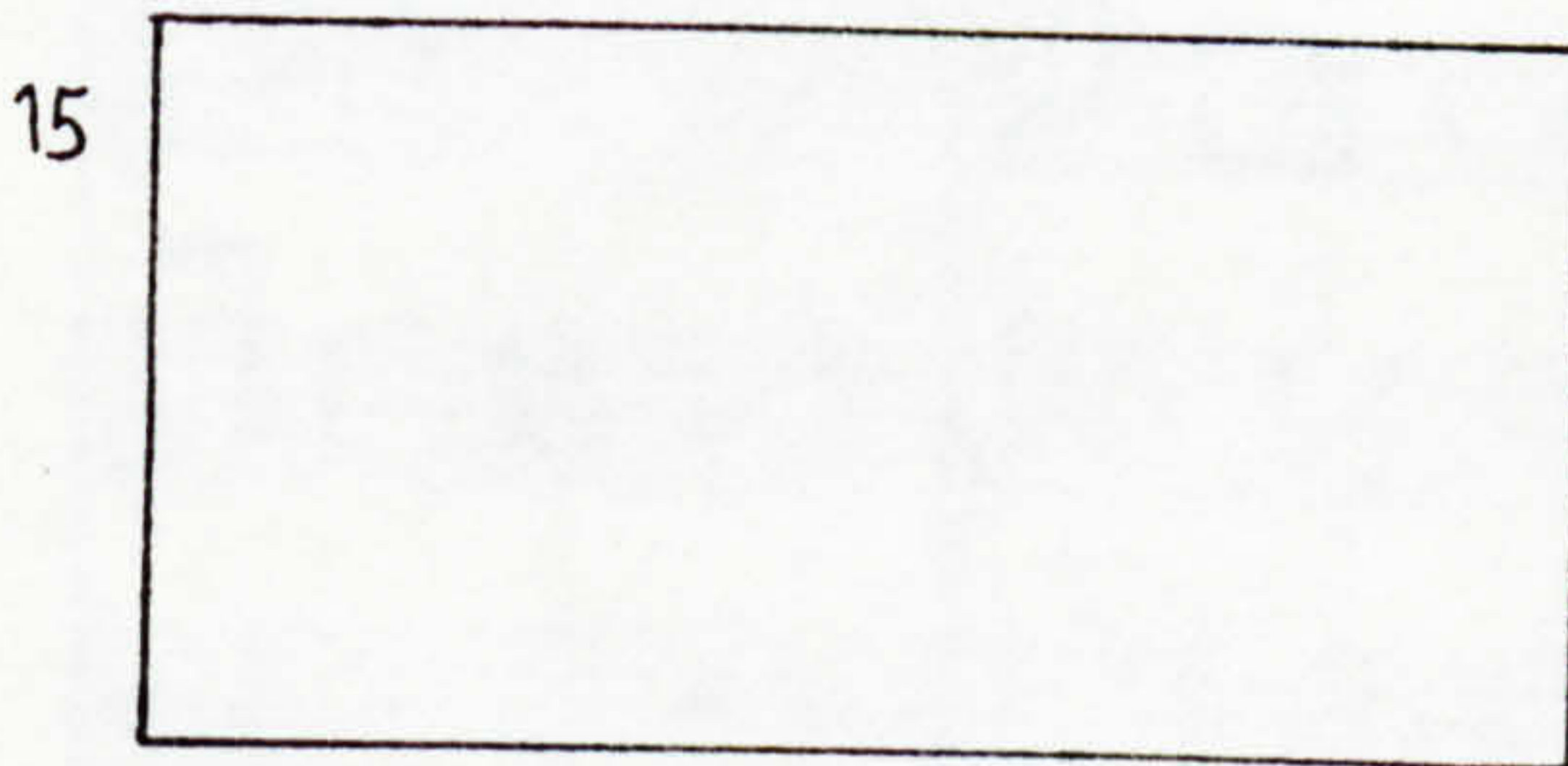
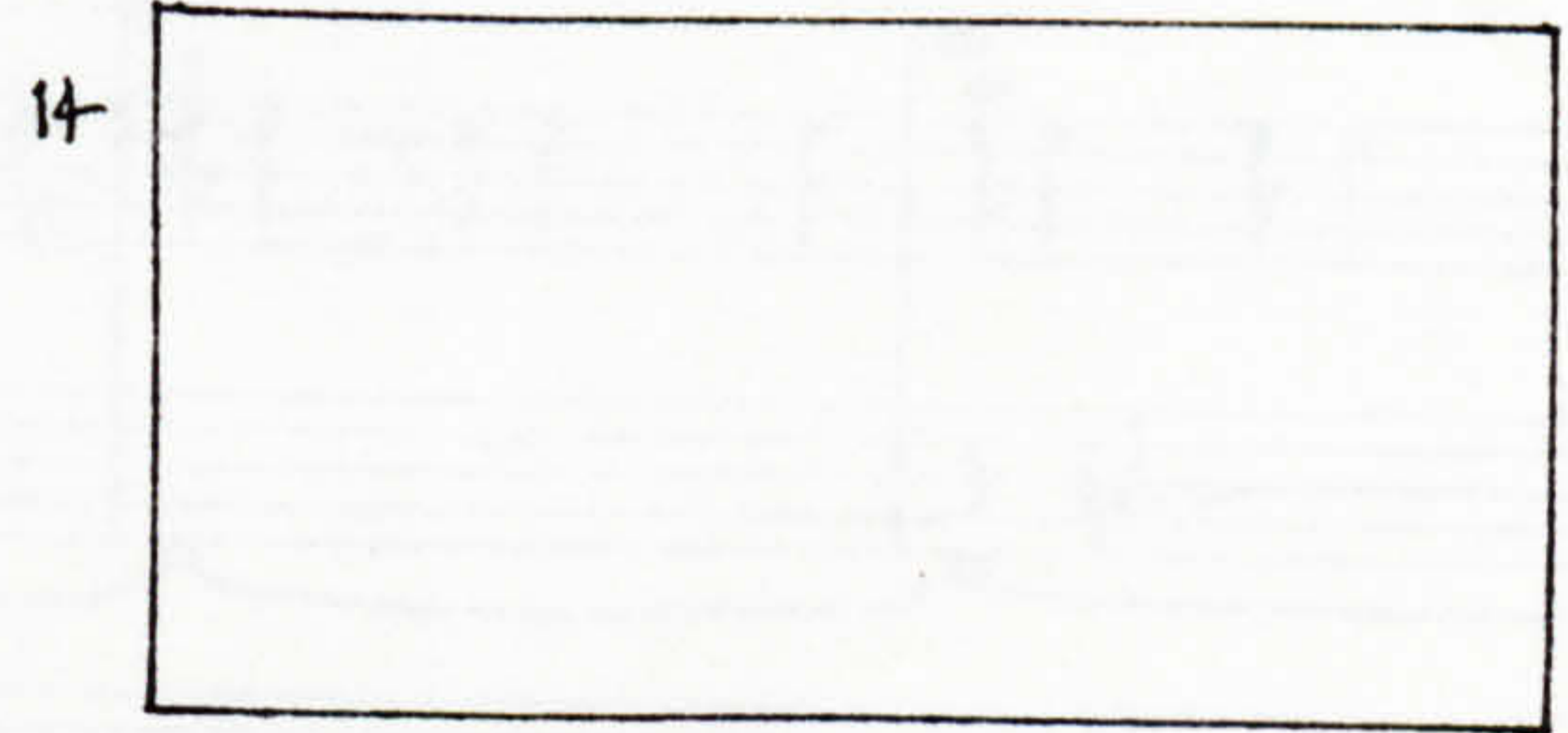
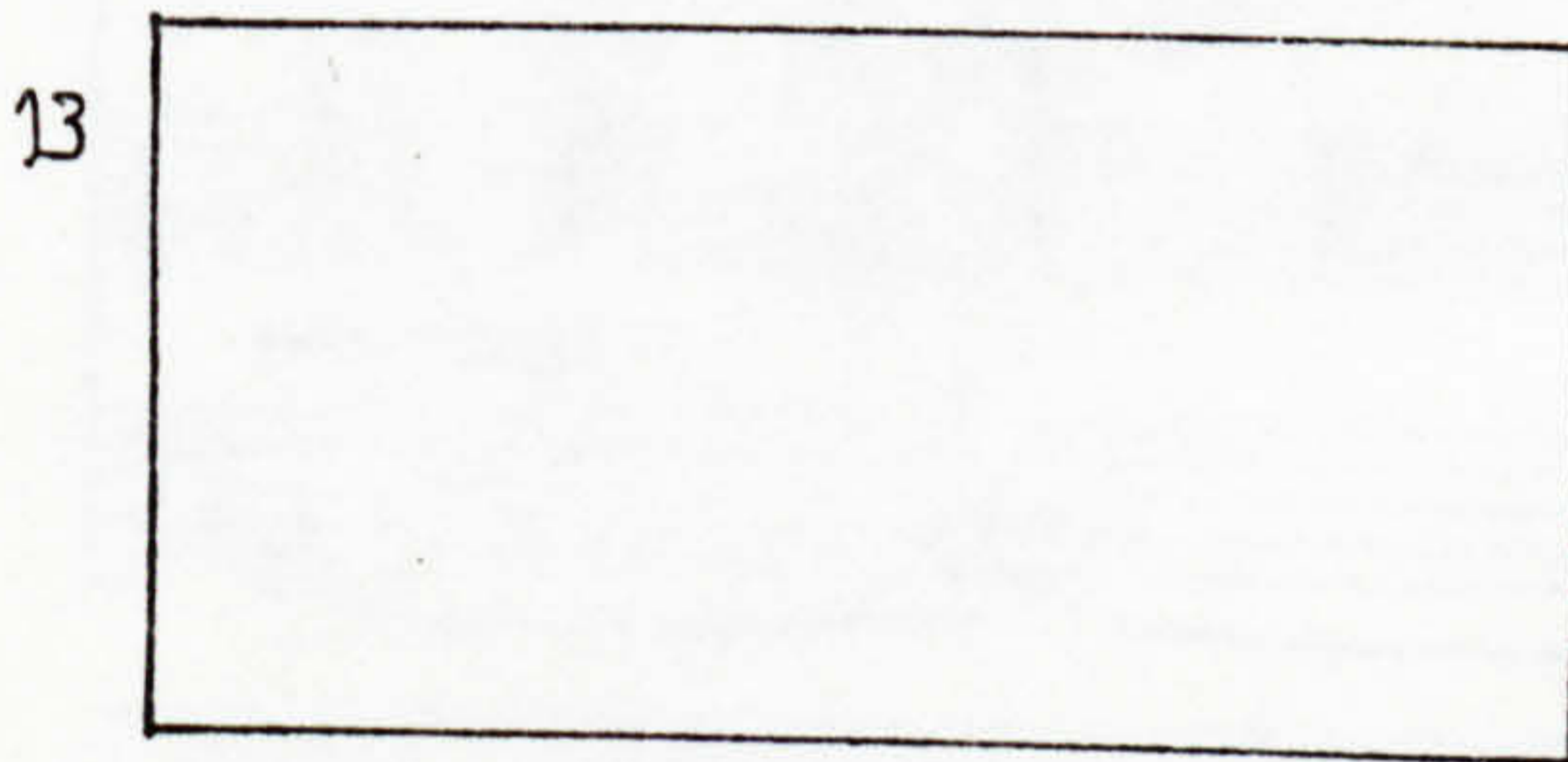
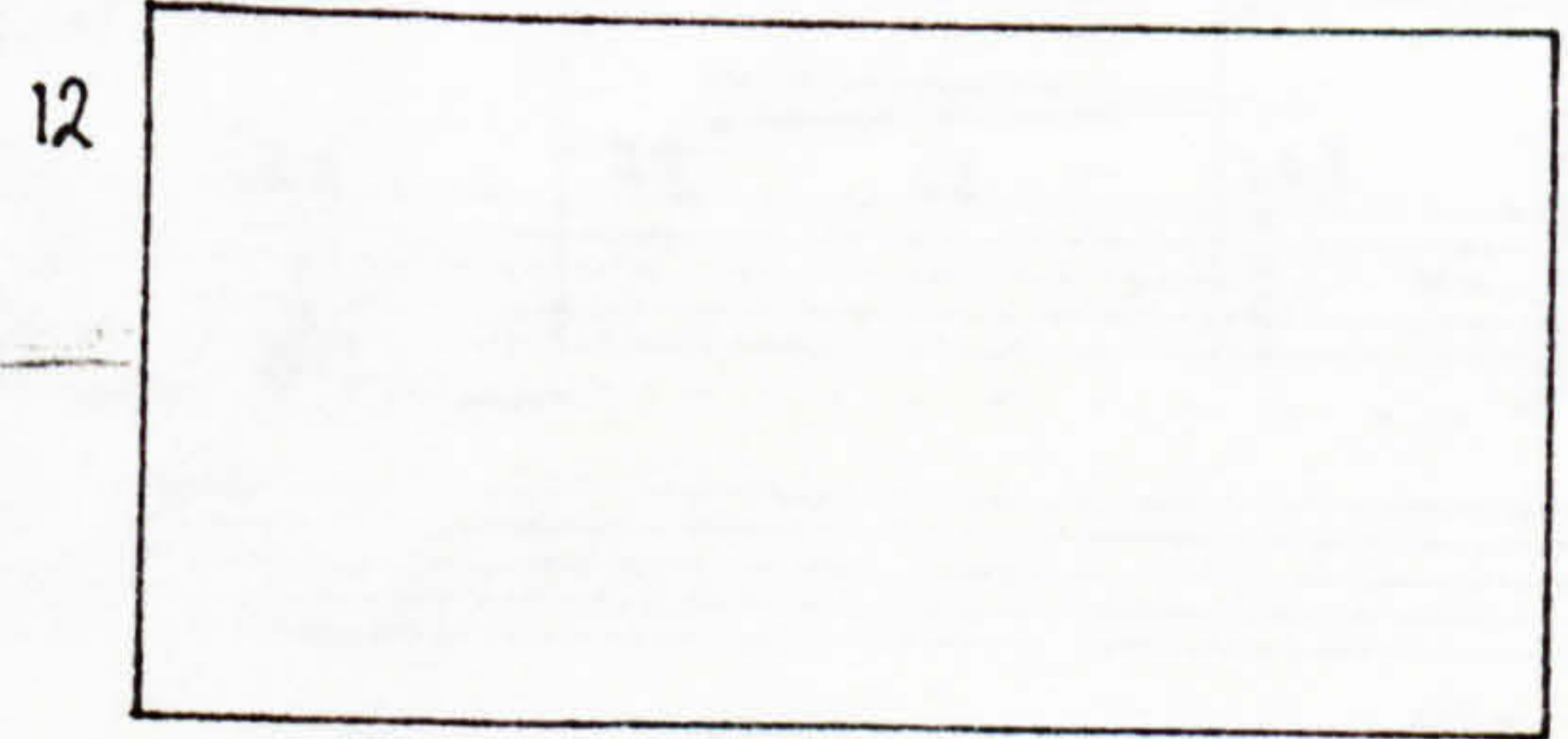
