Quantities and Qualities: Some Notes on Working Ideas in Art

Gillian Wise

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QUANTITIES AND QUALITIES
SOME NOTES ON WORKING IDEAS IN ART

Gillian Wise*

Abstract—*The author discusses briefly the present limited understanding of the aesthetic qualities of an art object conceived as a set of quantities (elements and relationships).*

The possibilities of organizing simple forms is demonstrated and illustrated with diagrams and the author's own works—relief structures made from industrial materials (transparent and opaque plastics and metalic sheet, polished and matt surfaces).

The author expresses the hope that visual art will become a form of communication through sensation that will influence functions in a rational manner rather than through the appeal to magic or indulging the artist with misplaced reverence.

I

Should the artist bother to communicate verbally, and if so how? As soon as the artist has taken up the pen he has answered the first question (for himself at least), but still has to deal with the second.

As an artist I expect to find aesthetic pleasure from ideas about work as much as in the work itself. So although I hope to explain what interests me because it seems to make sense—it is not the only criterion involved. By writing I am trying to convey something of the motivation behind working, whereas the professional aesthetician wants to deduce something from the art work itself and its effect on the spectator. Therefore there are different needs involved in the vocabulary and methods of talking about art, according to the standpoint taken. One method I like to use is that of taking ideas from other fields and trying to see if they are adaptable to a framework for the discussion of art. In this article there is an emphasis on quotations taken from the work of psychologists because there I found comments on the analogy between physical and mental constructs dealt with in a way that interested me.

The idea of the importance of structure may be far from new, both in the sphere of the arts and the sciences, but, even so, any change in the degree of its application is difficult to adapt to. Many of the writers who advocate the study of composition in art are often indifferent to the work of the scientist—who composes facts to make or prove an hypothesis—finding science uninteresting and even uncultured. Even a writer such as Coleridge, who was exceptional in the 19th century for the active interest he took in the development of science, showed alarm when nature seemed to be revealing more structure than he had expected (cf. Note 1).

The plastic arts, which deal directly with tangible form, rely on their effectiveness coming from a particular sequence of concrete relationships. What makes some of those relationships effective and others not? Should the artist want to know, or simply put his faith in cultivating inspiration or sharpening his sense of composition?

If science can interpret nature in terms of 'modes of arrangement', which explain the different types of 'power' exhibited, surely plastic art, which is self-evidently modes of arrangement, could lend itself to a similar classification. That is, in an attempt to understand both the urge to make art and the varied power it has over us. Behavioural psychology has already done a great deal to demonstrate effects on the spectator of physical phenomena, and this has probably influenced the shift of emphasis by the artist in exploiting the known power of visual effects—from an earlier preoccupation reflecting unknown inner drives, with its Freudian overtones, (e.g. Op Art and Happenings—the calculated play with audience response vs. abstract expressionism—pure subjectivism).

Although it is not enough to be proficient with the grammar of what looks nice (or acts powerfully) and what does not, any artist working with visual material has to pick up some rudiments of this grammar—up till now generally a trial and error process. After the vast output of art that man has achieved, only a small proportion of which is

*Artist living at 24 Charlotte Street, London W.1, England. (Received 27 July 1967).

accepted as outstandingly effective, (cutting across differences both in time and civilization) hardly anything survives that could be used as a universal body of teaching about the creation of art works. The control of spatial illusion by the laws of perspective is one, and the use of the golden section proportion is another. But so far no one could say that, for example, this artist tends to use this particular set of relationships to achieve the effect we associate with his name. Later, though he preferred to use another type of 'solution' that can be recognized as his late period, and these relationships can be formulated—he can be given a sort of formula. The 'good' artist reiterates and plays variations on his formula with consistency and imagination, and, if he changes the formula, an internal balance is still retained.

This implies that a special kind of spatial and volumic ordering of elements is developed and carried in the head of the artist. If this is so, how can one define it? The difficulty in any communication of this kind is: (a) the artist can say that aesthetic communication has been evolved simply because of its power to do what nothing else can, and, (b) why should it have to stand the test of translation into another discipline? It can be compared to demonstrating the principle of a tensegrity structure by a brick laying process.

