



*Programme from the Far Middle Ages*

I pass the Cathedral every day on my way to work. The building contains some typical Gothic specialties. An example is provided by the pointed arches of the 15th century cloisters reproduced below: a perfect example of the joyful (and artful) way the Gothic designers went to work.

Joyful, because it gave them pleasure to create complicated patterns in profusion. Artful, because they tempered the complicity to the beholder and concealed the profusion. That is: none of the 16 windows (one is missing in the picture) is identical with another; simply because somebody wanted to have fun (a whim, perhaps, of the head artisan ?) Each window is a design in itself based on an exact programme of constants and variants.

The Programme:

The material and execution are prescribed; the dimensions, outlines, including the vertical tripartition up to the springing line of the arch.

There are 16 different ornamental patterns to be designed in the triangle of the arch and they must be related from the following points of view:

the profiles of the lines and the joining together of the bundles of lines are in principle all alike - the tracing of the lines must be adapted organically to the outline and also to the vertical tripartition - the lines meet either at right angles to each other (or to the periphery) or run into each other at 0 degrees - there must be no residual forms; that is, each line must form a self-contained pattern on two sides.



Programme as morphology

Unbounded surfaces

Example.

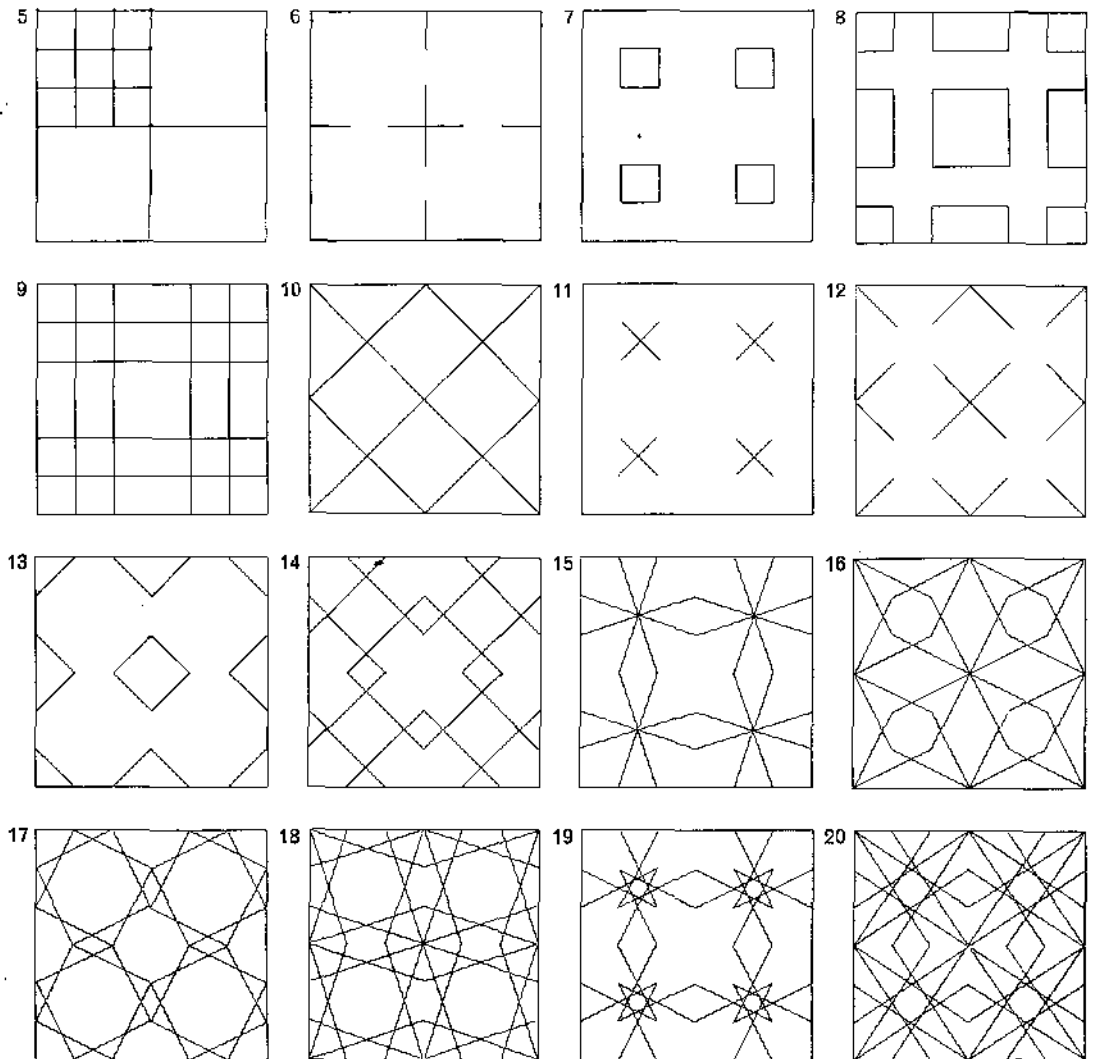
To give at least one instance of the astonishing richness and beauty of such geometrical patterns, Fig. 5 to 20 show forms which can be obtained in a latticework from a square consisting of  $3^2 = 9$  part squares by drawing a straight line between any two nodes. The number of nodes here is 16, which happens to be the same as the number of connecting lines between them and therefore also the number of patterns of the first order. Each total square  $3^2$  is repeated four times in juxtaposition so as to show the connection thus established between the single patterns (Fig. 5).

In patterns 5 to 8 the "theme", i.e. the line being multiplied in conformity to a rule (here the fourfold reflection of the square is being used), lies either minus a side of a square or in an axis of reflection, so that there are only four repetitions at a time. They make the simpler, more familiar forms. The other patterns are developed from lines in another position, each of which yields eight repetitions. The forms thus arising are largely unknown.

Each of the 16 forms can be combined with every other one in a pattern of the second order. They can be easily drawn if first one pattern is introduced into the latticework and then the other is drawn over it.

If three are drawn over one another, a pattern of the third order is obtained, of which there are 560.

From: "Harmonie der Formen" by Wilhelm Ostwald. Verlag Unesma, Leipzig 1927



*Programme as Logic*

Instead of solutions for problems, programmes for solutions -the subtitle can also be understood in these terms: for no problem (so to speak) is there an absolute solution. Reason: the possibilities cannot be delimited absolutely. There is always a group of solutions, one of which is the best under certain conditions.

To describe the problem is part of the solution. This implies: not to make creative decisions as prompted by feeling but by intellectual criteria. The more exact and complete these criteria are, the more creative the work becomes. The creative process is to be reduced to an act of selection. Designing means: to pick out determining elements and combine them. Seen in these terms, designing calls for method. The most suitable I know is the one Fritz Zwicky has developed, although actually his is intended for scientists rather than designers. (*Die morphologische Forschung*^Q53, Kommissionsverlag, Winterthur) I have produced the diagram below in accordance with his instructions and, following his terminology, I have called it the

morphological box of the typogram. It contains the criteria - the parameters on the left, the relative components on the right -following which marks and signs are to be designed from letters.

The criteria are rough. As the work proceeds, of course, they are to be refined as desired. The components are to be made into parameters and new components are to be specified, etc. Moreover, they are not only rough, they are also not self-contained. The component "something else" is the parcel in which the left-overs are packed if the parameter does not break down neatly. The designations are imprecise in some cases. There are many imperfections. But it is precisely in drawing up the scheme, in striving for perfection, that the work really lies. The work is not diminished; it is merely transferred to another plane.