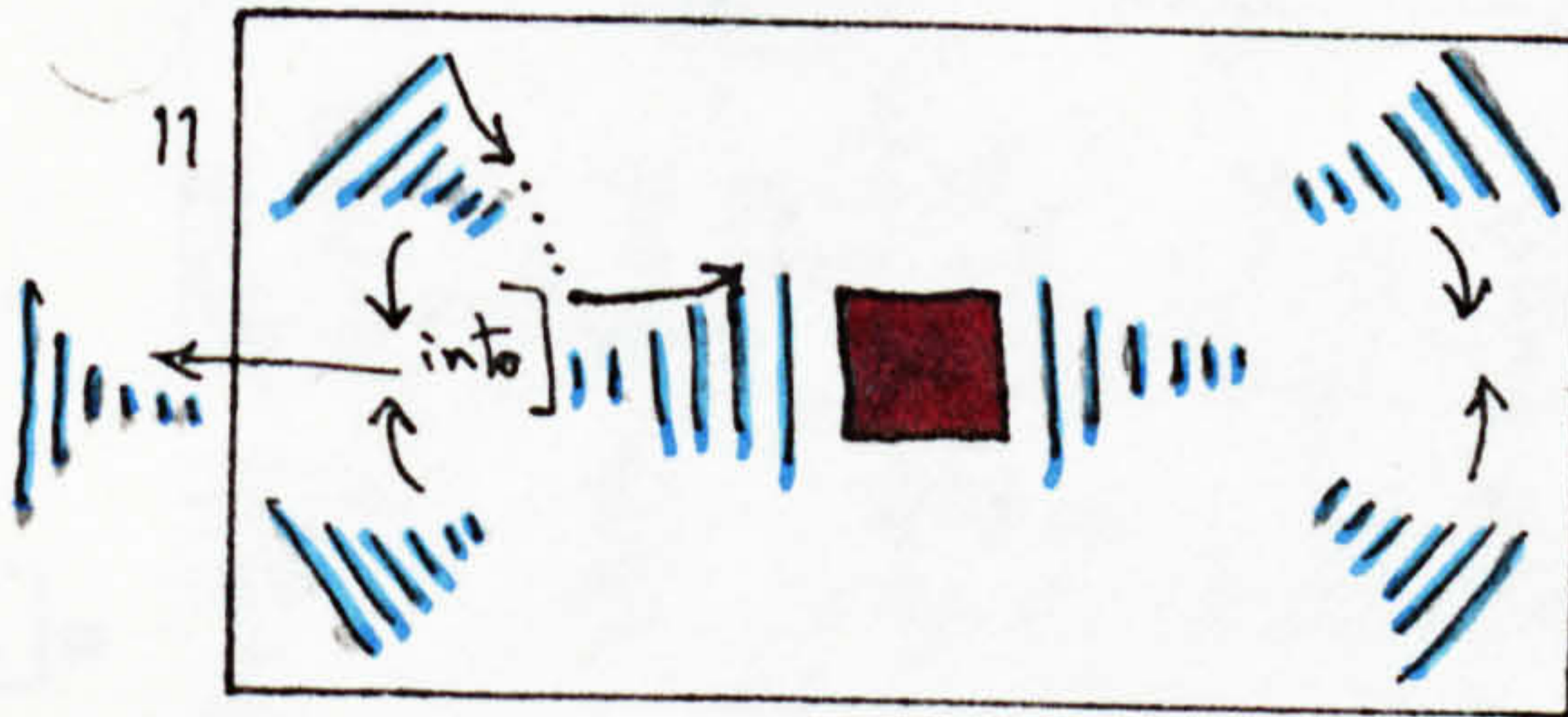
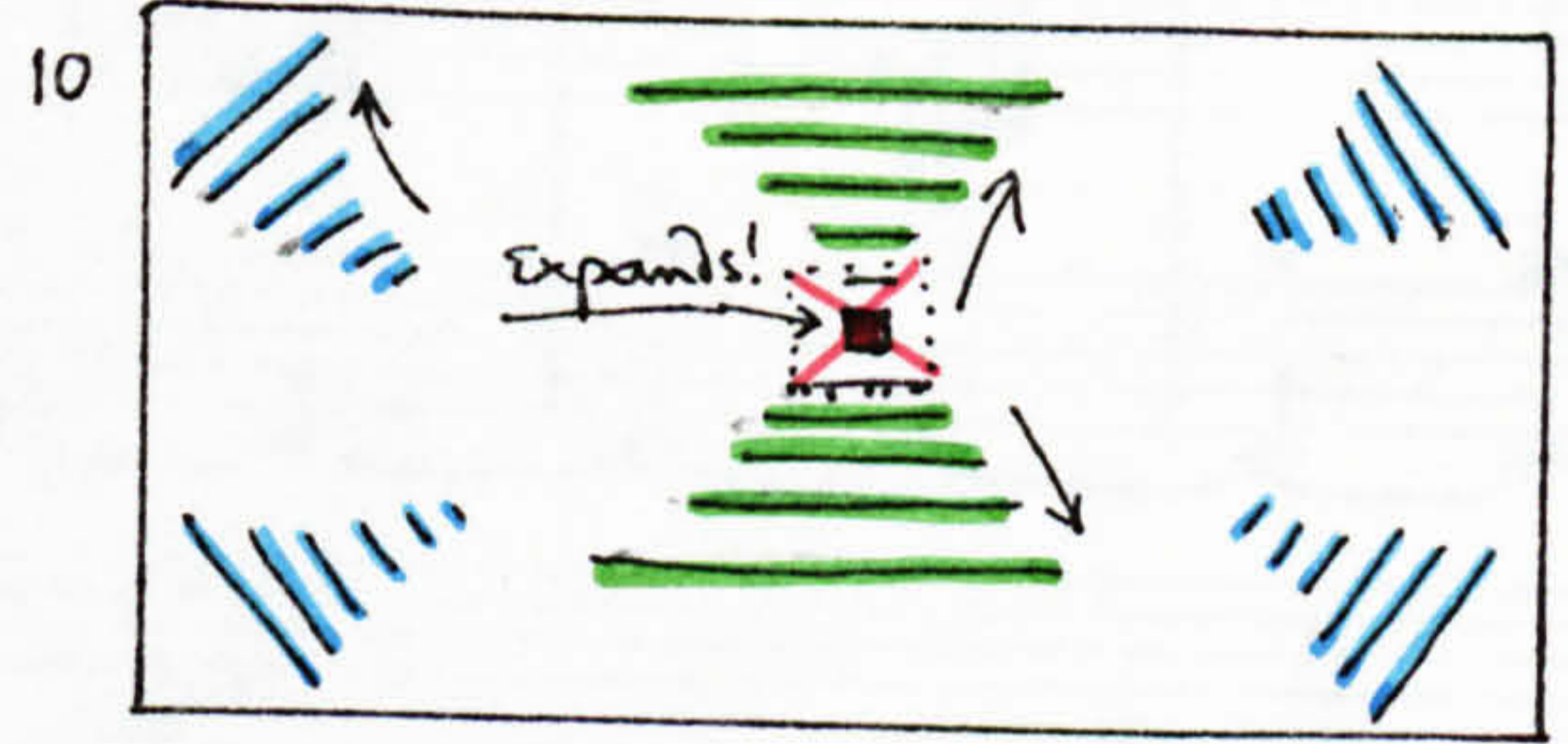
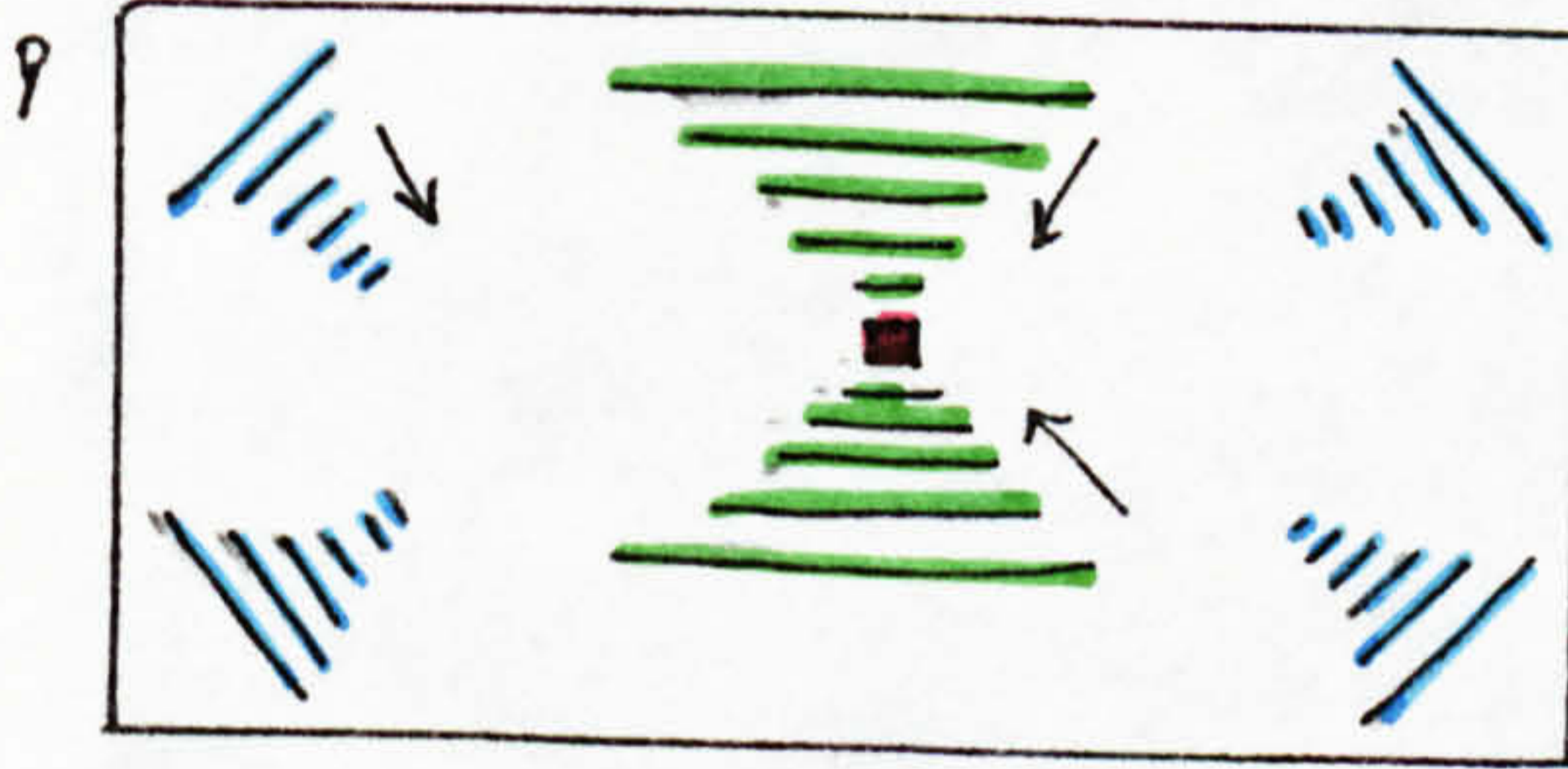
45