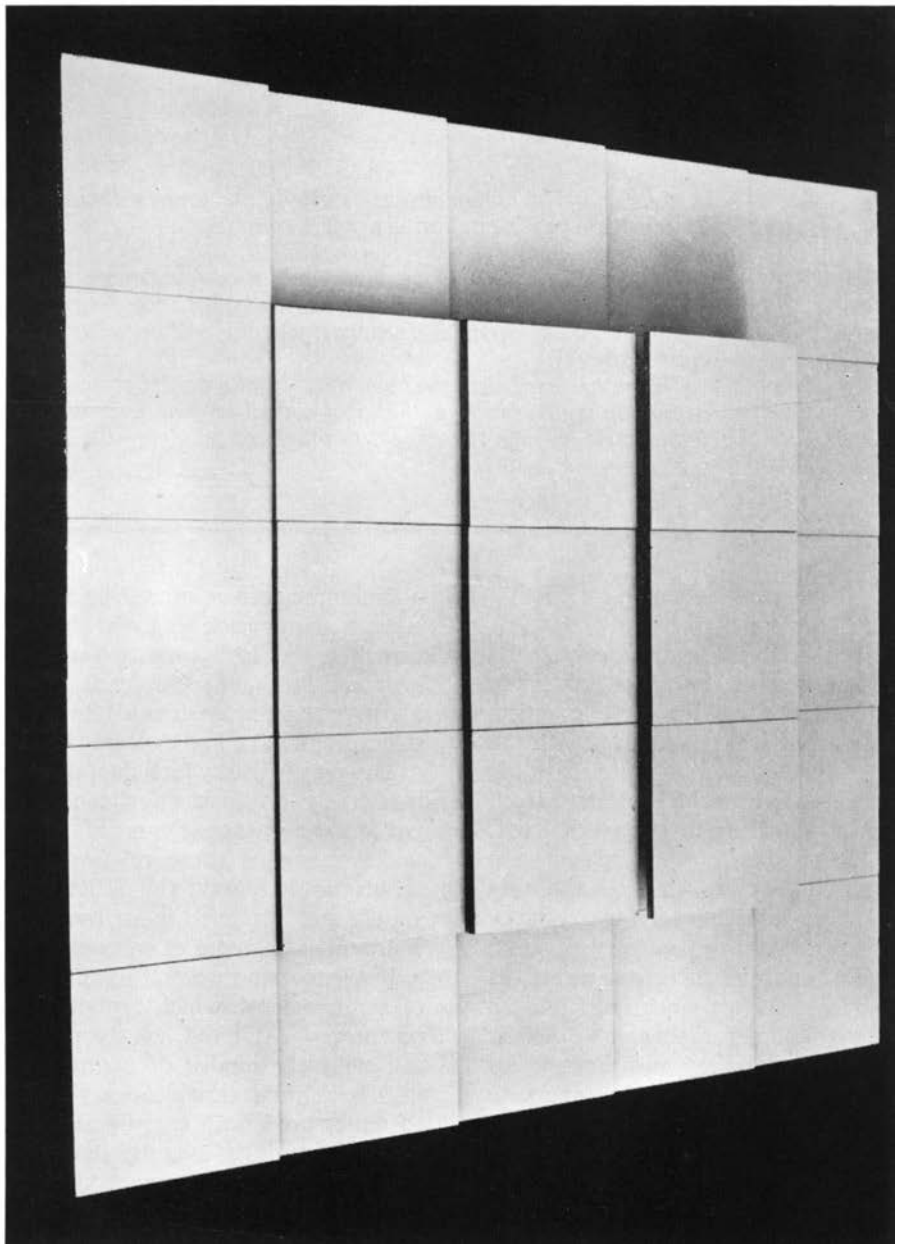

Fig. 1. '*Countermovement on Eight Levels*', 25 × 25 × 3 in., vinyl sheet and rubber, 1967.

This work is based on a 3 : 5 ratio with the smaller square of nine units embedded into one of twenty-five units. Every vertical row increases in depth from the base—starting from the right hand side, and making in all eight different levels. This creates a counter movement between the two planes.

You cannot learn to respond to art's power to give pleasure by a painstaking analysis of each of its component parts. Nor is it possible to draw a diagram of the balance achieved that gives a visual harmony. On the other hand, works of art that are taken seriously sometimes look very like diagrams (Mondrian, Vantongerloo, Vasarely). So what is the connexion between the diagram which stands for a set of related thoughts, and the art work which represents a set of relationships? Is one an abstraction of the other, emphasizing an aspect of cognitive processes? (cf. Note 2). In other words, perhaps the abstraction plays with the mental concepts we have been trained to make in life by trying to track down those which are the most pleasure giving. This may explain its 'detensing' effect on the psyche, as well as linking up with the 'aesthetic experience' claimed by scientists and mathematicians from their own activities.

By general consensus an object stops being an unexplained symbol or diagram, and starts being called a work of art when the overall arrangement of its quantities (component parts) produces a quality which is recognized as aesthetic. The components parts themselves play only a minor role, as pawns in the game of arrangement, although every artist will find some components more amenable than others and concentrate on using them. Vasarely, for example, has gone so far as to propose that an art based on variations of identical units be taken as the physical content of the art of the future, since such a basis would allow computer programmed art to be easily produced. Unit composed art in this sense has already had a long history dating back at least to Balla's (1912) futurist works, and is more generally used now than ever before, but it has never been the *raison d'être* of a movement, a method in itself, as suggested by Vasarely's 'Notes for a Manifesto' [3].

In my works, illustrated here, the square is used as a unit of composition. (Figs. 1–6). They are ordered in a way that is sometimes clear, and sometimes needs explanation. The materials used are limited to those currently available in industrial products, and aesthetically acceptable to me. In a sense the works are not intended to be seen as carrying a particular emotional or literary message, but as experimenting with their own processes.

II

In the following section I try to give an indication of the ideas used in my work, both specific and general, and the way one idea may suggest another. I will start with some of my reasons for choosing the square (and the cube) as a unit to work with. Apart from the important and well known mathematical properties (which need not be listed here) I find:

(1) It is well defined and understood as an independent structure, both singly and in assembly.
(2) It is amenable to numerical calculation and enlargement.
(3) Its form implies expansion rather than enclosure (compared with the circle, for example) giving more inter-action between units.
(4) The square can be used equally well for emphasizing point, line, or plane, or combinations of all three.

The square unit can be combined in a number of ways: adjacent (one beside the other), embedded (one in the other), overlaying (with the use of transparent planes) stacked (one above the other), or used to imply or define cubic volume.

The distinction that is always drawn between works in two and three dimensions (not considering three-dimensional illusion on the plane) (cf. Note 3) underlines the different capacities they have in making formal relationships. Take, for example, six adjacent squares drawn two-dimensionally (cf. Fig. 7) and six squares joined together three-dimensionally to make a cube. Suppose one wanted to deploy the areas to make three white squares and three black squares in each set. Whereas on the cube there are only two variations possible (discounting mirror image sets), the two-dimensional format offers six. If the cube is simply unfolded in the shape of a cross, and not rearranged into a rectangular shape as shown, there are fourteen variations possible. The advantage of working in the form of a relief structure is that both the precise articulation of a two-dimensional surface and the physical complexity and undefined viewing point of three-dimensional form can be utilized.

Given a format made up of identical units in a grid, since no two units can occupy the same place simultaneously, they can never be identical, but they can be exchanged physically, like counters on a board. The boundary of an art work is of prime importance, for without knowing where this is, no relating to it can take place, (a practice of television is to show works with the camera wandering over the surface in close up, which often renders the work almost meaningless.) Once the relationship of the inside to the outside is stressed, the next step is that of the boundary to the environment, and that of the human eye to all three.