The inadequacy of this box is my own and not inherent in the method. Even so: it contains thousands of solutions which - as could be shown by checking an example - are arrived at by the blind concatenation of components. It is a kind of designing automatic.

**21** a Basis

1 Components	11 Word	12 Abbreviation	13 Word group	14 Combined	
2 Typeface	21 Sans-serif	22 Roman	23. German	24. Some other	25 Combined
3 Technique	31 Written	32 Drawn	33 Composed	34 Some other	35 Combined

b Colour

1 Shade	11 Light	12. Medium	13. Dark	14. Combined	
2 Value	21 Chromatic	22 Achromatic	23. Mixed	24. Combined	

c Appearance

1. Size	11. Small	12. Medium	13. Large	14. Combined	
2. Proportion	21. Narrow	22. Usual	23. Broad	24. Combined	
3. Boldness	31. Lean	32. Normal	33. Fat	34. Combined	
4. Inclination	41. Upright	42. Oblique	43. Combined		

d Expression

1. Reading direction	11 From left to right	12. From top to bottom	13 From bottom to top	14 Otherwise	15 Combined
2. Spacing	21 Narrow	22. Normal	23 Wide	24 Combined	
3. Form	31 Unmodified	32. Mutilated	33. Projected	34 Something else	35 Combined
4. Design	41 Unmodified	42. Something omitted	43 Something replaced	44 Something added	45 Combined

*Solutions from the programme*

(Not all the solutions were found with the aid of the morphological box. But all those found can be assigned to a place in it and analyzed.)

If all the components contained in the trademark *intemobel* are added we obtain the following chain:

- a 11. (word) - 21, (sans-serif) - 33. (composed)
- b 14. (shades combined, viz. light and dark) - 12. (achromatic)
- c 12. (size immaterial, therefore medium) - 22. (proportion usual) - 33. (fat) - 41. (roman)
- d 11. (from left to right) - 22. (normal spacing) - 31. (form unmodified) - 43. (something replaced, viz. the face of the letter r by superimposition of the two parts of the word).

Not all the components are of equal importance; only two are actually decisive: b 14 + d 43.

The importance of "combined" is shown in example b 14: the components light-medium-dark are not very expressive in themselves because they do not represent an assessable value (apart from black always being dark). But if letters of varying degrees of darkness are combined (as here) the parameter of shade may be the point at which the solution crystallizes out.

Parameters as points of crystallization: I will illustrate all those in the section "Expression" by the following examples:

"Reading direction" determines the expression of the typograms *Krupp* and *Nationalzeitung*. In both instances the component d 15 (combined) forms the basis. In *Krupp* d 11 (from left to right) is combined with d 14 (otherwise, i. e. from right to left). In the case of *Nationalzeitung* the components are d 12 and 13. Incidentally, the typogram for Bech Electronic Centre belongs here, see page 44.

"Spacing", once again combined in the component, is determining in *Braun Electric* and *Autokredit A.G.*

22

**intemöbel**

23

**1181 99URK  
KRUPP 1961**

24

**National  
zeitung**

25

**B r a u n Electric International SA**

26

**A U T O K R E D I T**

Again: Solutions from the programme

"Form" is relevant in *Abfalle*, *Globotyper*, *wievoll?*. In *Abfalle* the component d 32 (mutilated, here fragmented); in *Globotyper* d 33 (projected, here on a sphere), in *wievoll?* d 34 (something else, the form is neither unmodified, nor is it mutilated or projected, but "something else": partly silhouetted).

The idea of "design" means something more than is conveyed by "form". To take an example: in *Auto AG*, the dropping of the crossbar of the A's cannot be called a mutilation nor a form operation either. If the form is mutilated, the components are preserved. That is not the case in this instance. The form as such is Berthold sans-serif but "something is omitted". The reverse applies to the case of *FH* (Federation Horlogere Suisse): here "something is added": namely, the Swiss cross within the letters. In the case of *Rheinbrücke* there is "something replaced": the part of the word "brücke" (bridge) by the sign.

The reader will have noticed that there is a criterion running right through the examples below: the relationship between form and content.

Basically, every typogram can be produced in two ways: firstly, through the word sense (to interpret the meaning) and secondly, through the word picture (to take the formal data as the point of departure). It would need a second, a semantic box, to bring this within a system. Its components can be found in the examples given here.

Say: the solution for *National Zeitung* is the perception of a formal rotation, *Krupp* is a literary interpretation (Look back to the past, look forward to the future). In *Autokredit* the word credit (payment over a long term) is represented, in *Globotyper* the typeface suggests the typewriter and the projection suggests the sphere (it was originally a name for the IBM spherical head typewriter). "*Abfalle*" and "*wievoll?*" symbolize the idea, etc.

27

Abfalle

28

globotyper

29

wievoll?

30

AUTO AG

31

FH

32

RHEIN 

*Programme as Grid*

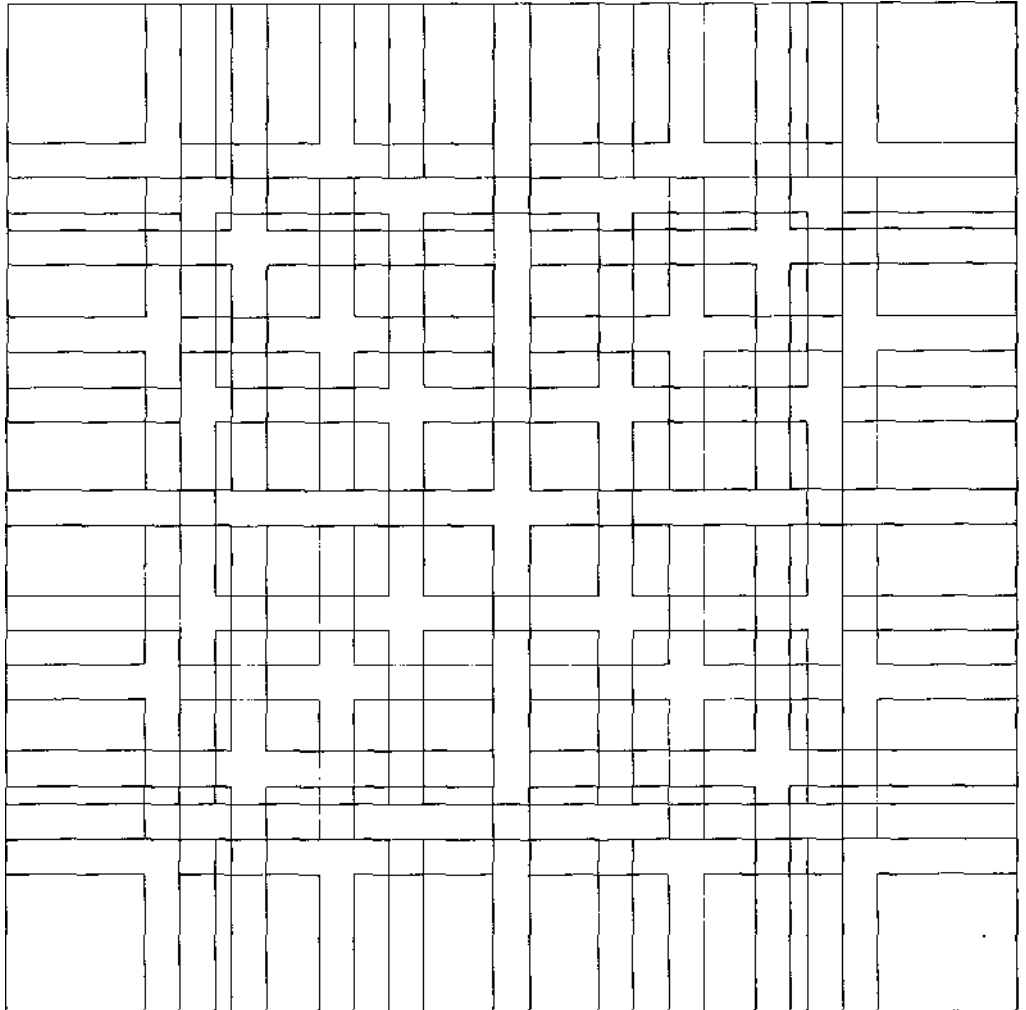
Is the grid a programme? Let me put it more specifically: if the grid is considered as a proportional regulator, a system, it is a programme par excellence. Squared paper is a (arithmetic) grid, but not a programme. Unlike, say, the (geometric) module of Le Corbusier, which can, of course, be used as a grid but is primarily a programme. Albert Einstein said of the module: "It is a scale of proportions that makes the bad difficult and the good easy". That is a programmatic statement of what I take to be the aim of "Designing Programmes".