|| End of Exposition.

N.B. Sub II is here initially developed by becoming more symmetrical, emphasising its resolution to the centre-point. This resolution is realized in frame no. 11 (overpage), when the ^{large*} square enters. From frame no. 11 onwards, the 'nodal' point is often other than the centre.

* in frames nos. 2-10, it was an afterthought to include a small red square; I felt the break from the red-t-green of the exposition too marked, so include the red square as a binding agent.





Introduction

Chord diagrams for measures 4, 11, 15, 16, 19, 23, 25, and 29 are shown above the treble staff. Measure numbers 1 through 29 are indicated below the bass staff. Performance markings include "at sim." and "attacca".

1 *

N.B.

Chord diagrams for measures 30 through 59 are shown above the treble staff. Measure numbers 30 through 59 are indicated below the bass staff. Performance markings include "8va", "p.", and "f.".

* this section all sharp of concert pitch.

Musical score system 1, measures 631-926. The system consists of three staves. The top staff contains notes with measure numbers 631, 721, 817, 896, and 926. The middle staff contains notes with measure numbers 622, 702, 780, and 859. The bottom staff contains a bass line with measure numbers 8 and 10. The key signature is one sharp (F#).

Musical score system 2, measures 935-1207. The system consists of three staves. The top staff contains notes with measure numbers 935, 972, 990, 1012, 1024, 1055, 1077, 1080, 1134, 1145, 1162, and 1207. The middle staff contains notes with measure numbers 13, 14, 15, and 16. The bottom staff contains a continuous zigzag bass line. The key signature is one sharp (F#).

Musical score system 3, measures 1246-1544. The system consists of three staves. The top staff contains notes with measure numbers 1246, 1257, 1292, 1330, and 1411. The middle staff contains notes with measure numbers 17, 18, 19, and 20. The bottom staff contains a zigzag bass line with a section labeled "[hiatus]" between measures 17 and 18. The key signature is one sharp (F#).

Musical score system 4, measures 1628-1652. The system consists of three staves. The top staff contains notes with measure numbers 1628 and 1652. The middle staff contains notes with measure numbers 21, 22, and 23. The bottom staff contains notes with measure numbers 21, 22, and 23. The key signature is one sharp (F#). The word "attaca" is written in the right margin of the system.

2 $\text{♩} = \text{♩}$

0x 9x 29x 35x 73x 75x 141x 151x 175x 231x

meno mosso 253x 277x 279x 339x 357x 387x 421x 435x 479x 495x

507x 519x 531x 563x 567x 577x 597x 600x 623x 627x 661x 667x 679x 690x 699x 710x 712x

760x 765x 777x 812x 827x 832x 852x 914x 919x 952x 958x

1035x 1044x 1080x 1025x 1114x 1117x 1156x 1168x 1179x 1198x

990x 1000x 1025x 1044x 1114x 1117x 1156x 1168x 1179x 1198x

tempo 2

attacca

3 $\text{♩} = \text{♩}$ (ma poco meno mosso)

69x 101x 179x 191x 212x

28x 37x 47x 122x 179x 191x 212x

8va 258x 267x (sharp) 363x 421x

307x 395x

pizz.

pitcher only x. approximate.

455 x 471 x Sol x 551 x 593 x 649 x

11 12 13 14 15 (echo)

737 x 795 x

16 17 18 19 20

925 x 969 x

21 22 attaca

4

0x 8x 27x 28x 34x 70 74 8va 141 176x 152 175 184 222 230 28va

23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38

253x 275x 277x 339x 359x x 366 387 421x 425 479x 495x 514 530 508x x x

7 8 9 10 11 12 13 14 15 16 17 18 19 20

white

OVER~

* N.B. Notations give avral effect ... hence Retrogrades 'inaccusate' on occasion.

(→R←)

568 578
563 x x x

597 601 611 614 624 628
x x x x x x

661 x 671 x 679 x 687 x 699 x 712 x

759 x 764 x 778 x 812 x 824 x 832 x

13 14 15 16 17 18

850 x 915 x 919 x 959 x 1007 x 1043 x 1039 x 1113 x

881 x 884 x

white

19 20 21 22 23 24

(→R←)

1121 x 1158 x 1171 x 1191 x 1208 x 1214 x 1251 x 1256 x 1321 x 1326 x

28va x 1132 x 1150 x 1188 x 1229 x 28va x

25 26 27 28 29 30

1331 x 1356 x 1403 1410 1433 x 1452 x 1458 x 1520 x 1540 x 1567 x 1601 x 1605 x

1364 x 1386 x 1396 x 1419 x 1458 x 1506 x 1581 x

31 32 33 34 35 36

(→R←)

1625 x 1659 x 1663 x 1668 x 1674 x 1687 x 1693 x 1710 x 1743 x 1756 x 1774 x 1790 x 1800 x 1806 x 1839 x 1847 x 1851 x 1865 x 1876 x 1880 x 1886 x 1893 x

1680 x

37 38 39 40 41 42

1945
1939 x 1956
1991 x 2005 2012
2032 x
2091 x 2097
2130 x 2139
2147 x 2190 x 2205 x

2220 x 2225
2295 x 2303 x
2337 x 2351 x 2359 x
2390 = o (Schonk)

165 x 352 x 416 x 606 x 697 x 823 x 977 x 1100 x

5 \downarrow \downarrow 4 v. slow (but \downarrow) 6 bars \rightarrow \leftarrow 4 bars \rightarrow \leftarrow 5 bars \rightarrow \downarrow 3 \downarrow attac

6 (cf. 1) for derivation

8va 89 x 127 x 150 x 204 x 237 x

1 x 9 x 32 x 35 41 59 71 104 x 130

Handwritten musical notation system 1. It consists of four staves: a top staff with a treble clef and a key signature of one flat, and three lower staves (two treble and one bass) with a common key signature. The notation includes various notes, rests, and accidentals. Above the top staff, several measure numbers are written: 272 x, 302 x, 337 x, 376 x, 412 x, 422 x, 450 x, and 514 x. A circled number '5' is written on the left side of the second staff. A circled number '6' is written above the second staff in the second measure. A circled number '7' is written above the second staff in the third measure. A circled number '8' is written above the second staff in the fourth measure. A circled number '461' is written above the second staff in the fourth measure.

Handwritten musical notation system 2. It consists of four staves: a top staff with a treble clef and a key signature of one flat, and three lower staves (two treble and one bass) with a common key signature. The notation includes various notes, rests, and accidentals. Above the top staff, several measure numbers are written: 544, 531 x, 619 x, 694 x, and 782 x. A circled number '531' is written on the left side of the top staff. A circled number '603' is written above the second staff in the second measure. A circled number '676' is written above the second staff in the third measure. A circled number '745' is written above the second staff in the fourth measure.

Handwritten musical notation system 3. It consists of four staves: a top staff with a treble clef and a key signature of one flat, and three lower staves (two treble and one bass) with a common key signature. The notation includes various notes, rests, and accidentals. Above the top staff, several measure numbers are written: 855 x, 880 x, 920 x, 938 x, 956 x, 971 x, 983 x, 1021 x, 1033 x, 1070 x, 1078 x, and 1094 x. A circled number '817' is written on the left side of the top staff. A circled number '817' is written above the second staff in the second measure. A circled number '956' is written above the second staff in the third measure. A circled number '995' is written above the second staff in the fourth measure. A circled number '76' is written above the second staff in the fifth measure.

⑦ Begins here →

Musical score system 1, measures 1133 to 1383. The system includes a treble clef staff with notes and rests, a bass clef staff with notes and rests, and a double bass clef staff with notes and rests. Measure numbers 1133, 1171, 1190, 1210, 1244, 1314, 1341, and 1383 are marked above the treble staff. A bracket above measures 1314 and 1341 is labeled with a circled 7 and an arrow pointing right, indicating the start of a section. The notation includes various note values, rests, and dynamic markings.

7

Musical score system 2, measures 1701 to 321. The system includes a treble clef staff with notes and rests, a bass clef staff with notes and rests, and a double bass clef staff with notes and rests. Measure numbers 1701, 233, 277, and 321 are marked above the treble staff. The notation includes various note values, rests, and dynamic markings. A section starting at measure 233 is marked with a circled 7 and an arrow pointing right, and is labeled "(glissandi)". A section starting at measure 262 is marked with a circled 7 and an arrow pointing right, and is labeled "(d. Burble)".

Musical score system 3, measures 382 to 639. The system includes a treble clef staff with notes and rests, a bass clef staff with notes and rests, and a double bass clef staff with notes and rests. Measure numbers 382, 412, 426, 452, 472, 528, 583, 619, 629, and 639 are marked above the treble staff. The notation includes various note values, rests, and dynamic markings. A section starting at measure 382 is marked with an upward arrow and labeled "8va". A section starting at measure 528 is marked with a circled 7 and an arrow pointing right, and is labeled "(d.)".

648 658 668 678 688

733 x

951x

778 x (d) 842x 887x

817 826 831

(cf. bars 10-12)

999 x 1011x 1027x x x 1085 1096 1106 1169 1205 1216 1224 1232 1250 1262 1266 1274

1089 1099 1270

967x 990x 1039x 1056 1065 1069 1103x 1110 1115 1232 1244 1259

1315 1321 1509 x 1516 1531

8

9

659 x 687 x 715 x 750 x 775 x 802 x 830 x 846 x 859 x 897 x 917 x 942 x

23 24 25 26 27 28 29 30 31 32 33 34

1001 x 1022 x 1052 x 1078 x 1112 x 1143 x 1151 x 1164 x 1194 x 1222 x 1234 x 1279 x 1294 x 1308 x

35 36 37 38 39 40 41 42 43 44 45 46

1335 x 1368 x 1381 x 1412 x 1443 x 1469 x 1500 x 1528 x 1537 x 1588 x 1612 x 1639 x

47 48 49 50 51 52 53 54 55 56 57 58

1658 x 1677 x 1697 x 1709 x 1721 x 1749 x 1778 x 1808 x 1837 x 1854 x 1890 x 1920 x 1949 x 1973 x

59 60 61 62 63 64 65 66 67 68 69 70

2007 x 2033 x 2061 x 2090 x 2118 x 2146 x 2169 x

71 72 73 74 75 76

APPENDIX 5

BLACK AND WHITE FILM ORIGINALS TO
OPUS I

This Appendix identifies by number each strip of black and white film, and indicates the filming treatment on the animation rostrum. Much of this material (but not all) was subsequently re-filmed through colour filters on an optical-printer for inclusion in Opus I.

The following abbreviations are adopted:

- fr = frame(s)
 - sf = single-frame exposure
 - df = double-frame exposure
 - for = sequence of line-tests filmed forwards
 - bak = sequence of line-tests filmed backwards
 - incs = incremental moves
 - cyc = cycled sequence of images
 - BR = bottom right of drawn image (sequence)
 - TR = top right....
 - BL = bottom left....
 - TL = top left....
 - 2x image; black = a repeating sequence: 2 frames of the image followed by one black frame
 - vert = image sequence shot at 90% to normal horizontal setting
 - angle = image sequence shot at 45%....
- In column 4, figures and abbreviations refer to field size.
NW1/4 indicates the north-west quarter of the drawn image (sequence).

<u>Strip no.</u>	<u>Image</u>	<u>Treatment</u>	<u>Field size</u>
1	Intro.Door 1	df for	max
		df bak	max
2		2x image; black for	max
		2x image; black bak	max
3		df for	5
		df bak	5
		df for: angle	5
		df for: angle	5
		df for: vert.	5 equiv.

.....

4	Intro.Door 2	df for (inc cyc)	5
		df bak	5
5		df for	max
		df bak	max
6		df for: angle	5
		df bak: angle	5
		df for: vert.	5 equiv.

.....

7	Intro.Doors 1 and 2 SINGLE fr. interleaved for c8		
---	---	--	--

.....

8	Intro.Doors 3	df for	max
		df bak	max
9		df for: vert.	mid
		df for: vert.	5 equiv.
10		df for: angle	5
		df for: angle	mid

.....

11	Intro.Door 4	df for	max
		df bak	max
12		df for	5
		df bak	5
13		df for: vert.	mid
		df for: angle	5

.....

14	Intro.Door 5	df for	max
		df bak	max
15		df for	5
		df bak	5
		df for: vert.	5
		df for: angle	5

.....

16	Intro.Doors 4 and 5 Sf interleaved for		8
----	--	--	---

17 [BLANK]
18 [BLANK]

.....

19 Intro.Door 6 df for max
df bak max
20 df for 7
df for: vert. 5
df for: angle mid

.....

21 Intro.Door 7 df for max
df bak max
22 df for 5
df for: vert. 5
df for: angle 5

.....

23 Intro.Doors 6 and 7 Sf interleaved for max

.....

24 Intro.Door 8 df' for max
df for: vert. 5
df for: angle 5

END OF DOORS

25 Section 3; 25 cel cyc x6
df for max

.....

Section 3; cycle spatter-shape (12 drawings)

26 Sf (12 norm/12 inv)x4 max
Ibid.(x4) 7.5
27 Ibid.(x4) 5
Ibid.(x1) 5 (NW1/4)
Ibid.(x1) 5 (NE1/4)

28a,b	Sf NW1/4 - NE1/4 (drawing 1) in 62 incs (with eases). Invert; shoot NE1/4 - NW1/4 sim.	5
29c,d	Ibid. (drawing 2)	5
30e,f	Ibid. (drawing 3)	5
31g,h	Ibid. (drawing 4)	5
32i,j	Ibid. (drawing 5)	5
33k,l	Ibid. (drawing 6)	5

.....

Section 3; cycle spatter-shape stills

34abc	df zoom in; 26 incs	10 - 5
35def	Ibid.	10 - 5
36ghi	Ibid.	10 - 5
37jkl	Ibid.	10 - 5
38	Zoom 'trace' experiment. As single fr. button is depressed, rotate zoom very fast from wide angle to C.U. - each (drawings 1 - 12) x4	10 - 5
39a-f	zoom bak/for while motor on auto - each of drawings 1 - 6	10 - 5
40g-i	Ibid. - each of drawings 7 - 12	10 - 5
41	Sf for: angle (12 norm/12 inv) Sf for: vert. (12 norm/12 inv)	mid mid

.....