A good way to articulate space (cf. Note 4) is to draw a space filling grid of regular units (2D squares, 3D cubes). The two-dimensional grid has always served as a method for accurate copying in art, both directly from the subject and from other paintings, because of its power of plotting exact relative positions on the plane. It becomes interesting in its own right too, for example, when working in a square format (divided up, say, into nine equal squares or sixteen equal squares as in Figs. 8a and 8b). It may become necessary for one reason or another, to count the number of points where the lines touch or cross, or the number of individual lines in the set. In the particular diagram shown, we note the number sequences: plane, point, and

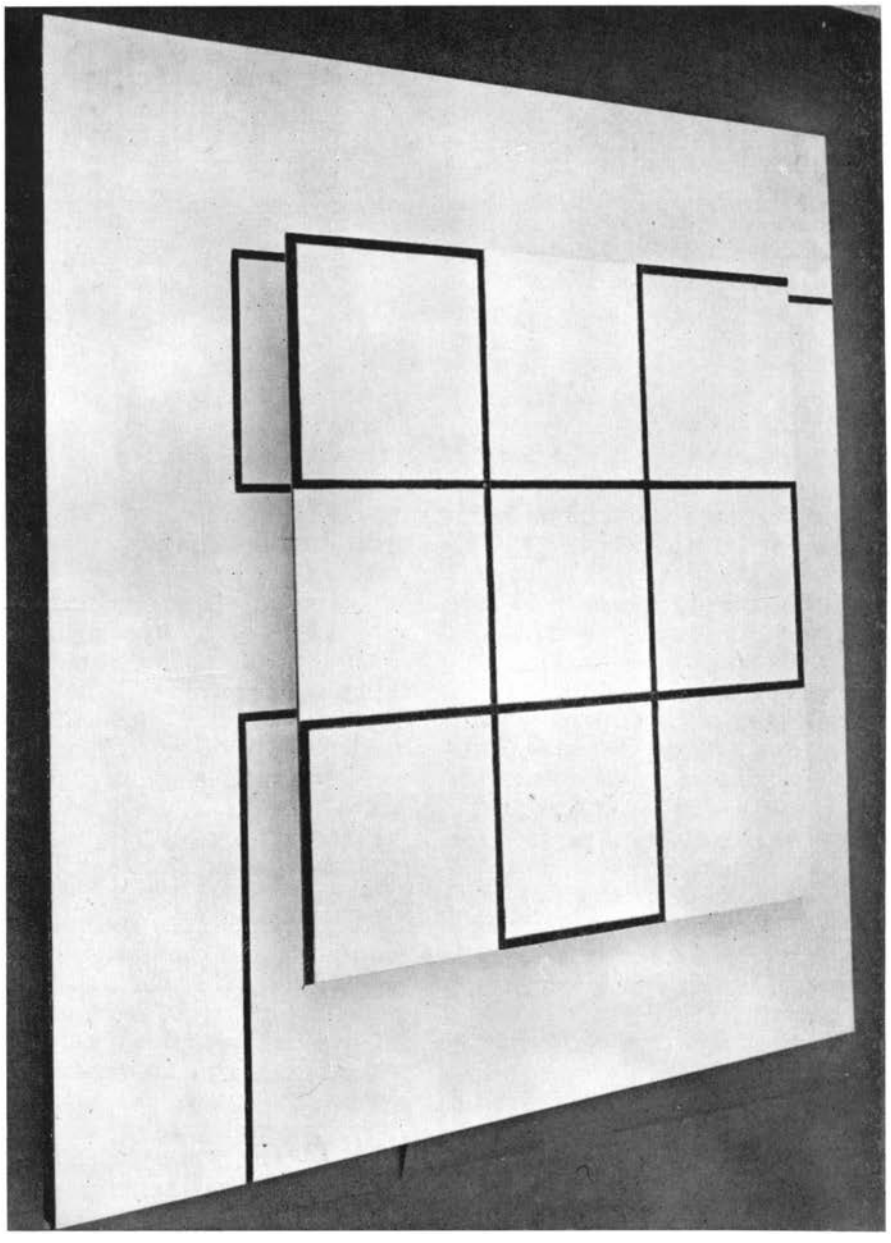

Fig. 2. '*Directed Path on Two Planes*', 25 × 25 × 3 in., engraved vinyl sheet, 1966.

Both this work and Fig. 3 have the same basic structure as Fig. 1. Here the nine unit plane is articulated by a continuous channel that falls either to one side or the other of the grid. It is reiterated on the larger plane.

line, each reveal a resemblance to a Fibonacci ratio (cf. Note 5). This information may have no bearing on the immediate reason for calculating the series of numbers, but, as it is a ratio used in other works, the coincidence is interesting, and suggests ways of using and developing it. Without the stimulus of having to put down some concrete facts about the format, this idea would not have suggested itself.

To take another instance—suppose on a square or cubic grid I decide to use a basic four line unit, and to experiment with possible variants of composition. The first step is to find out the range of shapes available. This is not difficult, coming to sixteen variants (cf. Fig. 9). As soon as these elements are established, the next step has to be one of aesthetic choice—and this requires a different kind of judgement. I have to decide which is the best unit or combination of units for the kind of effect I want to achieve, and, perhaps, make semi-random tests of arrangement/sequence/ tone and colour differentiation.