The typographic grid is a proportional regulator for composition, tables, pictures, etc. It is a formal programme to accommodate x unknown items. The difficulty is: to find the balance, the maximum of conformity to a rule with the maximum of freedom. Or: the maximum of constants with the greatest possible variability.

in our agency we have evolved the "mobile grid". An example is the arrangement below: the grid for the periodical *Capital*.

The basic unit is 10 points; the size of the basic typeface including the lead. The text and picture area are divided at the same time into one, two, three, four, five and six columns. There are 58 units along the whole width. This number is a logical one when there are always two units between the columns. That is: it divides in every case without a remainder: with two columns the 58 units are composed of  $2 \times 28 + 2$  (space between columns); with 3 columns  $3 \times 18 + 2 \times 2$ ; with 4 columns  $4 \times 13 + 3 \times 2$ ; with 5 columns  $5 \times 10 + 4 \times 2$ ; with 6 columns  $6 \times 8 + 5 \times 2$  10-point units.

The grid looks complicated to anyone not knowing the key. For the initiate it is easy to use and (almost) inexhaustible as a programme.



*Again: Programme as Grid* .y,

The grid meant here is the screen of a printing block. A good example for understanding an essential factor.

Designing programmes means finding a generally valid principle of integrated arrangement. This applies not only to typography (a predestined application in any case) or - going farther afield - to the realm of geometry. It applies without any restriction to the realm of the visual. Without restriction because all the elements are programmable periodically, i. e. at will. There is no dimension, proportion, form; no colour, which cannot be constantly led over into another. All the elements occur in series, or better, in groups.

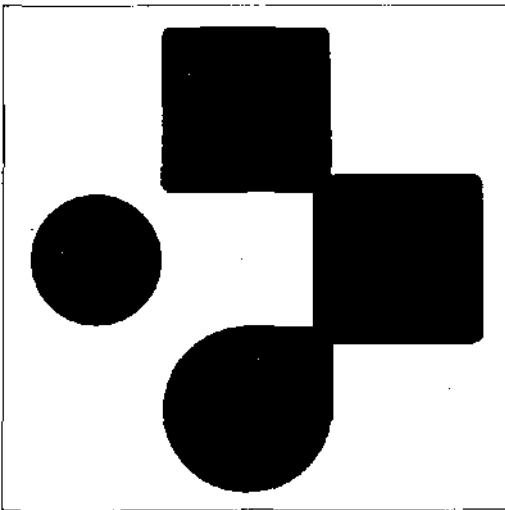
The same applies in the realm of the acoustic, in music. Language is different, because the elements have not been produced naturally but artificially. Even if programming in literature is subject to restricted laws, it is still quite possible, as is shown by Kutter's Programme for Berio.

The periodic demonstrated by the block screen: a light tone consists of small, black dots on a white surface; a dark tone is the reverse. Between them is the arithmetically exact grey tone: a checkerwork of black and white squares of equal size. Thus, from light to dark, the screen undergoes a transformation from circle to square to circle, in which process the form changes as steadily as the tone.

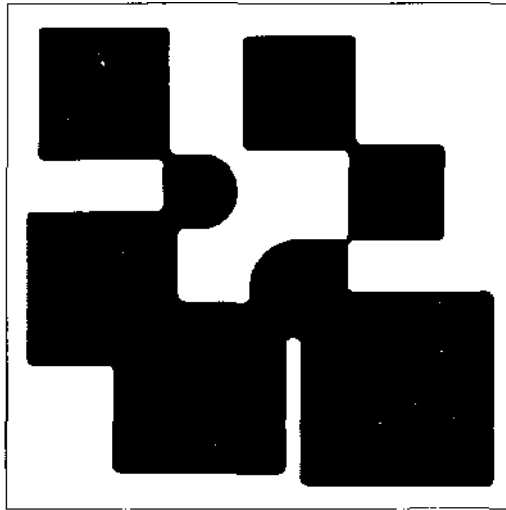
In the colour block there is the added fascination of the colour mixture: out of 4 colours (yellow-purple-cyan-black) all the colours can be produced periodically simply by manipulating the size of the half-tone screen dots.

What could have been more logical than to take the screen itself as a sign programme for a block-making factory? Fig. 34: the minimum form declared to be a form is integrated into a larger whole in the other three examples (advertisement subjects).

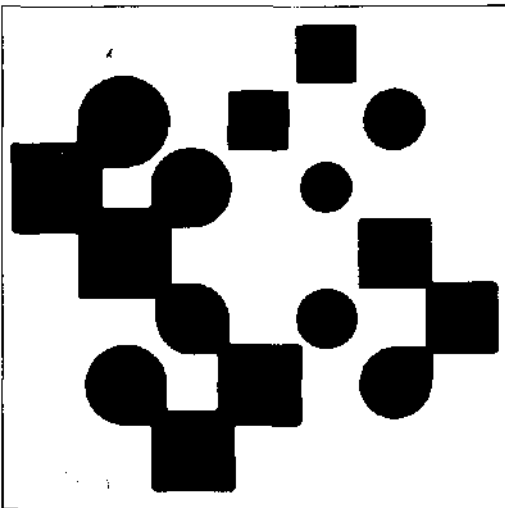
34



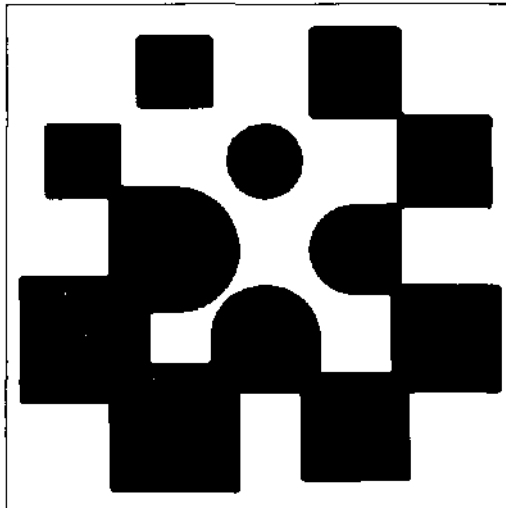
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37