42	Intro.foreground grid cycle df for x6 df for x6 df for x6	max c7.5 5
43	(Sheet 1) grid cycle df zoom (26 incs) df zoom (1-8;1-8;1-8)	10 - 5 10 - 5
44	df for x6: vert. df for x6: angle	5 mid

.....

Section 2:-background cycle

45	df for x2	max
46	df for x1 df for: angle	6 mid

.....

47	Big Background	24 fr	MAX!
		Sf zoom (c.50 incs)	max-min
		Sfz (c.100 incs)	max-min
48		24 fr: vert.	max
		Sfz: vert.(c 50 incs)	max-min
		24 fr: angle 45	max
		Sfz: angle 45 (c 50 incs)	max-min
		24 fr: angle 45	max
		Sfz: angle 45 (c 50 incs)	max-min
49		Sf PAN TL to TR	12
50		" " mid third L to R	12
51		" " bottom third L to R	12
52		Sf: vert PAN lo-hi, LH side	12
53		" " " hi-lo, mid-pic	12
54		" " " lo-hi, RH side	12
55		" : angle ;bottom of bgd	5
		drawn by hand R to L	
56		Ibid., but Middle of bgd	12
57		Ibid., but Top of bgd	5
58	Big background	Sf: rotate 360 (72 incs)	MAX!
59		df zoom at 45 angle	max-min
		(4 moves:BL;TL;TR;BR) (45 incs)	
60	REJECTED, faulty	Sf clockwise rotation. V.slow;MAX!	
		c 1064 frames.	
61		Ibid. to avoid visible card-edge. (Slower...c1500 frames)	MAX!
		NB Opening fogged...lose it in fade-in.	
62		Sf rotate and zoom	max-min
		(45 incs; 2 full revs)...c 2 secs	
	(unused)	Sf eccentric rotation	mid
		(centre set L) anti-clockwise	
		..will cycle (48 incs)	
		Ibid. 2nd attemp (both rough)	
63		Sf;LH side of sheet turned 90 to base:	c5
		PAN R to L (top segment)	
64		Sequence of carefully-selected shots	
		(chosen for qualities of static 'poise')	
		inc some zoom; various field-sizes	
65		Sequence of LS/MS/CU of same scene	
		- again, various field-sizes	
		(an 'uncontrolled' spatter of images,	
		often running camera on auto, and	
		hand-manip of bgd)	

.....

67	4a material L to R changing triangle	df for	max df bak max
----	--------------------------------------	--------	----------------

.....

68	Section 2	df for (inv. for printer)	max
69		df bak sim.	max
70		df for: vert.	mid
71		df bak: angle	mid
72	(sheet 2.73)	several special effects on rostrum...	

.....

73	Section 1: network of lines	df for: cyc x4	max
		(starts with no.12 - the still for grid as bgd to superimp. material)	
74	:Eb overlay for no.12 above	df for	max
		df bak	max
75	:Bb overlay for no. 12 above	df for	max
		df bak	max
	: cyc 1 - 6 vertical triangle shapes	df for x12	max
	(this also overlays on no.12 above)		
76	: the following overlay also on no. 12		
	I/184	df for	max
	I/217	df for	max
	I/257	df for	max
	I/289	df for (Bb)	max
	I/453-470	df for	max
	I/385		max
	I/394		max
	I/409		max
	I/424		max

77	Section 1: network of lines	df for; cyc x4	5
		(starts with no. 12)	
	: overlaid material		
	Eb overlay for no. 12 above	df for	5
	Bb overlay for no. 12 above	df for	5
79	: overlaid cycle 1 - 6 vertical triangle shapes	df for x12	5
		(opening fogged)	
80	: overlaid		
	I/184	df for	5
	I/217	df for	5
	I/257	df for	5
	I/289	df for	5
	I/453	df for	5

.....

81	Section 4: diagonal rectangles	df for x12	max
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```

            df for x6                                c5
            (slightly off-centre)
82      : disc moves TR to BL, getting larger
            in mid-screen
            df for                                    max
            df for                                    5
83      : disc divides in two
            df for                                    max
            df for                                    5
84      df for; vert.                                5
            df for; angle                             5
85      : discs curve BR to TL
            df for x4                                  max
            df for; vert. x4                           mid
            df for; angle x4                           mid
86      : exploding star TR of screen
            df for x3                                  max
            Sf plus blank; x3                           max
87      : exploding star TL of screen
            df for x3                                  max
            Sf plus blank; x3                           max
88      : exploding star experiment, TL x1
            df: 13243546576879                          max
            : exploding star experiment, TL and TR
            Sf: TL and TR alt:
                1L,1R,2L,2R,etc [x2]                    max
89      : exploding/contracting star, TL x3
            df for and bak: 1-9,8-2,etc                max
            : exploding/contracting star, BL x1
            Sf (1-9-1) upside down                      max
            : Ibid.....BR x1
            Sf (1-9-1) upside down                      max
90      : exploding star set central to screen
            df for x3                                    5
            : Ibid.
            Sf plus blank; x3                            5
            : exploding/contracting star set central
            df for and bak (1-9,8-2) x3                5

            .....