What I am trying to imply here is that, contrary to what is usually held to be the case, working with a concrete form with discipline (alongside aesthetic considerations) leaves one more conscious of the irrational or non-rationalized element in taking decisions, and, in making very precise choices, the range of possibilities often seems overwhelming. (cf. Note 6). The limitation of the range of possibilities lies in the fact that even on the physical

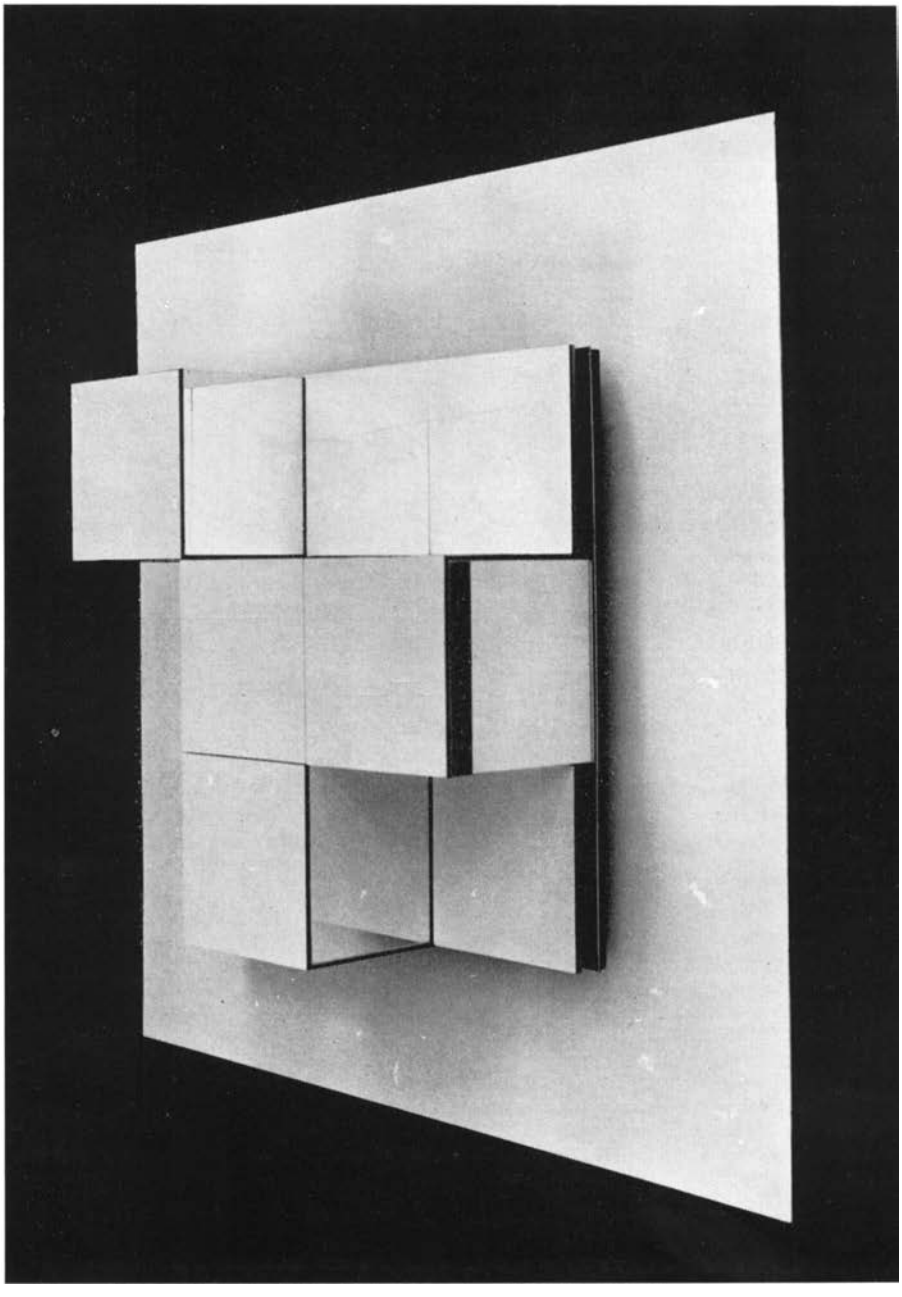

Fig. 3. '*Construction with Cubic Volumes*', 25 × 25 × 6 in., vinyl sheet and mirror, 1966/7.

This takes the areas on the plane defined by the continuous channel and emphasizes the ones that are completely enclosed by the line, making them into cubes. The side planes of the cubes are covered in mirror which explains the light effects in the photograph.

level two criteria have to be satisfied—that of the system and that of aesthetic judgement—and many 'good' effects will have to be abandoned because they can't be 'fitted in.' (The idea of fit being relative to the number of demands to be complied with) (cf. Note 7). The advantage of working this way is that it keeps providing material for inventiveness out of its own content, often in unexpected and interesting aspects, and this precise handling of dimension brings with it the need for a new kind of focus on the work itself. A different order of priorities has to be evolved right from the conception of an idea, and this sets it apart from comparison with the 'normal' process of self-expression in modern art.

Although formerly I worked by constructing or assembling orthogonal units into a 'whole'—relying on the assessment of the eye alone, the imprecision of this method was relieved when working in a metric framework, although this introduced new problems. The emphasis changed from the prime consideration being one of playing with the effects of form phenomena, to taking an equal place with a metric discipline (cf. Note 8).