36





*Programme as Photography*

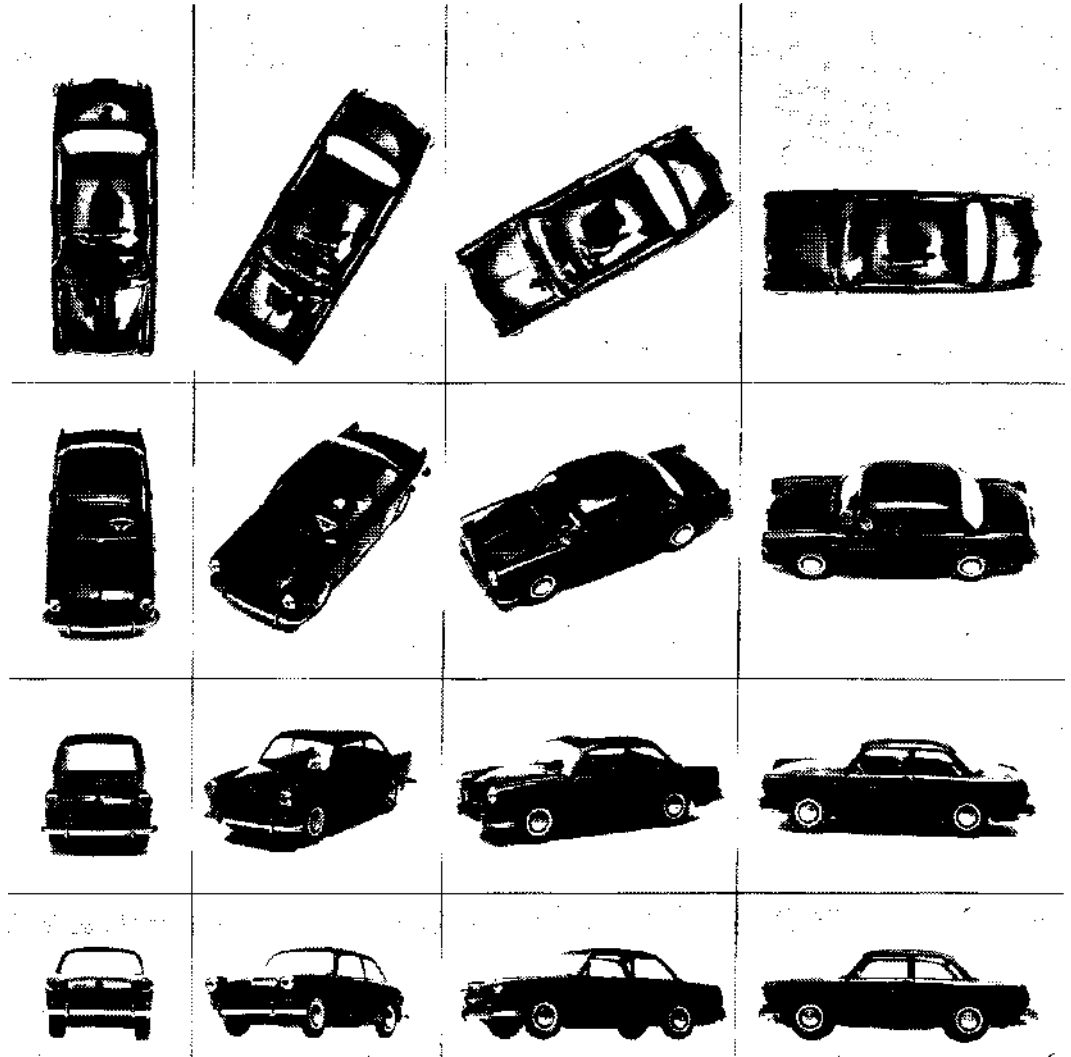
The fact that the elements of the visual are periodic, and that the periodic is an essential part of programming, finds its confirmation here: a photograph put together from photographs. The car is photographed from different angles, the positions of the camera being fixed periodically in accordance with a certain programme. The effect is an imaginary movement in two dimensions at the same time.

The periodic applies not only to the perceptible but also to perception itself, to sensory experience. True, our experience of the world is mediated to us through only two eyes, but our eyes are constantly moving in our head, with our head and with our body. That is the experience of space and time which (mortals that we are) we apprehend as being continuous.

Which is another point I wanted to make: the picture is a good illustration of the problems raised in this book. To see a thing in various perspectives; to select the viewpoints so that the views (cumulatively) produce a new whole. In the illustration below a programme has been made out of this approach, and as far as the book is concerned, a virtue has been made out of necessity.

Designing programmes: why is it so difficult to define what is meant in a nutshell. The subtitle: instead of solutions for problems programmes for solutions is more exact, certainly, but scarcely more graphic. The position is probably this: there can be no clear concept of something which, while not new, is not yet firmly fixed in the conscious mind; that is to say, which is still unclear in itself. This introduction, Gredinger's introduction, the whole book is nothing but a definition in different perspectives. Perhaps the title will take on substance as the reader goes through the text. Perhaps the words will become a concept? That would be ideal.