91      Section 4a: revolving discs
            df for x6                                    max
92      : permutations on 2 discs
            Sf alt x24                                    max
            (derive further visuals from this
            material...via opt.printer)
            Sf alt with blank x12                        max
            (derive....etc)
            Sf alt x24                                    5
            (derive...etc)
            Sf alt with blank x12                        5
93      : black disc to ringed white disc
            df for x6                                    5
            Sf plus blank; x6                            5
94      : expanding/contracting inner disc

```


	df for and bak (1-7,6-2) x6	5
95	: expanding/contracting inner disc	
	Sf plus blank; x6	max
	df for and bak (1-7,6-2) x6	max
96	: interleaving of the two discs	
	with exp/contr inner disc	
	Sf: alt (see film-strip itself)	max
	x4 (will cyc)	
	: Ibid. (will cyc)	5
97	: 6-pointed star	
	df for 1-4,1-4,etc...x6	5
	: Ibid.	max
98	: Ibid.	
	df for zoom (24 incs)	max-min
	(NB - min field cannot be centred,	
	so don't fit to other centred items)	
	: Ibid., but with pan L-R	
	df for 1-4,1-4,etc...for dur. of pan	5
99	: vert. triangle to vert. line	
	df for and bak, 1-5-2 x6	max
	: Ibid.	mid
	: Ibid.	5
	(these three above can be overlaid in superimposition)	
100	: windmill sequence	
	df for; cycle x6	max
	: Ibid.	5
101	: two inverted isosceles triangles	
	df for and bak 1-4-2 x6	max
	: 4 symmetrical triangles	
	df for and bak x4	max
102	: spiralling triangle TL to BR	
	Sf	max
103	: developing triangle	
	df for x2	max
	(twist film back to front to	
	occupy other side of screen)	
	: Ibid.	
	df for x2; but upside-down	max
104	: two rectangles...into one	
	df for and bak; cyc x6	max
	: Ibid.; but upside-down	max
105	: diagonal triangular design	
	df for and bak; cyc x6	max
106	: large to small triangle	
	df for and bak x3	max
	: Ibid.; but upside-down	
107	: circling/expanding/contracting isosceles	
	triangle	
	df for and bak	max
	(this ends with no.1 of cyc., but most	
	of the other cycles end with penult. fr.	
	to assist with multiple cycling)	
108	: field of black discs	
	df for; cyc. x6	max
	: Ibid.	
	df for; cyc. x2 with zoom	max-min
	(centred correctly at all times)	

NB MISTAKE: 1 blank fr. c.fr.5)

109	: diminishing circle outline df for and bak; cyc. x4	max
110	: black circle TR breaks in two, moving to BL df for and bak; cyc. x4	max
111	: Ibid.: but upside-down : Ibid.: but df for; cyc. x2 : Ibid.; but upside-down	max 5 5
.....		
112	Section 7 : large square diminishes df for x4 : Ibid. df for and bak x2	max max
.....		
113	Section 5 : perspective vertical lines df for x4 : Ibid. df for and bak x2 : Ibid. df for and bak; vert. x2 : Ibid. df for and bak; angle x2	max max mid mid
.....		
114	Rotations; using gram. turntable at 16rpm (rostrum camera set on auto.) : black disc with halo (48 fr) : clear middle, b/w dots round (48 fr) : Ibid. : black disc; slow zoom in and out : 'stars and planets' (48 fr) : Ibid. zoom in and out	MAX! MAX! max-min max-min- max max max-min- max
115	Rotations : using calibrations and turning fr by fr, by hand : black disc; clockwise in 96 incs Sf (1 rev...4 secs...will cycle) : clear middle, b/w dots round perimeter Sf; shot as above : 'stars and planets' Sf; shot as above	max max max
116	STILLS of : black disc	

	Sf 24 for and 24 bak zoom	max-min-max
	: clear middle Ibid.	max-min-max
	: 'stars and planets' Ibid.	max-min-max
.....		
117	VARIOUS EXPERIMENTS with discs (discs bent for perspective effect)	
	: clear middle, b/w dots round perimeter Sf zoom in and out (30fr in/30fr out)	max-min-max
	: 'stars and planets' Ibid.	max-min-max
	: black disc Ibid.	max-min-max
118	Rorschach symmetry of oval shapes (ellipsoids) 24 fr...several experiments	max
119	OUT-OF-FOCUS material (for matte/c-matte) : white disc; soft edge. 48 fr : smaller white disc...Ibid.	- -
120	IN-OUT-OF-FOCUS discs : 3 black discs (on white card); also black rectangle; EACH ONE shot first in focus: 24 fr; then out of focus: 24 frs	
121	HARD-EDGE still mattes : all versions available from my set of 'Song for Song' cards; 24 fr each one.	max
122	HARD-EDGE wipes L to R; and R to L Sf	5
	SOFT-EDGE wipes L to R; and R to L Sf	5
	" " T to B; and B to T Sf	5
	HARD-EDGE wipes T to B; and B to T Sf	5
.....		
	Intro; Background (bottom level)	
123	Sf for (upside-down)	max
124	Sf for (with timing mods; see movt master-sheet) (upside down)	max
.....		

NB 125 and 126 OMITTED AS UNSUITABLE

125	Simulated 3-D version		
	: STILL cel L and R		
		Sf alt. L and R x24	max
		Ibid., but upside-down	max
		Ibid., but set central	5
126	Simulated 3-D discs		
	: MOVING cels L and R (1-15;1-159		
		Sf alt. L and R	max
		Ibid., but upside-down	
		
127	Section 3		
		df for, upside down	max
128		3.551-3.591	
		df for; angle	mid
		3.551-3.591	
		df for; vert.	mid
129		3.267-3.305	
		df for and bak; angle	mid
		(will cyc.,but ends 3.267)	
		3.267-3.305	
		df for and bak; angle	mid
		(will cyc., but ends 3.267)	
		Ibid.	
		df for and bak; vert.	mid
		(will cyc., but ends 3.267)	
NB - latter part flawed?		
		
130	TITLES (4)	each given 24 fr	
		
131	Simulated 3-D rotations; all may cycle		
	: disc	df for	max
	: "	df for	5
	: "	df for; angle	mid
	: "	df for; vert.	mid
132	: other disc; 3 triangles; 2 squares;		
	3 sticks; all		
		df for	max
133	: Ibid.	Sf (too fast)	5
134	: Ibid.	Sf (too fast); angle	mid
135	: Ibid.	Sf (too fast); vert.	mid

APPENDIX 6

OPTICAL PRINTING PROCEDURE FOR
OPUS I

This Appendix details the re-filming procedure from the high-contrast black and white originals listed in Appendix 5. Note that frame-counter calibrations are re-set to 0 for each Section. The material appears here in projected sequence.

Abbreviations:

In column 4, the filters are given identification numbers, followed by the basic hue (in abbreviation).

bl. = blue

gn. = green

y. = yellow

The prefix W. - as in W.bl. - indicates that a Kodak Wratten filter, in this case Wratten blue, was used.

<u>Shot</u>	<u>Shot</u> <u>no.</u>	<u>f</u> <u>stop</u>	<u>filter</u> <u>no.</u>	<u>fades</u>	<u>frame</u> <u>counter</u>	<u>rew/fd</u> <u>run</u>

Title: <u>Opus I</u>	130	8	39 bl.	48 in	1- 48 49-144	
				48 out	145-192	r 145
Title: "A film"	130	8	39 bl.	48 in	145-192 193-264	
				48 out	265-312	r 265
Title: "D.K."	130	8	39 bl.	48 in	265-312 313-408	
				96 out	409-504	
<u>Introduction</u>						
:background	124	2.8	28 bl.	24 in	0- 23 24-180	
	still				181-558	
	movt				559-610	
	still					

	still			48 out	611-658	r	0
:foreground							
	42a	8	29 bl.	24 in	0- 23 24-155		
				24 out	156-179	r	156
	42b			24 in	156-179 180-425		
				24 out	426-449	r	426
	42c			24 in	426-449 450-610		
				48 out	611-658	r	83
:doors 1	1a	5.6	W.bl.		83-154		
				12 out	155-166	f	191
:doors 2	5a	"	"		191-260		
				12 out	261-272	f	319
:doors 3	8a	"	"		319-348	f	355
:doors 4	11a	"	"		355-390	f	401
:doors 5	14a	"	"		401-441	f	451
:doors 6	19a	"	"		451-502	f	505
:doors 7	21a	"	"		505-552	f	559
:doors 8	24a	"	"		559-610		
: " "	cycle			48 out	611-658		

Section 1

: background							
	47c	11	28 bl.	48 in	0- 47 48-1329		
	frl only						
	47c movt	11	28 bl.		1330-1406		
				24 out	1407-1430	r	1380
	47c	22	32 bl-gn.	24 in	1380-1403 1404-1456		
				24 out	1457-1480	r	1430
	"	"	22 gn.	24 in	1430-1453 1454-1506		
				24 out	1507-1530	r	1480
	"	"	24 gn-y.	24 in	1480-1503 1504-1556		
				24 out	1557-1580	r	1530
	"	"	16 y.	24 in	1530-1553 1554-1630		
		5.6		22 out	1631-1652	r	0
:network of lines							
	73	5.6	39 bl.	48 in	0- 47 48- 895		
	frl only						
	73cycle	5.6	39 bl		896-1233		
				96 out	1234-1329	r	1097
	77cycle	5.6	39 bl.	24 in	1097-1120 1121-1233		
				96 out	1234-1329	r	184
:synch	74a	5.6	32		184- 213	f	217
	"	"	"		217- 246	f	257
	"	"	"		257- 286	f	289
	"	"	"		289- 318	f	385
	76f	"	"		385- 393		
	76g	"	"		394- 408		

76h	"	"		409- 423		
76i	"	"		424- 430	f	453
76e	"	"		453- 470	f	557
76d	"	"		557- 586		
76d	"	"		587- 606		
last fr.			24 out	607- 630	f	639
76c	"	"		639- 668		
76c	"	"	12 out	669- 680	f	721
last fr.						
76b	"	"		721- 750		
76b	"	"	12 out	751- 762	f	817
last fr.						
76a	"	"		817- 846		
76a	"	"	12 out	847- 856	f	896
last fr.						
76i	"	"	2black/ 2fr per pic	896- 980	f	990
backwards						
76f	"	"		990-1011		
76g	"	"		1012-1023		
76h	"	"		1024-1046		
76i	"	"		1047-1054	f	1080
76e	"	"		1080-1096		
fri only						
76d	"	"	1 black/ 2fr per pic	1097-1186		
backwards						
76d	"	"	12 in/ 12 out :cyc.	1187-1329		
last fr.						
rheo osc.						
76d	"	"	1 black/ 1 pic :cyc.	1330-1388	r	0
fading						
75c	16	33	48 in	0- 47		
cycle				48- 895		
			24 out	896- 919		

Section 2

45	8	W.y.		0- 572		
cycle			24 out	573- 596	r	573
46a	8	W.y.	24 in	573- 596		
cycle				597-1186		
			12 out	1187-1198	r	0
68	5.6	1 red		0- 57		
	5.6	28 bl.		58- 71		
	8	-		72- 73		
	5.6	28		74- 140		
	5.6	1		141- 142		
	8	-		143- 144		
	5.6	1		145- 148		
	8	-		149- 150		
	5.6	28		151- 184		
	5.6	1		185- 203		
	5.6	28		204- 220		
	8	-		221- 222		

	5.6	1 red		223-	230	
	5.6	28 bl.		231-	252	
	5.6	1		253-	338	
	5.6	28		339-	489	
	5.6	1		490-	506	
	8	-		507-	530	
	5.6	1		531-	565	
	5.6	28		566-	570	
	8	-		571-	586	
	5.6	1		587-	598	
69	5.6	1		599-	600	
(retrograde)						
	8	-		601-	621	
	5.6	28		622-	626	
	5.6	1		627-	665	
	8	-		666-	689	
	5.6	1		690-	706	
	5.6	28		707-	759	
	5.6	1		760-	851	
	5.6	28		852-	880	
	5.6	1		881-	?	
	8	-		?	- 937	
	5.6	28		938-	951	
	5.6	1		952-	989	
	5.6	28		990-	1024	
	8	-		1025-	1026	
	5.6	1		1027-	1028	
	8	-		1029-	1034	
	5.6	1		1035-	1100	
	8	-		1101-	1102	
	5.6	28		1103-	1116	
69(discs)	5.6	1		1117-	1198	r 1051
STILL	8	-		1051-	1052	f 1061
				1061-	1062	f 1071
				1071-	1072	f 1081
				1081-	1082	f 1091
				1091-	1092	f 1101
				1101-	1102	f 1114
				1114-	1115	f 1124
				1124-	1125	f 1134
				1134-	1135	f 1144
				1144-	1145	f 1154
				1154-	1155	
			12 out	1156-	1167	

Section 3

	25	5.6	16 y.	12 in	1187-1198	reset 0
:bgd					0-	945
				24 out	946-	969
:spatter (fgd)						r 0
	26	16	24 gn.		0-	327
				12 out	328-	339
	26b	16	24 gn.	12 in	328-	339
						r 328

					340- 704		
				12 out	705- 716	r	705
27a	22	24 gn.		12 in	705- 716		
					717- 945		
				24 out	946- 969	r	0
:(middleground)							
127	2.8	W.bl.			0- 219		
	5.6	W.red			220- 221		
	2.8	W.bl.			222- 265		
	5.6	W.red			266- 325		
	5.6	-			326- 361		
	5.6	W.red			362- 469		
	5.6	W.red		12 out	470- 481	r	470
	2.8	W.bl.			470- 549		
	5.6	W.red			550- 591		
	5.6	W.red		12 out	592- 603	r	592
	2.8	W.bl.			592- 632		
STILL fr	2.8	W.bl.		48 out	633- 681	r	635
	2.8	W.bl.			635- 680		
	5.6	-			681- 713	r	681
127	2.8	W.bl.		24 out	681- 704	r	681
(cel 625)							
127	2.8	W.bl.			681- 701	f	737
127	2.8	W.bl.			737- 777		
(cels 593-647; upside-down)							
127	2.8	W.bl.		48 out	778- 825	r	778
STILL							
: cycle material							
127	2.8	W.bl.		out 1 inc	778- 969		
				every 5 fr	starting 869		

Section 4

	NO IMAGE	5.6	1 red		0-1170	r	0-24
(emulsion forwards)							
	70	8	-	24 in	-24- 0		
	STILL of fr.1						
	70 movt	8	-		0- 598		
	70	8	-		599- 858		
BACKWARDS							
				12 out	859- 870	r	859
					859- 944		
				12 out	945- 956	r	945
					945-1196		
	70	8	-	12 out	1197-1208	r	1171
	NO IMAGE	8	W.gn		1171-1208	r	1171
:angled shot							
	71	8	-		1171-1207	r	1171
:reversed angle							
	71	8	-		1171-1207	r	114
	82a	5.6	W.gn		114- 163		
	"	"	"		164- 213		
	"	"	"		214- 261	r	253
:emulsion forwards							

85c x3	"	"		253-328	r	263
85c x3	"	"		263- 338	f	402
BUT with 10 fr		delay				
NO IMAGE	"	"		402- 404	f	471
:central star	(expands/contracts)					
90c	"	"		471- 641		
82a	"	"		642- 690	r	687
85c	"	"		687- 709	r	697
85c	"	"		697- 719		
10 fr		delay				
82a	"	"		720- 767	r	764
85c x3	"	"		764- 837	r	774
85c x3	"	"		774- 847	f	881
10 fr		delay				
NO IMAGE	"	"		881- 883	f	919
90b	"	"		919- 954		
81a	"	"		955- 995		
			48 out	996-1043		
			to point 5			
			48 in	1044-1084		
			to max			
				1085-1131		
85b	"	"		1132-1145	f	1150
start fr 7						
NO IMAGE	"	"	2 on/	1150-1157		
			2 black :cyc.			
85b	"	"		1158-1170		
start fr 7						
(cont)	"	W.red		1171 only		
85b	"	W.red		1172-1185		
start fr 7						

NB Began Roll 3 starting again at fr. no. 1171, as follows:

:low D	NO IMAGE	8	W.gn		1171-1679	
	NO IMAGE	1.9	-		1680-1682	
	NO IMAGE	8	7 orange		1683-2301	
	8 fr alt:x6		29 bl.			
	NO IMAGE					
	12 fr alt:x6					
	NO IMAGE				f out 1 mark on rheo	
					every 16 fr to	
					final black.	
	16 fr alt:x6					
	NO IMAGE					r 1171
	24 r alt:x4					
:emulsion forwards						
	70	8	-	24 out	1171-1194	r 1172
	backwards					
	85b	5.6	W.red		1172-1185	r 1171
	start fr 7					
:base forwards						
	71	8	-	2 on/	1171-1179	
	angled shot:fr 1 only			2 black :cyc.		
"	71	8	-		1180-1780	
"	71	8	-		1781-2043	

NO IMAGE	4	W.bl.	24 in	0- 23		
				24-1052		
			48 out	1053-1100	r	0
:zoom in/out of stars and planets						
114f	8	W.red	24 in	0- 23		
(cyc)				24-1052		
			48 in	1053-1100	r	165
NO IMAGE	8	1/(1/2red,1/2gn.)	24 in;	165- 352		
			8 fr incs			
			24 out;	353- 476		
			5 fr incs			
		4/(1/2red,1/2y.)	24 in;	477- 606		
			5 fr incs			
			24 out;	607- 697		
			4 fr incs			
		3/(1/2y.,1/2gn.)	24 in;	698- 823		
			5 fr incs			
			24 out;	824- 976	r	165
			6 fr incs			
:three sticks						
132 (stick 1)	5.6	-		165- 260		
			12 out	261- 272	r	177
"	"	"		177- 272		
			12 out	273- 284	r	189
"	"	"		189- 284		
			12 out	285- 296	r	353
132 (stick 2)	5.6	-		353- 448		
			12 out	449- 460	r	365
"	"	"		365- 460		
			12 out	461- 472	r	377
"	"	"		377- 472		
			12 out	473- 484		
132 (stick 3)	5.6	-		477- 572		
			12 out	573- 584	r	489
"	"	"		489- 584		
			12 out	585- 596	r	501
"	"	"		501- 596		
			12 out	597- 608		
:emulsion forwards (three sticks)						
133 (stick 1) DOUBLE FRAMED	5.6	-		609- 704		
			12 out	705- 716	r	621
"	"	"		621- 716		
			12 out	717- 728	r	633
"	"	"		633- 728		
			12 out	729- 740	r	698
133 (stick 2) DOUBLE FRAMED	5.6	-		698- 793		
			12 out	794- 805	r	710
"	"	"		710- 805		
			12 out	806- 817	r	722
				722- 817		

			12 out	818- 829	r	824
133 (stick 3) DOUBLE FRAMED	5.6	-		824- 919		
"	"	-	12 out	920- 931	r	836
"	"	-	12 out	836- 931		
"	"	-	12 out	932- 943	r	848
"	"	-	12 out	848- 943		
"	"	-	12 out	944- 955		

Section 6

:background rotation (base)						
61 (start fr.no.81)	5.6	26 bl.	48 in	0- 47		
				48-1340		
			43 out	1341-1383	r	0
:network of lines						
77	5.6	39 bl.	48 in	0- 47		
				48- 854		
77 (cyc)	5.6	"		855-1148		
			96 out	1149-1244	r	204
91	16	33	48 in	0- 47		
				48- 854		
			24 out	855- 878		
78a	5.6	1 red		204- 233	f	237
"	"	"		237- 266	f	272
"	"	"		272- 301		
"	"	"		302- 331	f	389
76f	"	"		389- 395		
76g	"	"		396- 411		
76h	"	"		412- 421		
76i	"	"		422- 428	f	450
80e	"	"		450- 467	f	544
80d	"	"		544- 573		
80d LAST FR.ONLY	5.6	"		574- 593		
			24 out	594- 617	f	619
80c LAST FR.ONLY	"	"		619- 648		
	5.6	"	12 out	649- 660	f	694
80b	"	"		694- 723		
"	"	"	12 out	724- 735	f	782
80a	"	"		782- 811		