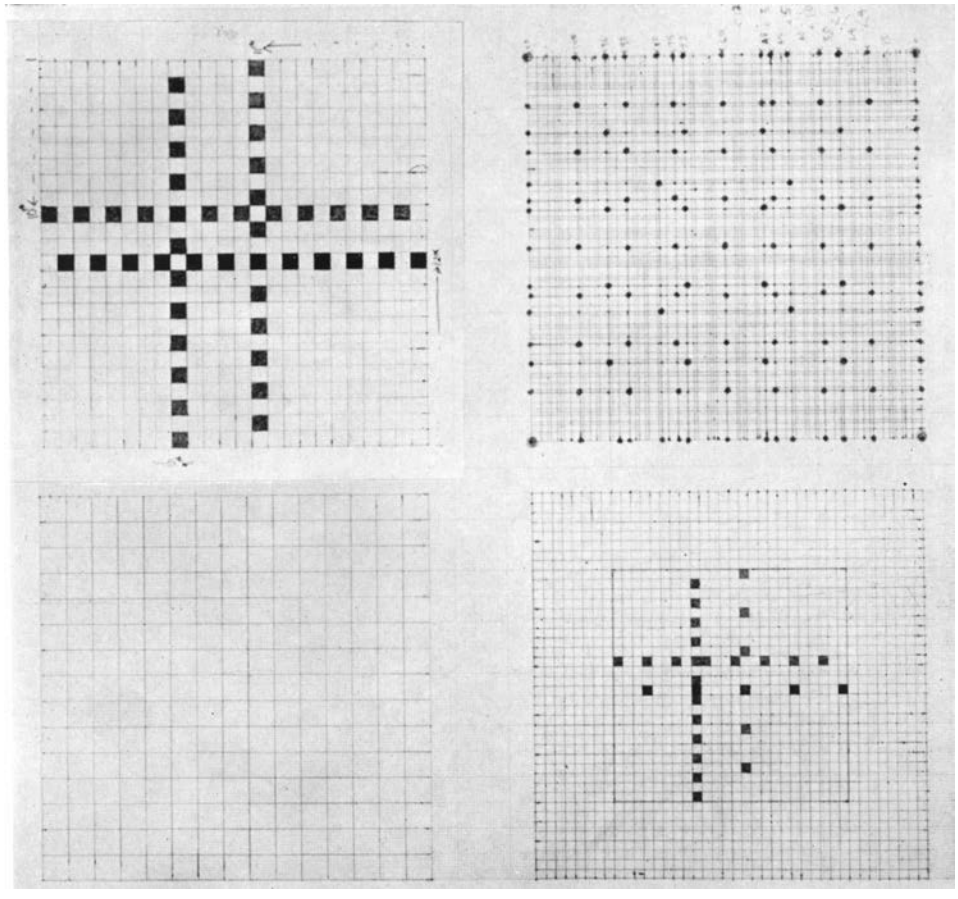

Fig. 4. *Preliminary drawing*, 17 × 22 in., 1965.

This drawing serves as a key to Fig. 5. It consists of 3 grids in a multiple Fibonacci series, i.e. 3:5:8 increased to approximately 15:25:40 (as this was plotted on a 120 unit grid it had to be modified to 15:24:40) and a fourth grid where all three are super-imposed. Here the points of cross connexions between the grids are picked out in dots revealing a kind of snowflake or flower arrangement. In the top left grid I took a dotted line down the ninth row of vertical squares (counting from the left), then revolved it at right angles onto the tenth line down (from the top right) then the eleventh at the next revolution and finally the twelfth. In the bottom right drawing, this unit is embedded into a larger square, since the grid is finer, and the same numbering used. The spaces between each dot increase at each turn.

NOTES

1. In a letter to Sir Humphrey Davy (who was at that time doing experimental work in chemistry and crystallography at the Royal Institution), Coleridge wrote, 'That which most discourages me is that I find all *power* and vital attributes to depend on modes of *arrangement*' [1]. Although the progress of scientific ideas was considered something of a curiosity and entertainment by the Victorian public that went to the Institute lectures, the more serious followers, such as Coleridge, tried to reconcile the philosophical implications.

2. *Cognitive maps* is the phrase used to describe mental constructs of ideas. In the following extract taken from Edward Chace Tolman, he speculates on what he has observed from experiments with rats [2]. 'Learning consists not in stimulus response, but in the building up in the nervous system of sets which function like cognitive maps, and . . . such cognitive maps may be usefully characterized as varying from a narrow strip variety to a broader comprehensive variety.' He already suggests that there are good and bad, or perhaps good and better types of cognitive maps. In other words, one may may seem to be more psychologically satisfying than another. If this idea is reversed, and the map is seen as something external (for the use of communicating) you can say that at the practical level of maps and diagrams some will tell you much more, much more clearly than others. Beyond that, some might offer an extra type of psychological satisfaction that could be categorized as 'aesthetic.'