38



14.15

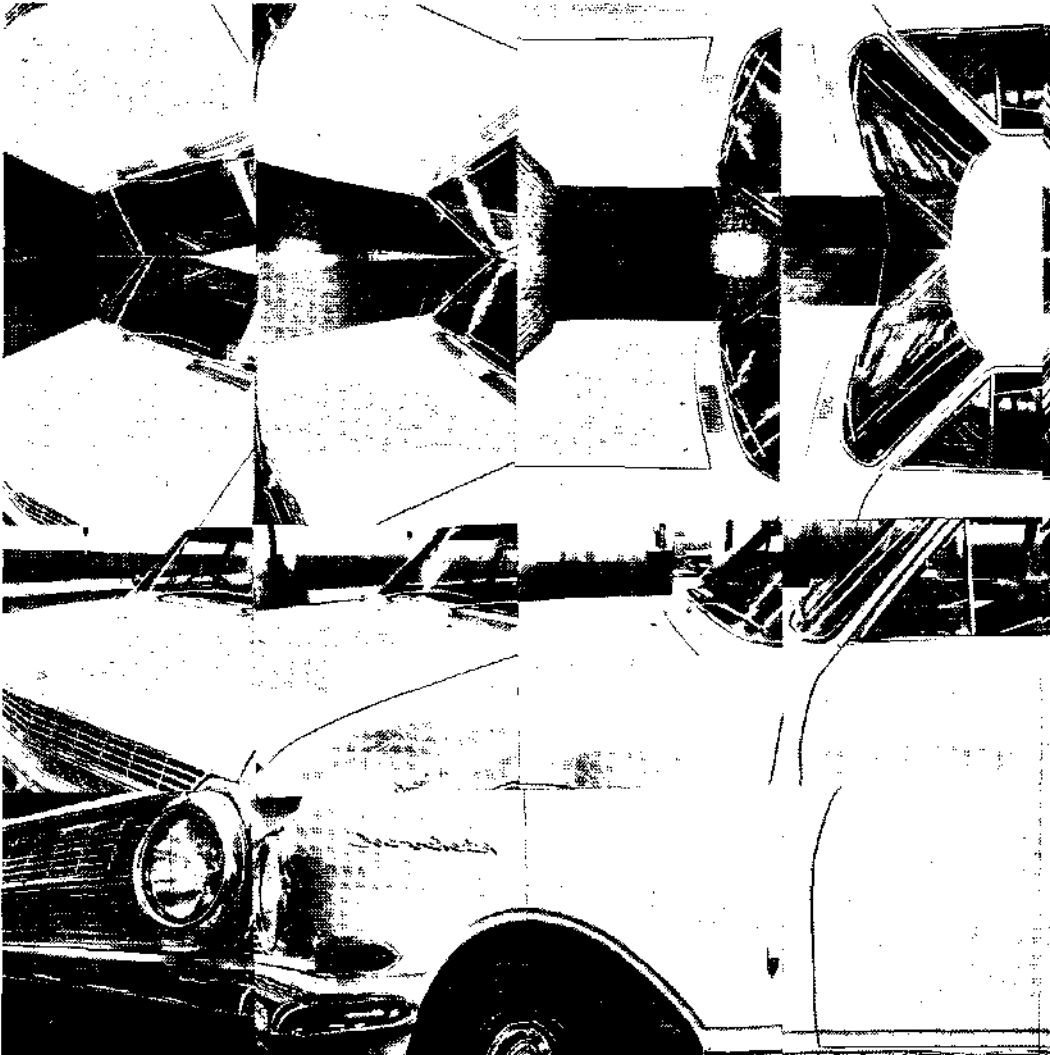
*Again: Programme as Photography*

The photograph below shows what might be termed a metaphysical view of the same object, viz. a car. It is an extract from a "pastework picture" by Vera Spoerri.

"No one has yet seen a table as it really is", says the mathematician Andreas Speiser, "but always only a part view relative to the point from which it is viewed. The table itself is an unalterable object which constantly appears in a variety of aspects. It is therefore an invariant, an unalterable, in an infinite number of pictures. Let us remember this law: in the apparently unordered sequence of our visual ideas appear invariant structures, these very objects in space; these ideas are by no means voluntary but linked through the operation of a law with existing objects, they are conditioned by something absolute and therefore relative to this. Mathematics can create such relations a priori, and the theory of relativity is born, but it is actually an invariant theory."

However much this picture may differ from the picture on the left, the differences between the two underlying programmes are small. Thus: on the left is the full view of the car, here are parts of the car photographed from periodically fixed viewpoints and pieced together. In both cases the points from which the car is viewed are virtually the same; the distances away are different: farther away on the left, closer here. In both cases the beholder sees different views of the body - from in front, from the side, from above - in the flat. That is to say, what is in reality perceived spatially only at different points of time is here experienced simultaneously.

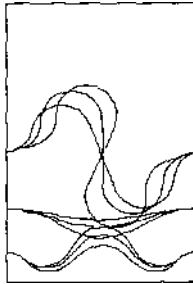
(Perhaps it may even be possible to bring off the trick of not only showing a full view of the car from outside but also doing away with the contrast of inside and outside. The camera would not merely wander round the object but through it. It is the same principle as the Mobius band. It is a question of programming.)



*Programme as commercial design*

Problem: to design packs for three washing powders. It must be remembered that each of them has its own "brand personality" and yet they all belong to the same family. That is to say, a basic form must be found which allows the three variants to be sufficiently distinctive and at the same time sufficiently alike.

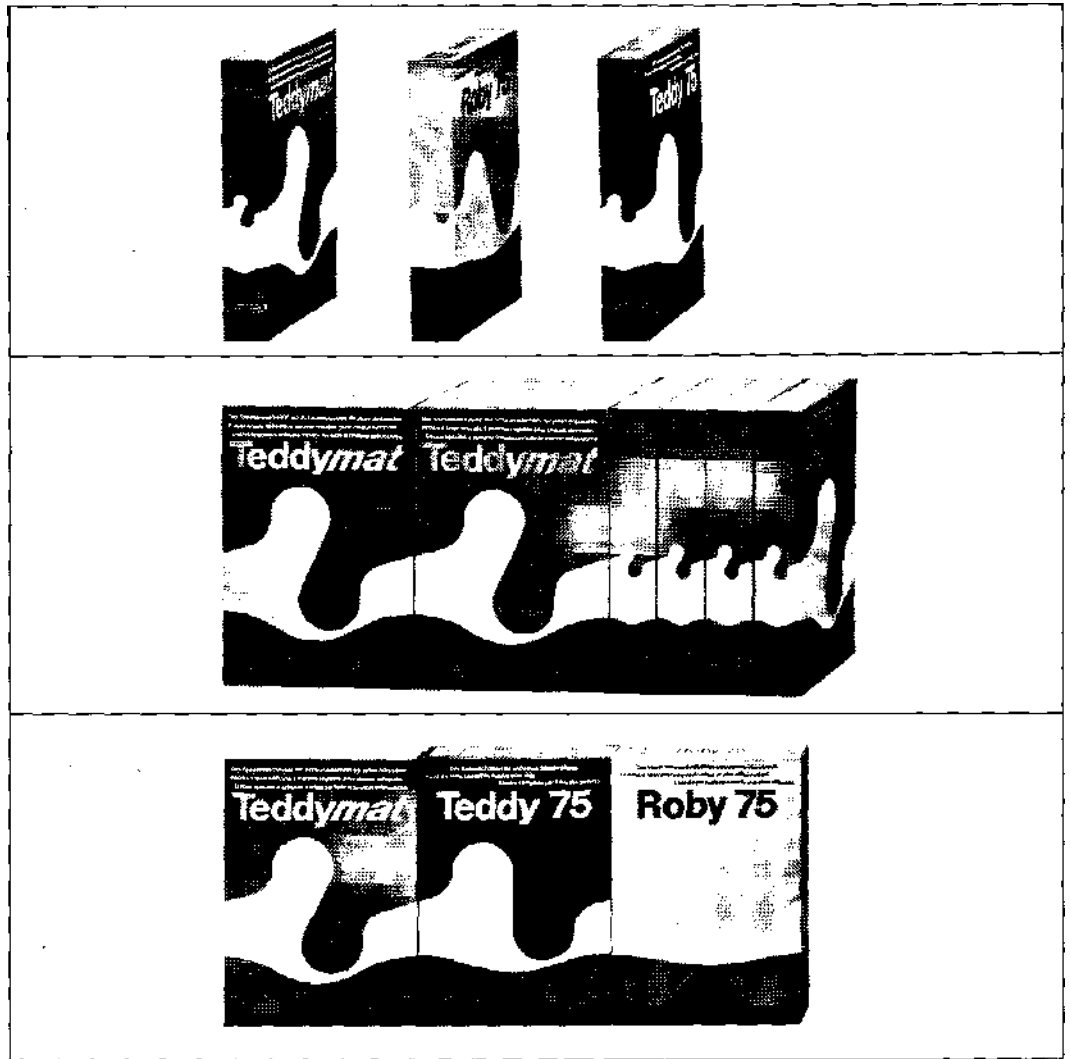
Programme: waves with a different pattern of crests and troughs and overlaps in each pack.



In addition a cumulative effect was wanted. Packs of washing powder are bought chiefly in self-service shops and must therefore make their own impact. He nee the poster-like "presence" had to be maximized: the three packs together had to add up to something more than just the sum of three packs.

Solution : The waves form a continuous pattern over the different packs. This occurs irrespective of whether the packs standing side by side are identical or different. It also occurs when the ends and faces of packs are placed side by side.