" LAST FR. ONLY	"	"	12 out	812- 823	f	855
76i BACKWARDS	"	"	2 black/ 2 fr per pic :cyc.	855- 928	f	938
76f	"	"		938- 955		
76g	"	"		956- 970		
76h	"	"		971- 987		
76i	"	"		988- 995	f	1021
76e FIRST FR. ONLY	"	"		1021-1032		
80d BACKWARDS						

	"	"	1 black/	1033-1122	
			2 fr per pic	:cyc.	
"	LAST FR. ONLY (rheo mid-pos: 8 - 18)				
	5.6	1 red	12 in/	1123-1243	
			12 out	:cyc.	
"	BACKWARDS (gradual fade)				
	5.6	1 red	1 black/	1244-1302	r 1244
			1 pic	:cyc.	
:background with rotation and zoom					
62a	5.6	W.mag.	2 black/	1244-1383	
			1 pic	:cyc.	

Section 7

: pan background

49	4	47 mag.	12 in	0- 11	
				12- 100	
			12 out	101- 112	r 101
50	"	"	12 in	101- 112	
				113- 197	
			12 out	198- 209	f 270
51	"	"	12 in	270- 281	
				282- 367	
			12 out	368- 379	r 368
49	"	"	12 in	368- 379	
				380- 465	
			12 out	466- 477	f 528
52	"	"	12 in	528- 539	
				540- 629	
			12 out	630- 641	r 630
54	"	"	12 in	630- 641	
				642- 732	
			12 out	733- 744	f 835

:angle shot

56	"	"	12 in	835- 846	
				847-1043	
			12 out	1044-1055	f 1085
63	"	"	12 in	1085-1096	
				1097-1288	f 1321
64	5.6	alt 2 red/15 y.			
			4 red of pic	1;4 of black;	
			4 y. of next pic;		
			4 of black:	cyc.	
			- with 24 fade-in		
				1321-1344	
				1345-1508	f 1531

64 POSITIVE

5.6	Ibid.	Ibid.;	but no fade-in		
				1531-1659	f 1677

: emulsion forwards

62 NEGATIVE

5.6	Ibid.	alt red/y. every 3 fr.			
				1677-1711	
			16 out	1712-1727	r 1677

: base forwards

62 neg.	"	Ibid.		1677-1711	
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			16 out	1712-1727	r 1321
41b	"	-	24 in	1321-1344	
				1345-1508	
NO IMAGE	1.9	-		1509-1515	f 1531
41a	5.6	-		1521-1659	
NO IMAGE	1.9	-		1660-1663	f 1677
27b and c	"	-		1677-1711	
			16 out	1712-1727	f 1738
NO IMAGE	"	-		1738-1747	r 0-42
109	4	W.gn.	48 in	-959- 6	
			12 out	7- 18	f 178
"	"	"	12 in	178- 189	
				190-1314	r 262
92a	5.6	15 y.		262- 268	f 340
"	"	"		340- 360	f 371
NO IMAGE	"	28 bl.	12 in	371- 382	
				383- 472	
			12 out	473- 484	r 365
105	"	-	1 black/	365- 404	f 409
			1 pic : cyc.		
"	"	-	Ibid.	409- 448	f 453
"	"	-	Ibid.	453- 492	f 508
92c	"	15 y.		508- 514	f 566
"	"	"		566- 571	
"	"	"		572- 577	r 572
NO IMAGE	"	7 or.	12 in	572- 583	
				584- 733	
			12 out	734- 745	f 819
92c	"	"		819- 825	
"	"	"		826- 830	
"	"	"		831- 835	f 940
NO IMAGE	"	28 bl.	12 in	940- 951	
				952-1056	
			12 out	1057-1068	r 931
105 BACKWARDS					
	5.6	-	1 black/	931- 970	f 975
			1 pic: cyc.		
"	"	-	Ibid.	975-1014	f 1019
"	"	-	Ibid.	1019-1058	r 967
104 (FREEZE on counter no. 978)					
	5.6	W.red		967- 979	
" (no. 978 STILL)					
	5.6	W.red	12 out	980- 991	f 1039
" Ibid.	"	7 or.	12 in	1158-1169	
				1170-1274	
			12 out	1275-1286	

Section 8

65c L.S.	8	27 gn-bl.		0- 146	
			24 out	147- 170	r 147
" M.S.	"	"	24 in	147- 170	
				171- 264	
			24 out	265- 288	r 265
" C.U.	"	"	24 in	265- 288	
				289- 480	r 0

" C.U. POSITIVE				
	11	7/(1/2 bl., 1/2 red)	0- 480	r 0
	128a (omitting every other fr.)			
	8	3 red	0- 21	r 0
: emulsion forwards	"	"	0- 21	r 0
: base forwards	"	-	0- 21	
	128b		0- 21	
		12 out	22- 33	f 100
: three sticks				
	134 (stick 1);	STILL on fr.1		
	8	-	100- 111	
	Ibid.	"	112- 125	
	134 (stick 1);	STILL on last fr.		
	"	-	126- 137	f 157
	134 (stick 2);	STILL on fr.1		
	"	-	157- 168	
	"	" ; movement		
	"	"	169- 182	
	"	" ; STILL on last fr.		
	"	-	183- 194	f 215
	134 (stick 3);	STILL on fr.1		
	8	-	215- 226	
	"	" ; movement		
	"	8 -	227- 240	
	"	" ; STILL on last fr.		
	"	-	241- 252	f 270
	135 (stick 1) ;	STILL on fr.1		
	8	-	270- 281	
	"	" ; movement		
	"	"	282- 295	
	"	" ; STILL on last fr.		
	"	-	296- 307	f 327
	135 (stick 2);	STILL on fr.1		
	8	-	327- 338	
	"	" ; movement		
	"	"	339- 352	
	"	" ; STILL on last fr.		
	"	-	353- 364	f 386
	135 (stick 3);	STILL on fr.1		
	8	-	386- 397	
	"	" ; movement		
	"	"	398- 411	
	"	" ; STILL on last fr.		
	"	-	412- 423	r 0
:isosceles triangle				
	107 (cyc)			
	4	W.red	0- 480	
	93a (cycle as necessary) : shoot 7 fr each thus:			
			481- 517	f to
			Section 9; no.19	
	5.6	: W.red		
	8	: W.orange		
	8	: W.green		
	4	: W.blue		

Section 9

:Rorschach symmetry						
	118 BACKWARDS					
	22	W.red	12 in	19- 30		
				31- 58		
	118 FORWARDS					
	22	"		59- 120		
	118 STILL					
	22	"	12 out	121- 132		
:C.U. of ellipsoids						
	118	22	"	12 in	133- 144	
	118 STILL					
	22	"		145-1307		
			48 out	1308-1355		r 1308
: stars and planets revolve						
	115c	22	"	48 in	1308-1355	
				1356-2160		r 2033
: middle section of discs						
	72 (rheo 1 - 18 ONLY, in 12 incs)					
(1)	5.6	-	12 in	2033-2044		
			12 out	2045-2056		r 2045
(2)			12 in	2045-2056		
			12 out	2057-2068		r 2057
(3)			12 in	2057-2068		
			12 out	2069-2080		r 2069
(4)			12 in	2069-2080		
			12 out	2081-2092		r 2081
(5)			12 in	2081-2092		
			12 out	2093-2104		r 2093
(6)			12 in	2093-2104		
			12 out	2105-2116		r 2105
(7)			12 in	2105-2116		
			12 out	2117-2128		r 2117
(8)			12 in	2117-2128		
			12 out	2129-2140		r 2129
(9)			12 in	2129-2140		
			12 out	2141-2152		r 2141
(10)			12 in	2141-2152		
			8 out	2153-2160		r 117
: doors						
(8)	24a (cyc)	5.6	W.bl.	117- 268		
			12 out	269- 280		r 117
	24b (cyc)	11	W.red	117- 268		
			12 out	269-280		f 321
(7)	22a (cyc)	5.6	W.bl/W.red; alt.16 fr.	321- 448		
			24 out	449- 472		r 321
	22b (cyc)	11	W.mag; double-frame each pic	321- 448		
			24 out	449- 472		f 498
(6)	20a (cyc)	5.6	W.bl.	498- 806		
			24 out	807- 830		r 498
	20b (cyc)	16	W.gn.	fr 1;3 black;		
				fr 2;3 black; etc.		

				498- 806		
			24 out	807- 830	r	498
(6/7 interleaved)	23	11	15 y.	498- 747	f	846
	- shoot cyclically thus: [alt. yellow and white frame by frame; then 72 black]					
(5)	15a and b	5.6	W.bl.	for and bak: cyc.		
				846- 930		
			12 out	931- 942	r	846
	15c (cyc)	8	W.mag.	846- 930		
			12 out	931- 942	r	846
	15d (cyc)	11	W.gn.	846- 930		
			12 out	931- 942	r	846
: emulsion forwards						
	15d (cyc)	11	W.gn.	846- 930		
			12 out	931- 942		
: base forwards						
(4)	12a and b (cyc)					
		5.6	W.gn./mag.	mag. for, gn. bak.,		
				2 fr. each per pic		
				943-1100		
			12 out	1101-1112	r	943
	13b: for and bak					
		11	15 y.	943-1100		
			12 out	1101-1112	r	943
(4/5 interleaved)						
	16	5.6	-	943-1145	r	1143
	- shoot fr.1; then 5 black; then fr.2;					
	sim.; finally, random flutter.					
: doors						
(3)	9b (cyc)	5.6	W.bl.	1143-1430		
			12 out	1431-1442	r	1143
	10a (cyc)	8	W.red	1143-1430		
			12 out	1431-1442	r	1143
:emulsion forwards						
	10a (cyc)	8	W.mag.	1143-1430		
			12 out	1431-1442	f	1469
(2)	4a and b; for and bak once					
		5.6	W.bl.	1469-1596		
			12 out	1597-1608	r	1480
	Ibid.	11	15 y.	1480-1607		
			12 out	1608-1619	r	1491
	Ibid.	11	W.gn.	1491-1618		
			12 out	1619-1630	r	1502
	Ibid.	16	W.or.	1502-1629		
			12 out	1630-1641	f	1677
(1)	3e	5.6	W.bl.	1677-1837		
			12 fade to circa 12 on rheo.			
				1838-1849		
	N.B. 2 stops lower after each run-through, from f 5.6 to 11 to 22.					
	Rheostat from 12 to 24 to 12 etc., one increment per frame...					
				1850-2041	f	2230

END TITLE

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130	8	39.bl.	24 in	2230-2253
				2254-2349
			48 out	2350-2397

END

APPENDIX 7

The rejection of narrativity in Opus I

One of the central debates within contemporary cinema devolves upon notions of narrativity, and the extent to which avant-garde film-making can be read as re-assessing and reconstructing traditional representations within cinema of the supposedly 'real'. A key text is Christian Metz's Film Language : A Semiotics of the Cinema. Even the recent English independent movement, with its concern for what may be regarded as 'musical' treatments such as 'cycling', rhythmic editing, crescendo-figures, and variation-forms, still deal in terms of an underlying narrativity upon which their materialist-structuralist films pass comment. The burden of story-film weighs down upon the independents, whose most extreme departures from the norm can and must be seen as ultimately confirmatory, if not directly supportive, of its pre-eminence. For as long as live-action shooting is retained by the independents, so long will their work fail to define itself in terms other than those originating in theoretical discussion of conventional narrative. Just as a social 'gaffe' can only be recognised by members of that society; for those to whom the social conventions are foreign its meaning will be lost. Thus the dominance of commercial (narrative) cinema is not only acknowledged but required by the independents if their work is to retain any commentative import.

It will be found that Opus I does not operate in terms of narrativity; rather does it draw its inspiration directly from musical structuring, using film only as a medium for recording imagery and projecting it in synchronization with a music track. Like the Zoetrope and Praxinoscope, Opus I presents to the eye not a semblance of 'reality' but a sequence of drawings in simulated movement. Every element of Opus I is synthetic; not only is the sound electronically synthesised, but the visuals are drawn, photographed frame-by-frame, and the colour sequentially superimposed. The camera's capacity to 'capture' segments of real-time activity with 'naturalistic' sound and colour is thus ignored. To repeat, the medium of film is exploited for its capacity to present animated drawings in synchronism with sound.

The cartoon film, featuring anthropomorphic characters in situations which exaggerate human predicaments, is invariably scripted as if it were a live-action film; just as Eisenstein drew out story-boards in clarification of his filmic treatments, so the animator works to a story-board of key-actions, shot changes, etc., in his preliminary drafts for a cartoon film. The personality and behaviour of characters is determined, their facial expression and physical movements defined, as if they were human individuals. Their relationship to their environment is often fantastic - their resilience comically improbable - but this is grounded in human responses. Narrative dominates; there is a comprehensible, if wry, cause and effect at work.

In absolute film (not an abstraction, where what we see is a symbol for an extra-filmic reality) it is the activity of that thing as manifest in that film and in that film alone which informs us of

its 'capacity', of its potential as a structuring element. In this regard we find absolute film operating within the same parameters as music, where similarly there reside none but intrinsically musical relationships. With but rare and obvious onomatopoeic exceptions - cuckoo-calls, bells, etc. - music is recollecting an emotion transmuted into autonomous sound structures where 'logic' cannot be interpreted or divined through extra-musical literary or graphic paraphrase. The suffocating issue of what is 'filmic reality' which so bedevils theorising, can receive a straightforward, unambiguous response in the case of absolute film, where the medium is not mediating a reality which can be perceived other than through itself. In absolute film, the material rendered visible by the film cannot exist other than on film (or video); similarly with the synthesised sound: it IS NOT, unless heard on tape, or film sound-track.

For the reasons outlined above, the same cannot be said of conventional cartoon animation, where - were it not for our identification with the personalities and actions of the characters - these films would be literally unthinkable; their very essence - comic exaggeration - would be lost.

So the demonstrably self-referential, substantive nature of absolute film-visuals can be seen as collateral to that of music, and thus the potential for fruitful interconnections is set. Neither is parasitic on other realities. Both are temporal (sharing the same clock-time), both are gestural, with the one gesturing in the spatial dimension, the other in the sound-dimension. In intimate synchronization the concurrence of the two remains no mere concurrence but is manifest as a fusion - the eye hears, the ear sees. 'Sound is the soul of form.' (Kandinsky) Once it is established that visuals and

sounds in absolute animated film with synthetic music are thus hermetic to the extent that they are not directly or indirectly commentative on other 'realities', new problems of establishing criteria of cohesion, cause and effect, tension-resolution, arise; problems which now cannot be resolved by extra-filmic reference. For example, if, as I feel it is proper, anthropomorphic allusion is rejected (on the grounds that it impoverishes otherwise absolute imagery by depriving it of full potency), the flux of images must be controlled according to compositional criteria relieved of narrative constraint. Analogies with verbal language are as dangerous and inappropriate here as they are in the field of music, where likewise it is facile to identify, say, pitch with word, phrase with melody, sentence with cadence. The individual units of music have none of the semantic potential with which verbal language is imbued. We cannot in music divorce signifier from signified as does the semiologist in literature and hence can - mutatis mutandis - do in narrative film; for the discrete elements in music are building blocks without inherent identity. Their identity can only be construed by their context. Individually they cannot transmit associations; only when combined vertically into chords and/or horizontally into melodies, are they endowed with the capacity to evoke. So it is with absolute visuals; in geometric abstraction the inherent quality of shape is very weak; only by analogy can we attribute aggressive characteristics to a triangle, or regard the circle as inactive, self-sufficient, or whatever. Equally, insistence upon the inherent virtual dynamism of line - horizontal, vertical, diagonal - seems suspect if considered as fixed, immutable values. It is in the relation of element to element in time that energy is discovered; only when the potential imbalance - Mondrian's 'dynamic equilibrium' - is realised through a resolution of

such stored-up tensions, can shape be endowed with any temporary attribute. Some canvases appear as frozen moments, instantaneous photographs snatched from a continuum of activity (for example, many of Malevitch's paintings), and here the instability of the design impresses itself upon us in its yearning to find release from tension. But canvas art commonly seeks to resolve its spatial tensions by a complex process of integration within the frame. Potential velocities, gravitational weightings, qualities of recession and progression are counterbalanced spatially, just as in music they are counterbalanced temporally.