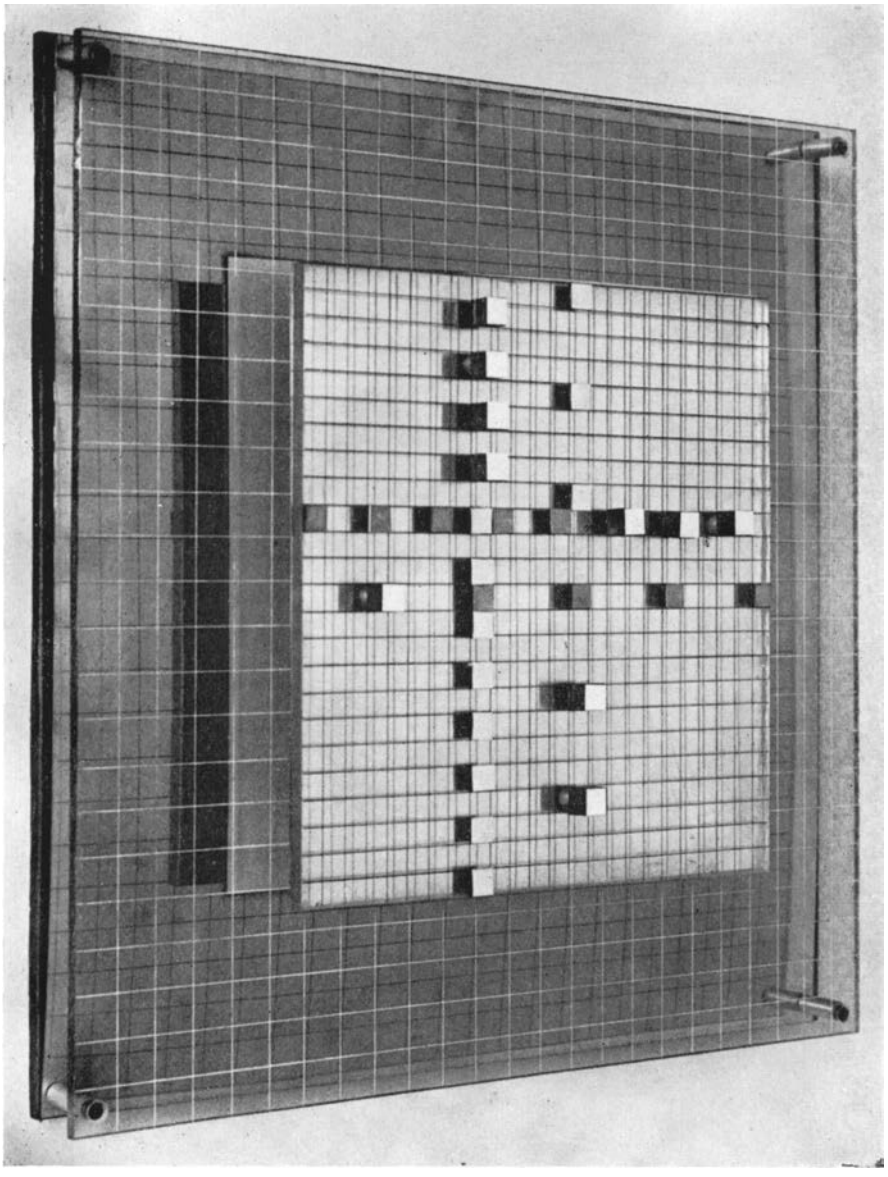

Fig. 5. '*Expanding Revolving Line No. 2*', 15 × 15 × 2·5 in., 1966.

Here the theme is translated into three dimensions with slight variations; for instance, the base grid is an enlargement of the smaller one. Where each line is dissected by another, the shorter ends in deep relief (black with a white facing), make a spiral motif of 1,2,3,4, that moves anti-clockwise.

3. One of the statements made by Piaget in his work on the learning processes of children is: 'Drawing or imagining a straight line presupposes a projective or Euclidean space, so that in actual practice such a notion is far from elementary' [4]. This idea may help in explaining the extraordinary spatial quality conveyed in a small number of straight lines on a surface (particularly as used in the Suprematist paintings of Malevich and Lissitsky). This effect seems to be as powerful when the lines are not attempting to portray a co-ordinated figurative picture of the world as when they are. This does not mean the lines can be placed at random, the composition has to be controlled by an idea of articulating space, and by a generalized knowledge of perception. A lifetime's conditioning to the interpretation of one straight line (perspective) is exploited, rather than portraying the physical objects themselves.

4. Koffka suggests that we respond to a field of vision that has a number of well defined and understood markings on it with more ease than with an all-over, equally-defined field, and states that 'Homogeneous space is not as stable as well articulated space' [5]. The all over, homogeneous effect is often used in art in a way where the artist knowingly manipulates its instability. A blank surface can disorientate, since the spectator expects to find a message here—is it then to be interpreted as a Dadistic or philosophical comment? Is it at once no space and infinity? Its very lack of information is relaxing too, as well as disturbing, and so creates 'mood'. The intensity with which we have to become involved with a network of inform-

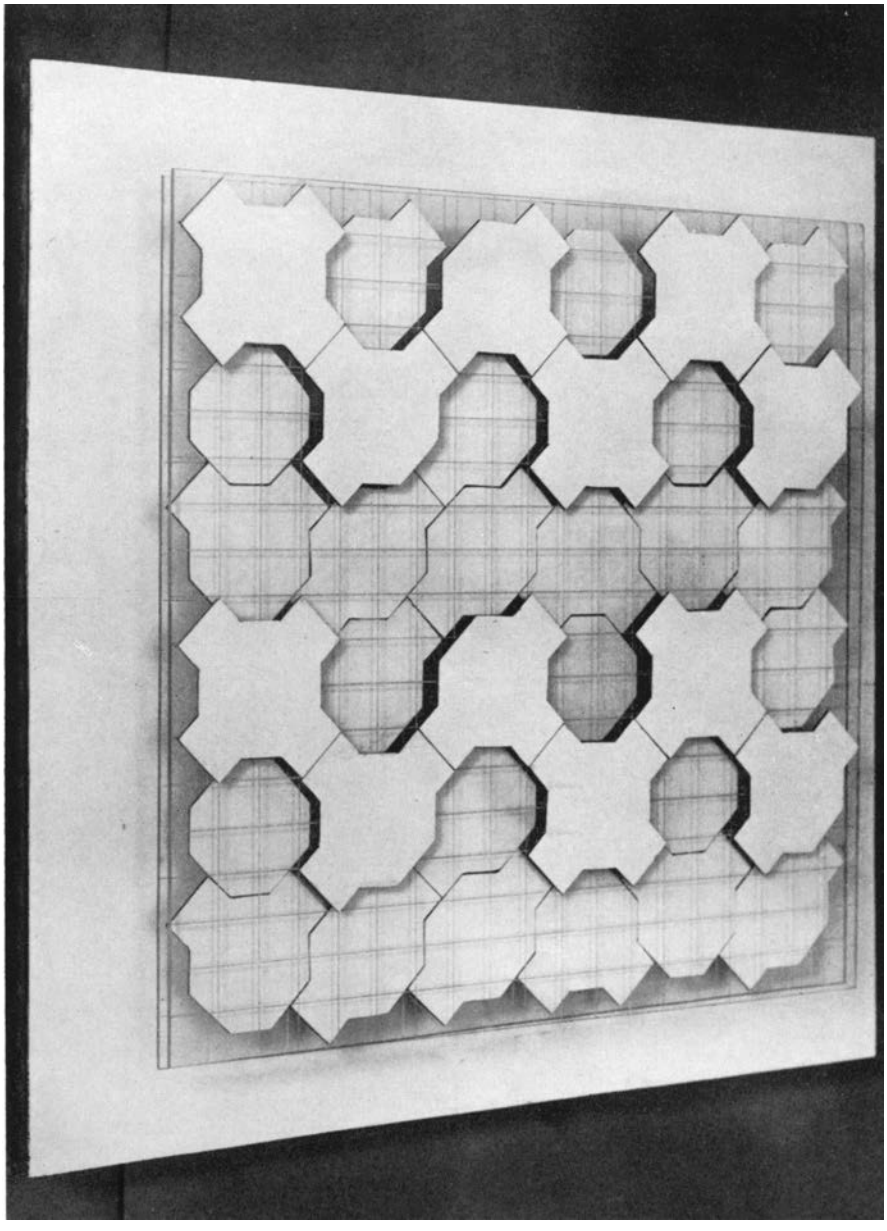

Fig. 6. '*Six Units Covering a Plane*', 15 × 15 × 1·75 in., vinyl and perspex sheet on a Darvic base, 1966.