To say what goes without saying: this programme deals only with formal problems, the solution of which (in this instance) is without any intrinsic significance. What is crucial, of course, is that the formal programme should square with the psychological one. But that raises questions which we have not space enough to go into here.



*Programme as computer graphics*

The illustrations below show pictures from the series 201. They came into being in 1966 and are the work of Frieder Nake, who is per sea programmer at the computing centre of the Stuttgart Institute of Technology.

He writes:

*Visual objects generated by computers and drawn by automatic drawing machines are solutions of aesthetic programmes which are written by human beings and implemented by machines.*

*Una (more or less subjective) selection process, a person decides on a certain class of visual objects. In concrete terms this means: the elements are fixed which are to appear in the picture or pictures. In the examples below: horizontal or vertical lines of equal length.*

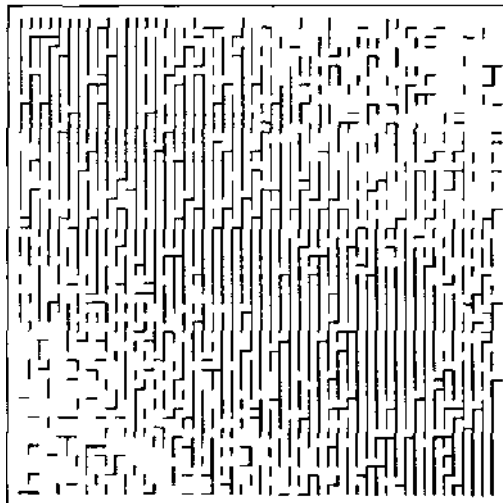
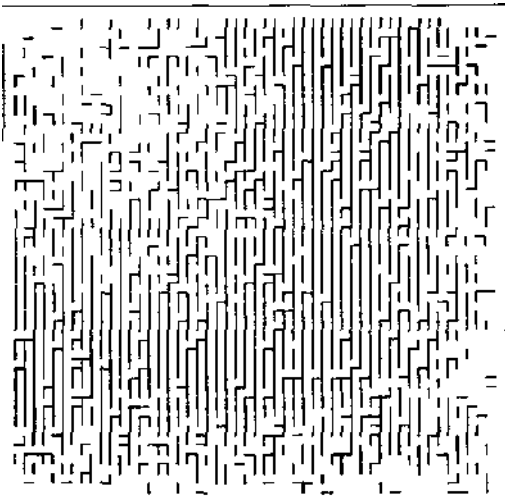
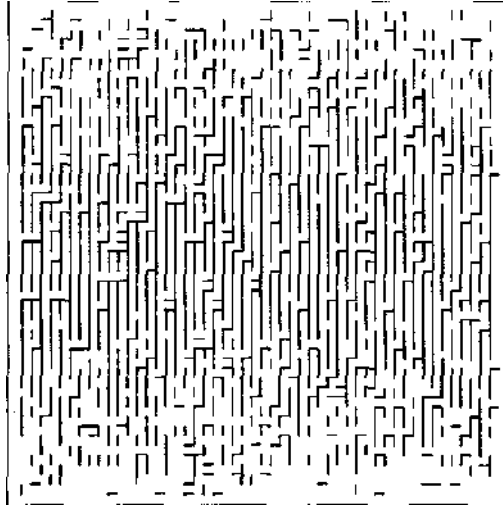
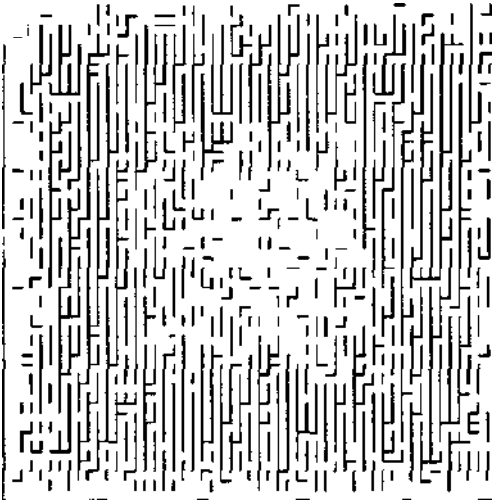
*2. He or others then formalize the problem radically so that it is suitable for the programming of an automatic production process in which man is involved simply in an ancillary and not a decisive capacity. This means that all the concepts arising (colour, form, completion, selec-*

*tion, proximity, relation, tension, frequency, etc...) must be translated into mathematical language. When the problem has been formulated in mathematical terms, it is translated into a text which the computer can understand. This translation is the "programming of a computer". For this purpose a "programming language" is used, e.g. ALGOL 60. In this language we find sentences like:*

```
"for" i: = 1 "step" 1 "until" n "do"  
"begin" x: =choose (mx, x1, x2); y = choose (my,y1 ,y2);  
Z: = choose (mz,z1,z2); draw (x,y,z)  
"end".
```

*3. The programme is delivered and passed onto modern computers which, working in conjunction with drawing machines, ensure that the process is carried out automatically and deliver the finished visual object.*

*The use of chance generators plays an important part in this process since they simulate imagination, variations and series formation. A programme can be repeated virtually as often as desired without the same result ever occurring twice. F.N.*



*Programme as movement*

"All elements of the visual are periodic, i.e. capable of being programmed at will". I was glad to have an opportunity to write a commentary on this theme. The opportunity was offered by the periodical "Graphic Design", from which the following extracts are taken. I am, however, replacing the expression "periodic" by "continuous"; it is more apposite and precise.

Numbers are continuous: 1-2-3-4-5-6-7-8-9-10... The step between 1 and 2 is precisely the same size as that between 9 and 10. The steps can be refined ad lib.: 1-1.1-1.2...2 without the step between 1 and 2 being altered.