From this it can be seen how inappropriate it would be to mimic the formal precisions of canvas art when translating absolute geometric figures into the temporal medium of film. A concatenation of 'dynamic equilibria' would be akin to riding a conveyor belt round the walls of an art-gallery: glimpses of self-sufficient art objects, whose instabilities are all inwardly-resolved. No: in absolute film, instability finds active release in time. The viewer should not look for, should not expect to find satisfaction in a distanced assessment of frame-bound tensions. He is inevitably drawn into the screen, his eye led by the movement of figures. Momentary tensions are eased, dissonance resolves to consonance, only for new tensions to be generated. Just as in music it would be futile to seek out any split-second from the flux in the hope thereby of isolating a momentary perfection, so it is pointless to expect of absolute visuals that they will yield up their beauty to a study of their appearance frame-by-frame. —It is in the continuity that the argument, and hence the beauty, resides.

The composition of absolute film imagery demands an awareness of this, and a consequent preparedness to establish a compositional method which will support the elaboration of developing forms, forms whose growth, whose trajectory, whose transformations, will be as defining as the form-shapes themselves. Thus it is no use attributing qualities to shapes independent of their activity. The play of shapes within the screen (where it is a frame) and across the screen (where it is a partial view, an aspect) is as important as the nature of the shapes themselves, and is furthermore the most immediate means of asserting the unity of sound-visual simultaneity. Given only a static image, any musical accompaniment can only be heard as qualifying, in some way locating the visual mood. There is a sensation of concurrence conveyed, but none of any necessary indivisibility between that seen and that heard. Once the visual moves, the eye ceases to roam and is led through the desired trajectory, with the ear assuming that whatever is heard either emanates from the moving figure, or bears some intimate relation to it. Should the appearance of visual and sound be simultaneous, it is inevitable that the two should be recognised as one; the visual 'utters'; the sound becomes corporeal.

Now it is a characteristic of a visual to be specific; we can see its dimension, study it - through quick eye-movements - almost in the moment. It has specific size, location, colour, and in film it can metamorphose - either in shape, or in location, or both. Even in the field of absolute geometricism, it has an immediate graspable identity. It is almost tactile. Sound is different. Its attraction is its universality; it is non-specific, of no given size or shape, and in location far less definable than are visual stimuli. So to synchronise it with a visual is to some degree to delimit it, to

'place' it, perhaps in a sense even to impoverish it - for we deny it part of itself - its very fugitive intangibility. What could not be measured, quantified, now becomes the voice of a visual that can be so treated. It becomes a manifestation of the visual - the 'voice' of the visual only. No longer a free agent, the sound has been taken-over by the dominant sense; we know its size, its location, its trajectory... 'it comes from that square/circle/rectangle.'

Although it has been argued that music is without shape, size, and location, this is not the whole truth. For - with the singular exception of synthesised music, and we shall come to this - musical sound is generated by instruments of familiar shape, and size, and playing technique. So that, in audition, such music is far from disembodied - we imagine, even if we cannot actually see, the performer or performing group at work; we empathise, involuntarily ghosting the player as he articulates sound. The music has, then, a performance location, works within a certain acoustic (which in the case of live audition is an acoustic common to the listener); instruments are sounded by individual performers, whose performing gestures are inseparable from our response to the music played. (This is obvious: forceful music requires greater physical exertion - with the exception of the organ - than does placid music; we intuitively relate the scale (size) of instrumental intensity to the maximum and minimum intensity which we sense is available from any given instrument.)

It can be seen that a conflict must arise if instrumental music is used in conjunction, and in synchronization, with absolute film-visuals. (Note Whitney's observations above, in Chapter 4.) For a double location is then proposed for the sound - the primary

inescapable instrumental location, and the secondary grafted location enforced by synchronism. The illusion of unity in this instance can never be total, the recollection of instrumental gesturing ever vying with the the intended artificially-manufactured synchronism. However, such a conflict does not arise in the case of synthesized electronic music, almost by definition a performer-less music. Live performance is not ignored, but there is not the same visible necessary interrelation between performing gesture and resulting sound; nor does the sound possess one individuality - as does the timbral quality of an orchestral instrument). And it is here that the strength of absolute animated film with tape music becomes most apparent. Synthesized music has failed to attract an audience for a variety of reasons - because the musical language employed is unfamiliar, because performances are rare owing to expense and technicalities, but above all because the sounds cannot be located as emanating from a known battery of instruments. To all but a fellow tape-music composer, and often not even then, the way in which a synthesised sound took shape - how it was made - is obscure. The resultant sound-complex simply is; divorced from instrumental gesture it hangs disembodied in the air, defying 'placement', resisting definition. Audiences have not come to terms with this music. Concert-hall presentation is very problematic, neither darkened nor lit auditoria proving satisfactory. The eye yearns for some associated visual stimulus, some assurance that there are limits beyond which the sound cannot trespass. The union of synthetic sound with absolute imagery fulfils this need.

From what has been said above, it might appear that music is the subordinate partner in this artificial marriage, but in fact this is not so. For it matters not that there will for ever remain a

perceptual imbalance between our visual and auditory receptivity; in absolute film with tape music, the Gesamtkunstwerk is 'orchestrated' in obedience to a musical hegemony; it is musical thinking which conditions both large- and small-scale time-structures. Interrelated graphic imagery enables the audience initially to 'place' sound by appearing to embody it. Once this audio-visual film type is firmly established (and established afresh for each film), the new convention can undergo just those transformations of variation, elaboration, dislocation, and reassembly that have already proved such durable and infinitely flexible communicative modes within the realm of absolute music per se.

APPENDIX 8

Notes on the distribution and screening of absolute animated sound films

Integral to the writer's conception of absolute animated films with tape music is the selection of a medium of reproduction sympathetic to the content. Whilst it has already been proposed that sound cine-film cannot at present be excelled for visual quality, it is recognised that the optical sound-tracks of 16mm film are wanting in fidelity and would ideally be replaced by some other synchronised playback apparatus. This is offered by, for example, the now outmoded Siemens 2000 Double-Band projector which can run a 16mm-width magnetic track in synch with the (mute) visuals whilst remaining physically apart from them. A virtue of this device is that one 'saves' on a generation of copying, being able to transfer from quarter-inch magnetic tape to the 16mm magnetic film and then no further; magnetic reproduction seems in any event - even when recorded on 16mm stripe - to be preferable to optical track - but the limitation of this arrangement becomes apparent when copies are to be made for wider dissemination of a film. Separate visual and magnetic copies would be required, a procedure for which the laboratories are not generally geared, accustomed as they are to producing only optical copies, in which both visual and sound can be simultaneously duplicated.

If 16mm optical sound is poor, what of 8mm, and why indeed should 8mm - the 'boot-lace' amateur movie-maker's gauge - be considered at all? From a time when 16mm was scorned by every professional film-maker working in 35mm, technological development within the smaller gauges has made the large 35mm gauge often seem cumbersome even to the professional, particularly in an age of fluid, often hand-held camera movement in ciné-verité situations. 16mm has long been the province of the independent film-maker who could enjoy the comparative cheapness of this 'sub-standard' gauge without sacrificing professional laboratory processing facilities. Only in the last twenty years has the yet smaller 8mm gauge gained ground, and one finds American film-makers - Brakhage and Breer, for example - making and distributing their work on this gauge. The advantages - technical quality apart for the moment - are obvious; economically 'cheap' to make, process, duplicate, and screen, with the home movie-making market already flooded with 8mm projectors designed to show the films...the audience potential is great; not on a commercial cinema footing, but on a basis of outright purchase of the material, with only the same conditions and copyright restrictions as apply to gramophone recordings, and available at a price attractive to the average customer. Technical quality has proved inadequate for the serious independent film-maker until recently, when great advances have been made, and sound-projectors for 8mm are now commercially viable, angled towards the home movie-maker keen to capture both visual and sound in his family film-making activities, rather than to promoting a ready commodity of sound-films, although there would appear to be a small market for these, ranging from the perennially popular cartoons to shortened versions of screen 'classics'. But more appropriate to the needs of a medium of absolute animated film and

tape music is the so-called 'table-top' projector, which is as compact and self-contained as a domestic mono record-player with built-in speaker, and more transportable, 'collapsing' into a case of brief-case dimensions weighing about twenty pounds. Whilst these projectors are expensive, being primarily produced as audio-visual advertising package display-units, they would clearly become less prohibitive if they made further inroads upon the amateur movie-making field.* With the recent development of front projection by these machines in addition to their TV-screen-size enclosed image, the home market seems exploitable, and will become yet more accessible as film-projectors are replaced by video-recorders and discs. The film medium itself must inevitably capitulate to the fast-developing technology of video, just as conventional animation will - in many areas- be overtaken by computer graphics.

The attractions of disseminating absolute films through these media are manifold, now that technically sound and visual are approaching acceptable levels of fidelity. The film-maker can enjoy relatively cheap stock, laboratory-work, and duplication, but can also package his material in continuous-loop form (thus protecting his film from accidental user damage) or in video-format, making it as uncomplicated to view as audio tape-cassettes are to hear. The manual dexterity required to insert the cassette and switch on is minimal, compared with the convolutions necessary to lace-up even the simpler reel-to-reel projectors.

* Technicolor Audio Visual Systems Ltd market such a table-top projector, the Technicolor Showcase, intended primarily for sales demonstrations. This will show a Super-8 continuous-loop (max.31 minute) cassette with a choice of optical or magnetic sound, allows for stop-motion operation (single-frame display), and can project either rear-screen or front-screen. It seems though inevitable that this will be superseded by video-playback.

The essential differences between making films (as described above) for a domestic market, and making films for - however limited - distribution in art-house cinemas are basically two-fold: image-size/sound-`size`, and repeatability. It is important not to underestimate the effect of image and sound dimension upon the images and sounds themselves; unfortunately, our sensitivity to the differing impact of large and small images has been persistently dulled over twenty years by the televised screening of movies once these have been drained of commercial appeal in the circuit cinemas. Of recent years not only has the intended image size been thus violated, but with the advent of Cinemascope and other wide-screen formats even the original screen-proportions are maimed in a most cavalier manner, often to ludicrous effect, resulting in an unusually high percentage of unintentional `off-screen` activity. That careful choice of image-size is, however, inseparable from the image-content is evidenced by the great variety of frame dimensions selected by canvas artists past and present - from the delicate mediaeval miniatures of the Book of Hours to the magnificent overpoweringly fleshly canvases of Rubens, to the little walking lines of Klee, the deliberately overblown pop-art, strip-cartoonery of Roy Lichtenstein, and the claustrophobic Rothko `walls` in the Tate Gallery. Size and proportion in relation to man's own dimension is crucial, screen-size in particular conditioning the legibility (a function of scanning-rate) of the image. For a TV-screen format one must devise an image/sound activity sensitive and responsive to this format; one must avoid creating mighty mice just as much as in Cinemascope one avoids and indeed cannot attain extreme delicacy and intimacy of gesture.

It is, however, by no means a matter of indifference how large the picture appears to the spectator. The photography is designed for projection of a particular relative size. Thus in a large projection, or when the spectator is near the picture, movements appear more rapid than in a small one, since in the former case a larger area has to be covered than in the latter. A movement which seems hurried and confused in a large picture may be perfectly right and normal in a smaller one. The relative size of the projection, moreover, determines how clearly the details in the picture are visible to the spectator.(1)

Sergei Eisenstein