Sets of six non-identical units fit together to cover the plane (comparable to a jig-saw). This is based on a square grid format and gives possibilities of formal variation. It could also be used on different levels, as shown here in a very simple form.

ation, even at an aesthetic level, is at once more dogmatic, demanding and ambitious. In his book *Understanding Media* Marshall McLuhan insists on the power of the mosaic format of information to involve the spectator at a physical level [6].

5. Fibonacci series: 'The series of numbers 1,1,2,3,5,8, ... of which each is the sum of the preceding two, and which converges to 1–618 ... the numerical equivalent of the 'Golden Mean' (see the footnote in D'Arcy Thompson's *Growth and Form* [7]).

6. Does proposition always precede expression? In disciplines such as the sciences this is a self-evident fact, since the results of work are presented to demonstrate or elucidate a proposal. In *Logic and Scientific Method* Cohen and Nagel state that 'Logically proposition is prior to expression' [8]. If art can be considered as expressing logical processes, we have to stand before a work of art with the question, what was the proposition of the artist? What did he say he was doing and what do others feel in response to it? How much did he feel himself to be in the service of a collective philosophy or attitude, and how much did he attempt to influence and change general ideas by individual effort. For example, an artist like Kandinsky wanted to break with the formal expression of art of his day—

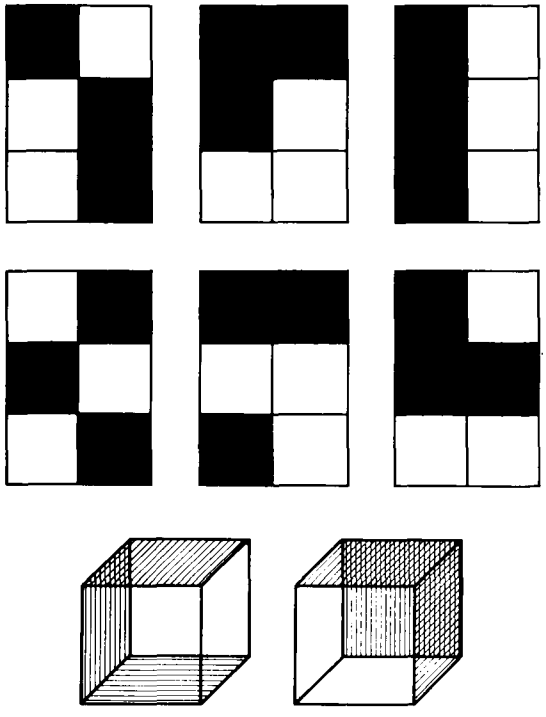

Fig. 7

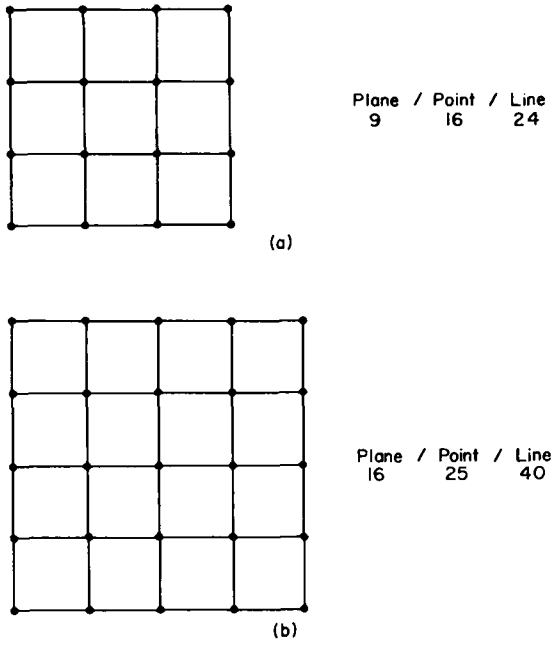

Fig. 8

to make entirely abstract work—but he still wanted to put it to the service of expressing traditional religious and mystical ideas. Although Kandinsky wrote extensively about his attitude to art, he seems to disclaim any thought of exact analysis. In his essay *Reminiscences*, in reply to critics who accused him of 'going astray in brainwork', he writes 'Nothing was farther from my mind than an appeal to the intellect, to the brain. This task would still

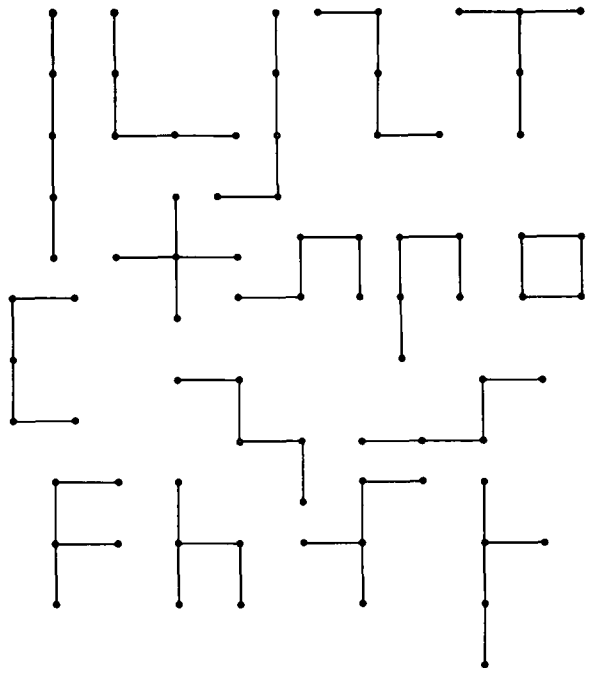

Fig. 9

have been premature today, and will lie before artists as the next, important, and unavoidable step in the further evolution of art. Nothing can and will be dangerous any longer to the spirit once it is established and deeply rooted, not even therefore the much-to-be-feared Brain-work in art' [9]. Mondrian, too, remained mystical in his outlook, and probably expected his work to reflect this. It is paradoxical that while an art work may not succeed in expressing all of the artist's stated intentions, it can often contain ideas that are important to him, but which he has been unable to formulate verbally. These ideas may be no less precisely understood than those which have been clearly verbalized.