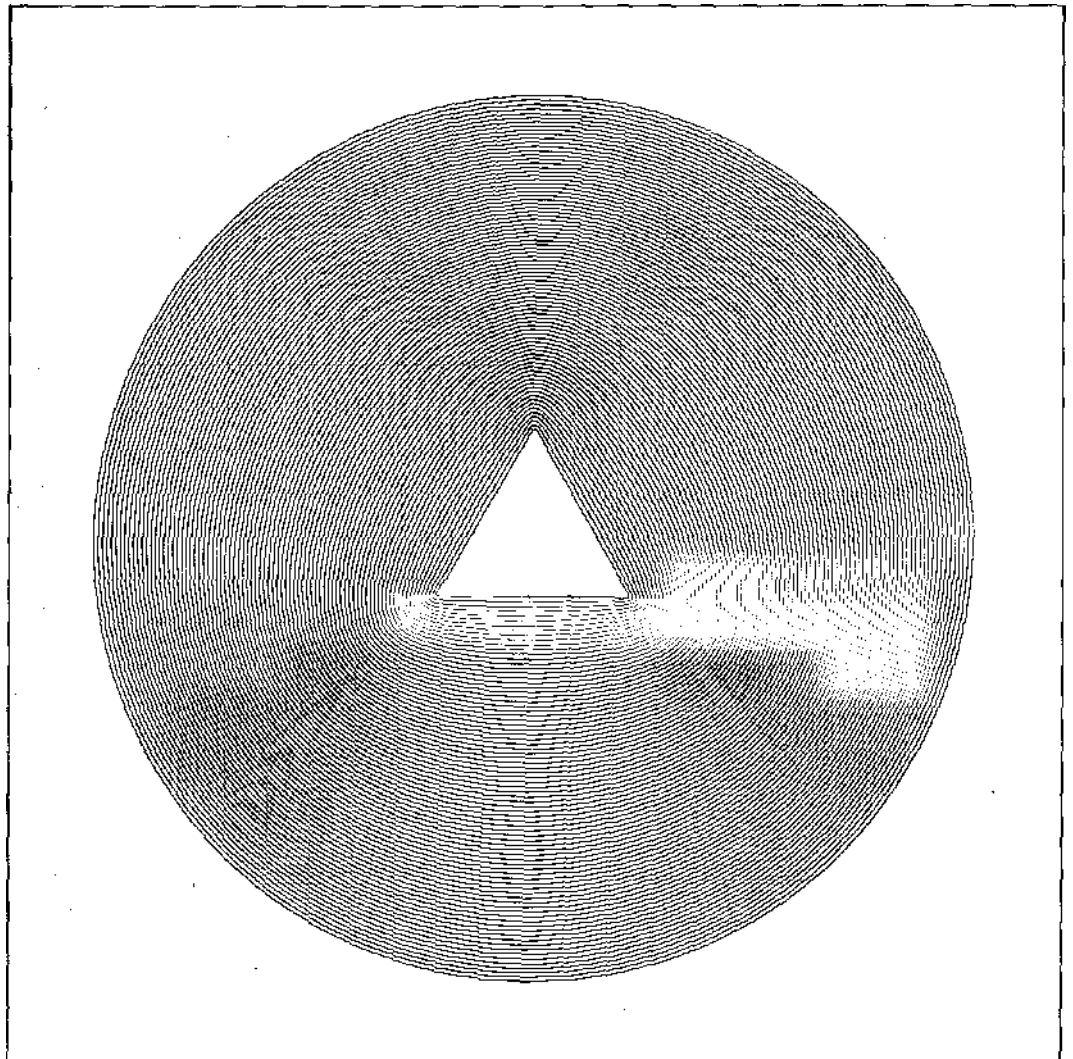
This truism about numbers is also true of colours: colours are of their nature continuous. A series from white to black, e.g. in ten steps, each step the same size as the next and the one preceding it. Here the question is not one of counting but one of measuring. What is measured is the distance between two points. Between white and black there may be ten steps, or two, or two hundred (the human eye cannot distinguish more): a

certain grey will always occupy the same place, an exactly intermediate shade of grey will occupy a place exactly in the centre between black and white, and so forth.

But not only white will pass over continuously into black but any colour into any other colour. Colours form a closed system.

But not only colours *but all the elements of the visual are continuous*. Any form can pass over into any other. Any form of movement (a bird's flight for example) is a process of continuously changing forms, only in this case the change is "fluid". It is because any movement can be resolved back into single forms = phases that the film is possible: it consists of 24 static but continuous single pictures which, when projected, again create the illusion of movement.

I am indebted to Mitsuo Katsai, Tokyo, for an example of a continuous change in the field of elementary geometry: he caused a triangle to merge "imperceptibly" into a circle.



*Programme as squaring the circle*

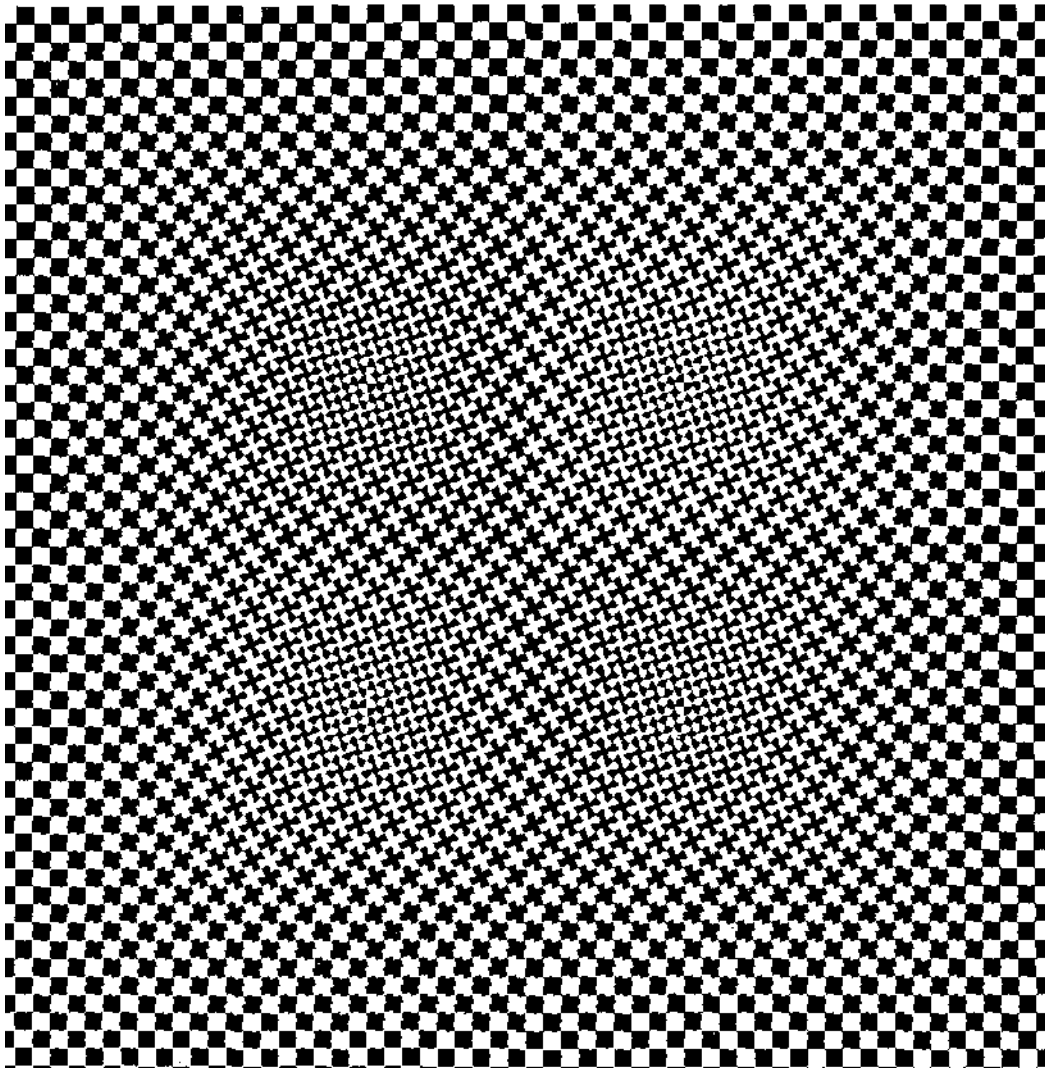
The development of colour systems is the concern of account in the book "Farbsysteme" by Giinter Wyszecki, Musterschmidt Verlag Gottingen, 1960). scientists. There are special theories of proportions, ornamentation and so forth. There is also a morphology or theory of form (by Wilhelm Ostwald, see p. 8). But there is no general system of forms and volumes. I do not know whether a system of correlating form and colour has ever been attempted. It seems strange that it should not have been when we remember that it is very largely through volumes, forms and colours that we experience the world. I think that continuity would occupy as central a position in such a system as in the system of colours. I will illustrate what I mean by taking an example "from life".