So one creates for a specific frame size and viewing situation. The need to peer into the old sea-side 'What the Butler Saw' Mutoscopes was as much a salacious ingredient of voyeurism as were the naughty flickering images themselves. And - to take a contrasting example - it is unlikely that Miklos Jancso's imagination could have flourished before wide-screen arrived to enable the liquid choreography of his timeless Hungarian deserts. Much earlier, Gance felt obliged in Napoléon to create a horizontal tryptych of standard-format frames to achieve a similarly wide-angle effect in 1926. Sadly, commercial requirements now dictate standardisation here as in so many other aspects of cinema.

The facility of repetition is crucial to a reappraisal of the function of music in film - or as it should rather be expressed - the interrelation of music with film, for music is no longer the servant. All commercial film-entertainment is calculated on a premise of the single screening; some people do go to see a film more than once, but these are untypical, as are the films which merit or gain such attentions. Bearing in mind the low opinion which producers had and still have of the general level of their mass-audience taste and

comprehension, it is clear that one must expect - even perhaps irrespective of this factor - a very immediate, direct, and unambiguous psychological drama, to which music contributes psychological 'veracity' and atmosphere whilst fulfilling the basic desperate need to draw the shadow-play into the presence and acoustic of the auditorium.

The average cinema-goer is thus conditioned into grasping the narrative essence of the film straight away. It is because they must win over their public immediately that producers have remained so conservative in their attitude to every aspect of their product; if they fail to do so, stars being mortal and taste being fickle, it is unlikely that a second chance, a 'revival', will present itself. Narrative films are so bound up with their times that, whether they be documentary, present-day or historical drama, they reveal their date of manufacture even to the non-specialist, so fast do fashions change. Absolute and experimental independent films are generally, although not in any sense timeless, at least not at any stage 'box-office', and thus not prey to the fortunes of the same. If the independent film fails to impinge on first viewing, the film-maker can lodge it with a Distribution Co-operative in the reasonable hope that informed critical comment may eventually win him an audience. The work is thus as accessible as, for example, an avant-garde musical composition available on hire terms.

But most independent films would similarly be outstaying their welcome upon a second screening, and one suspects that first impressions are the goal of many independent film-makers. Only a few individualists expressly call for several viewings of their work: Peter Kubelka most notably. Others create films which themselves

exploit structured repetition or prolongation; witness the minimal, lengthy films of Warhol, and of Michael Snow, which may take the viewer beyond boredom through to a heightened consciousness of the infinite malleability of time.

The prints of Kubelka's Schwechater and Adebar are distributed with each film once repeated so that - in the case of these very short, dense works - one has at least a second chance to come to terms with the material (much as Boulez's Répons was recently heard twice during a concert). The immediate (and of course subsequent) re-performance of a piece of new music is very often desirable, particularly if its argument is dense, or foreign. In film, such repetition is greatly facilitated by means of the loop-cassette which indeed can provide endless repeats until the viewer is motivated to switch off the apparatus, or the film disintegrates through eventual wear and tear.

It is striking and incongruous that the medium of film, which can so readily furnish innumerable replica-prints of itself, should for so long - like the lithographs and etchings of the past - have been produced in limited editions in order to preserve commercial value. The restriction of copies has always had only commercial advantage, and cannot be supported by any aesthetic argument. Today, of course, new films speedily find their way, legally or otherwise, on to video-cassette, and become available for home viewing. In the case of absolute films, it would seem - as happened in the case of series art (by Takis and others), briefly popular in the sixties - that their duplicative potential should be acknowledged by the film-maker's admitting that his work may be considered a 'commodity' as available as a gramophone record or a bar of soap. Whilst it will in

consequence be denied the aura intrinsic to attendance at a cinema, and denied the merits and demerits of that mass psychology exploited by the commercial producer, it will have all the appeal of the acquired artefact, and may form part of a personal, private library of similar works, individual to the collector.

The consequence of producing work with such a 'market' in view, is that one must expect the film to be played and played again. Most gramophone records disseminate music that was never meant to be repeated in identical, unvarying 'interpretation'; only electro-acoustic music is true gramophone music, in that its maker designed it to be the one and only version of itself, 'interpretation' being a non-issue, or at best a matter of gain-control, frequency-bias, speaker-placement, and room-acoustic. In the case of absolute film, even these variables can, if desired, be eliminated. One envisages a situation where the individual will sit at a desk facing a screen, dons headphones, inserts the sound-film or video cassette, and submits totally to the audio-visual experience, unaware of his immediate surroundings, whether the room be lit or dark.

CH-6600 Locarno, December 3, 1970
Via Bustelli 2

APPENDIX 9 : Letter from Hans Richter

Mr. David K e r s h a w ,
Goodricke College,
University of York,
Heslington / York

England

Dear Mr. Kershaw,

Thank you for your very interesting letter
of October 25th.

I cannot be as explicite as you are in your
four pages, but I agree with you in practically every point
you make.

Taped music is also for me a strain on my
concentration. I heard an evening of electronic music at
the Teatro Fenice in Venice, and I do not remember to have
been bored more in one single evening than at that time..
though I can follow modern composers like Varese without
loss of concentration and without visual ~~XXXXX~~ nourishment.

I also agree that the medium ^(tape) will not attain
creative status by absolute synchronisation between sound
and picture like Fischinger did it. But on the other hand
the word 'counterpointing' as you suggest (between sound
and picture) is perhaps too ambiguous. I would agree if you
use the word in the sense that picture and track move in
relation to each other, but whether that is counterpoint or
not seems doubtful?

As a matter of fact I have experimented with
this problem in my very last film "Dadascope", which un-
fortunately is not to be seen in England. In this film I
have used the poems spoken by my Dada-friends (poems they
made betwen 1916 and 1924) as the sound track and have gone
with my picture in a completely unhibited direction. What I
want to say is that there is no real relationship between
the poetry and the imagery, except they both are poetic
(whatever that means). In this way I have arrived to a very
free art-form, in which ear and eye may enjoy the happenings
on the screen and from the loudspeaker, independently but
simultaneously.

If you ever come into these parts of the world,
I shall gladly screen the film for you.

As far as Eggeling's and my work went in the
'20: We were concerned to find the elements of a "visual
language" which Eggeling discovered in what he called "The
orchestration of the line". I followed him to a certain point,
but then realized that we have to deal in film with


orchestration of Time and not so much of Form. For that reason his and my first film are so very different.

It might interest you to hear that we always spoke during the silent film period of the "musical rhythm of the images". It is this musical rhythm which Eggefling and I in a different way tried to establish on celloid. It is also the "sound" of the machines of the fleeing battle-ship On Potemkin which we thought we "heard", though the film was silent.

If I may try a resume of this question, I would say: A visual artist who has a musical sense and a musician who has a visual sense could and would solve the problem you have in mind. But the modern tape music (to use your term) is in my opinion too limited to reach from one sense to the other, from the optical to the visual or from the visual to the optical.

I hope I have given you some small portion of an answer to your letter and wish you the best possible luck.

Sincerely yours,



Hans Richter

Note : The presentation of references is based on the recommendations given in Demar Irvine's Writing about Music: A Style Book for Reports and Theses. 2nd ed. Seattle: 1968.

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CHAPTER THREE

Early Absolute Animation to 1930

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CHAPTER FOUR

Absolute Animation from 1930

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43. See Mary Ellen Bute, "Abstronics," Films in Review, V (June-July 1954), 263-66.
44. P.Adams Sitney, Visionary Film : The American Avant-Garde 1943-1978 (2nd ed., p/b; New York: Oxford University Press, 1979), p.239.
45. Ibid., p.232.
46. Le Grice, Abstract Film, pp.77-78.
47. Russett and Starr, Experimental Animation, p.111.
48. Le Grice, Abstract Film, p.78.
49. Douglass Crockwell, "A Background to Free Animation," Film Culture, No.32 (Spring 1964), pp.30-31. Crockwell's article is dated 1955.
50. Noel Burch, review of four films by Robert Breer, in Film Quarterly, XII/3 (Spring 1959), 56.
51. Ibid., p.56.
52. Ibid., p.57.
53. Adrienne Mancía and Willard van Dyke, "Four Artists as Film-Makers," Art in America, LV/1 (Jan-Feb 1967), 65.
54. Breer. Quoted from Mancía and van Dyke, *ibid.*, p.66.
55. Breer. Quoted from Guy L. Coté, "Interview with Robert Breer," Film Culture, No.27 (Winter 1962), pp.17-20.
56. Peter Kubelka, "Working for the Next 1000 Years," Cinema, IX (Cinema Rising Ltd., 1971), 28-31.

57. Sitney, Visionary Film, pp.294-95.
58. Ibid., p.295.
59. Ibid., pp.296-99.
60. John Whitney, "Moving Pictures and Electronic Music," Die Reihe 7 - Form and Space (Bryn Mawr: Presser, 1965), pp.61-71.
61. Mantle Hood, "Color Music: A New Art Form," (Pt III) New Outlook (Aug 1951), p.55. Hood is quoted in Thomas Leland Silliman, "Research into the Problems Encountered in a Film Experiment integrating Abstract Forms and Music," thesis in Theater Arts (University of California, Los Angeles, 1958), pp.16-17. Surprisingly, this thesis, beyond furnishing the Hood quotations, was of little assistance towards the present study. Silliman seems, for example, to have been unaware of the early experimentation of Eggeling, Richter, and Ruttmann.
62. John and James Whitney, "Audio-Visual Music," in Art in Cinema, p.32.
63. John Whitney, "Moving Pictures," p.70.
64. Whitney, "Audio-Visual Music," p.32.
65. McLaren, "Notes on Animated Sound," pp.189-91.
66. Whitney, "Audio-Visual Music," p.33.
67. Ibid., p.33.
68. Ibid., p.61.
69. Ibid., p.62.
70. Ibid., p.63. [Incidentally, Noel Burch has independently remarked how apposite is the conjunction of non-tonal serial music and (any) film imagery. He seems to be echoing Eisler in this. See Burch, Theory of Film Practice (London: Secker and Warburg, 1973), pp.99, 143.]
71. Ibid., p.68.
72. Lewis Jacobs, "Avant-Garde Production in America," Experiment in the Film, p.141.
73. Whitney, "Audio-Visual Music," p.69.
74. Ibid., p.69.
75. Ibid., p.69.
76. Ibid., pp.60-61.

CHAPTER FIVE

Interrelationships of Absolute Image and Sound in Film

1. Len Lye, "Is Film Art?" Film Culture, No. 29 (1963), pp.38-39.
2. Clive Bell. Quoted from Raymond Spottiswoode, A Grammar of the Film - An Analysis of Film Technique (London: Faber, 1935), p.180.
3. Ibid., p.181.
4. Ralph K.Potter, "Abstract Films," Films in Review, V/2 (Feb 1954), 85.
5. Ibid.
6. Ibid., p.86.
7. Ibid.
8. Ibid.
9. Thorold Dickinson, A Discovery of Cinema, p.59.
10. Potter, "Abstract Films," p.87.
11. Mantle Hood, "Color Music: A New Art Form," (Pt II) New Outlook (July 1951), p.53.
12. Potter, "Abstract Films," p.88.
13. Ibid.
14. Ibid.
15. Susanne K. Langer, Philosophy in a New Key (3rd ed.; Massachusetts: Harvard University Press, 1957), pp.223-24.
16. Jean d'Udine, L'art et le Geste (Paris: Alcan 1910). Cited in Langer, Philosophy in a New Key, p.227.
17. David Rothenburg, "Visual Music - A New Art Form," in Sound Sculpture, ed. John Grayson (Vancouver: A.R.C. Publications, 1975), p.140.
18. John Whitney, Digital Harmony : On the Complementarity of Music and Visual Art (Peterborough, New Hampshire: Byte Books, McGraw Hill, 1980), p.5.

19. Ibid., p.6.
20. Ibid., p.10.
21. Ibid., p.5.
22. Ibid., p.16.
23. Ibid., p.44.
24. Ibid., p.38.
25. Ibid., p.40.
26. Ibid., p.42.
27. Eisenstein, The Film Sense, p.131.
28. Frits Weiland, "Relations between Sound and Image," Electronic Music Reports,⁴ (Sept 1971), pp.66-91. Tr. Ruth Koenig. (Published by the Institute of Sonology, Utrecht State University.)
29. Ibid., p.83.
30. Burch, Theory of Film Practice, pp.51-52. (Burch aligns with Jean Mitry in asserting this distinction between aural and visual perception. See, for example, the Chapter on Mitry in J. Dudley Andrew, The Major Film Theories, (London: O.U.P., 1976), especially pp.195-96.)
31. Ibid.
32. See Etienne Souriau, "Time in the Plastic Arts," J.A.A.C., VII/4 (June 1949), 294-307, for a fascinating dissertation on 'intrinsic time'.
33. Burch, Theory of Film Practice, p.53.

CHAPTER SIX

Experiment before the Film Opus I

1. Read, Art Now, p.23.

2. Rudolf Arnheim, Art and Visual Perception (London: Faber, 1956), p.312.
3. André Hodeir, Since Debussy (London: Secker and Warburg, 1961), p.76.
4. Klee, The Thinking Eye, p.17.
5. Eisler, Composing for the Films, p.79.
6. Sergei Eisenstein, The Battleship Potemkin (scenario trans. from the Russian original (1926) by Gillon R. Aitken; London: Lorrimer, 1968), pp.11-12. The scenario is preceded by Eisenstein's 1939 essay on Potemkin which also appeared in Eisenstein, Notes of a Film Director.
7. Burch, Theory of Film Practice, p.11.
8. Read, Art Now, p.42.

CHAPTER SEVEN

Technique of Opus I

1. Eisenstein, Film Form, p.20.
2. See Shattuck, Banquet Years, pp.256-71.

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