The idea that concepts cannot be taken seriously until they are handled in a verbal or in a symbolic form (i.e. mathematical) is understandable, since, if ideas cannot be talked about lucidly, they cannot be held up for examination and argument, and norms of discussion established. So what possibility of success has the artist, who would like to write about his work in a way more satisfying than uncoordinated reports of his feelings—these feelings being the preferences that influence him to work in a certain way? Should one be optimistic that means of expression will be found if they are sufficiently needed? If the material aspect of life has been understood and classified to the extent it has, surely there is hope that with the help of that material knowledge and the methods used, we might get something better from art writing and criticism, than chaotic lyricism or stockbroking. A contemporary American philosopher, Paul K. Feyerabend, in discussing the difficulties of writing philosophically about ideas based on feelings (which every individual accepts as existing, pain for example)

suggests that there is no reason to assume automatically that only materialistic notions can be expressed clearly. Rather it might be seen as the poverty of our development in this field. '... the relative poverty of mental notions is by no means a common property of all languages. Quite the contrary, it is well known that people have at all times objectivized mental notions in a manner very similar to the manner in which we today objectivize materialistic notions' [10].

7. This analogy of fitting has already been adapted to the aim of architectural design and town planning of the future in *Notes on the Synthesis of Form* by Christopher Alexander [11]. He proposes to revive what in primitive societies was a balance between improvisation and tradition in the design of objects and buildings, but which in industrialized societies has atrophied. In primitive society the social needs were much more limited, and what was required could be more easily tailored to their needs; hence what was made reached a higher degree of individual and collective 'comfort' than in our own situation. Koffka describes 'fittingness' in this way, '... all problem solutions can be said to consist in finding the *fitting* part which will relieve the existing stress, a law of fittingness would be the most universal law to explain thinking, and with it the arousal of new processes' [5].

8. As an artist I have two alternatives, that of saying 'I am an instrument, a medium for the expression of certain responses and feelings I do not understand, but for some reason I am constantly concerned and involved with them. I have faith that they must have a meaning, and I will try and express them to my own satisfaction, and hope that they will communicate some satisfaction to others.' Or I can say 'I notice that this has a powerful effect on perception, perhaps I will try and fit it in with what I am doing, so I can be more sure of effective communication and attention.' Whether this is looked upon as gamesmanship, or control of technique, or a tool for philosophical expression, one begins to make the sort of observation that psychologists make. Once you start making observations you start to compare—then you want to try and classify—and here the artist comes to a virtual dead end. As I understand it, Feyerabend suggests we extend the range of our mental concepts to adapt them to cope with the *felt* as much as the *observed.* In art both these aspects are interdependent (if it can be interpreted as a felt proposition objectivized), therefore it can also be treated materialistically, at the level of studying the objects as evidence.

REFERENCES

1. L. Pearce Williams, Letter from Coleridge to Sir Humphry Davy, *Michael Faraday, A Biography* (London: Chapman & Hall, 1965).
2. Edward Chance Tolman, Cognitive Maps in Rats and Men, in: *Collected Papers in Psychology* (Berkeley: University of California Press, 1951).
3. Victor Vasarely, Notes for a Manifesto (Cineticism), originally published in the catalogue of the exhibition *Le Mouvement* Paris: Galerie Denise Rene (1955).
4. Jean Piaget: Piaget and Inhelder, *A Child's Conception of Space* (London: Routledge, Kegan, Paul, 1956).
5. Kurt Koffka, *Principles of Gestalt Psychology* (New York: Harcourt, Brace, 1935).
6. Marshall McLuhan, *Understanding Media—The Extension of Man* (New York: McGraw-Hill, 1965).
7. D'Arcy Thompson, *Growth and Form*, Chap. 15, f.n. pp. 923–924. (London: Cambridge University Press, 1952).
8. Morris Cohen and Ernest Nagel, *An Introduction to Logic and Scientific Method*, (London: Routledge, Kegan, Paul, 1957).
9. Wassily Kandinsky, Reminiscences 1913, in: *Modern Artists on Art*, ed. by Robert L. Herbert (New Jersey: Prentice Hall, 1964).
10. Paul K. Feyerabend, Problems of Empiricism, in: *Beyond the Edge of Certainty—Essays in Contemporary Science and Philosophy*, ed. Robert Colodny (New Jersey: Prentice Hall, 1965).
11. Christopher Alexander, *Notes on the Synthesis of Form* (Cambridge: Harvard University Press, 1964).

Quantité et Qualité: Quelques Notes sur les Procédés en Matière d'Art

Résumé—L'auteur étudie brièvement la compréhension actuelle—fort limitée—des qualités esthétiques de l'objet d'Art conçu en tant qu'un assemblage de quantités (éléments et rapports).

Les possibilités d'organisation des formes simples sont démontrées et illustrées ici à l'aide de schémas et de reproductions d'œuvres de l'auteur—structures en relief construites avec du matériel industriel (matières plastiques transparentes ou opaques et feuilles de métal laminé à surface mate ou polie).

L'auteur exprime l'espoir que l'Art visuel puisse devenir une forme de communication sensorielle qui exercera son influence sur les fonctions d'une manière rationnelle, bien plus qu'en faisant appel à la magie ou en vouant à l'artiste une vénération déplacée.