Any kind of growth can be conceived as movement, that is to say a change of form and colour in the smallest steps. Now, out of a white egg develops a black tad pole, from which develops a green frog. The beginning and the end of this process are different, very

different. But the intermediate steps cannot be directly perceived. Why not? Precisely because the development is a continuous one.

But "constancy" is not the same thing as "continuity". The circle/triangle figure is continuous, to be sure, but is not constant. I would say that the steps are larger near the triangle than near the circle. This is not a value judgment but emphasizes that both continuity and constancy are controllable at will. In this case as with all visual elements. There is not only a circle to be made into a triangle but also a circle to be squared, as careful examination of the work below will show.

(This, by the way, is an excerpt from a project I began ten years and shall probably never complete. I wanted to make an "optical torture room": a room with a round chequer design in which the pattern changes continuously in every possible way. Just as circles grow out of black-white squares here, so colours, volumes and textures arise in other variants.)





Again: Programme as literature

the ultimate poem by Emmett Williams:

*What it amounts to is an eternal project, and, at least for most of us, eternity is more time than we have at our disposal for perfecting works of art. Besides, these days there are far more important things to achieve.*

The procedure:

7. Choose twenty-six words by chance operations, or however you please.
2. Substitute these twenty-six words for the twenty-six letters of the alphabet, to form a working alphabet of words.
3. Choose a word or phrase (the shorter the better) as the first line of the poem.
4. For the letters of this word or phrase, substitute the corresponding word in the alphabet of words.
5. Repeat the process with the result of (4).
6. Continue the process.

*In the 1966 version, I chose an alphabet of words which reflected some of my preoccupations upon returning to*

*the United States after an absence of seventeen years.*

*For the first line of the poem /chose IBM, a tribute to the muse's assistant.*

*In the first substitution, these three letters yielded*

*red up going  
in step (5), the ten letters of these three words blossomed into*

*perilous like sex  
yes hotdogs  
eviljesus red black devil*

*The forty-six letters of these ten words in turn produced forty-six words, these forty-six words two hundred and fifteen, these two hundred and fifteen words a thousand and fifty, and so on, quickly multiplying by thousands and millions.*

*To thicken the plot, and relieve the monotony, the alphabet of words shifts twenty-five times (the "a" word becomes the "b" word, etc.), so that there are twenty-six versions of the poem. Samples of the beginnings of two versions are shown below:*

IBM

RED UP GOING

PERILOUS LIKE SEX  
YES HOTDOGS  
EVIL JESUS RED BLACK EVIL

HOTDOGS LIKE PERILOUS RED KOOL JESUS YES ACTION  
KOOL RED TICKLISH LIKE  
ACTION LIKE DEATH  
NAKED LIKE ACTION  
OLD JESUS VIRGINS SEX JESUS EVIL ACTION  
LIKE EASY RED KOOL  
ZULUS LIKE ACTION YES ACTION  
PERILOUS LIKE SEX  
UP KOOL MONEY IDIOTS TICKLISH  
LIKE EASY RED KOOL

IBM

QUIVERING NAKED ZULUS

BLACK PERILOUS QUIVERING ACTION UP JESUS QUIVERING TICKLISH SEX  
TICKLISH DEATH OLD UP MONEY  
FEAR PERILOUS RED PERILOUS HOTDOGS

NAKED RED DEATH WHITE OLD  
GOING UP JESUS QUIVERING RED KOOL PERILOUS HOTDOGS  
BLACK PERILOUS QUIVERING ACTION UP JESUS QUIVERING TICKLISH  
DEATH WHITE COMING QUIVERING KOOL TICKLISH  
COMING KOOL  
EVIL UP HOTDOGS PERILOUS HOTDOGS  
BLACK PERILOUS QUIVERING ACTION UP JESUS QUIVERING TICKLISH SEX  
COMING QUIVERING WHITE OLD RED QUIVERING HOTDOGS LIKE  
JESUS MONEY YES  
COMING QUIVERING WHITE OLD RED QUIVERING HOTDOGS LIKE  
MONEY UP DEATH COMING LIKE  
TICKLISH OLD MONEY  
COMING KOOL  
ZULUS KOOL TICKLISH UP EASY  
IDIOTS UP DEATH JESUS  
GOING UP JESUS QUIVERING RED KOOL PERILOUS HOTDOGS  
JESUS UP MONEY  
GOING UP JESUS QUIVERING RED KOOL PERILOUS HOTDOGS  
LIKE KOOL COMING MONEY KOOL SEX HOTDOGS



Programme as music

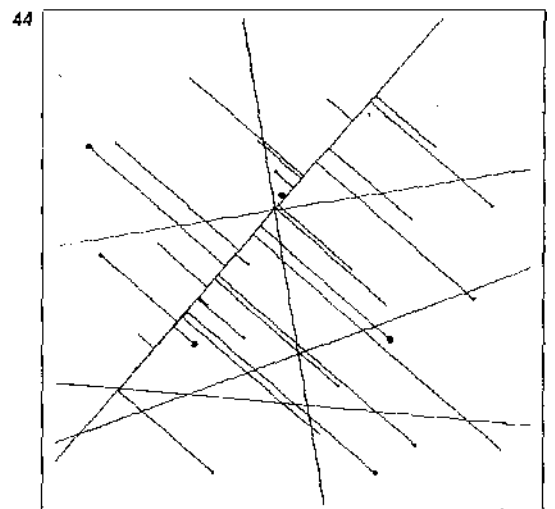
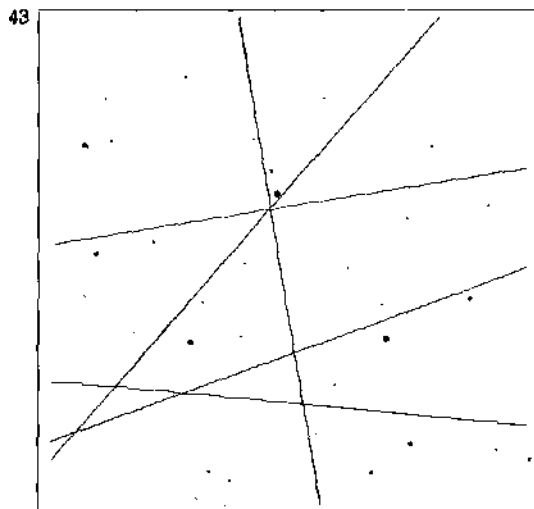
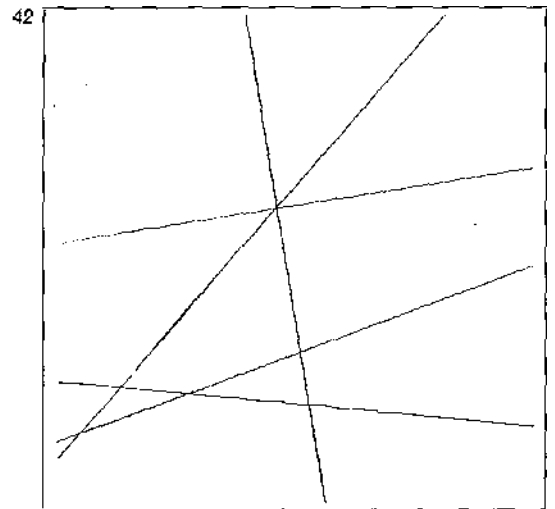
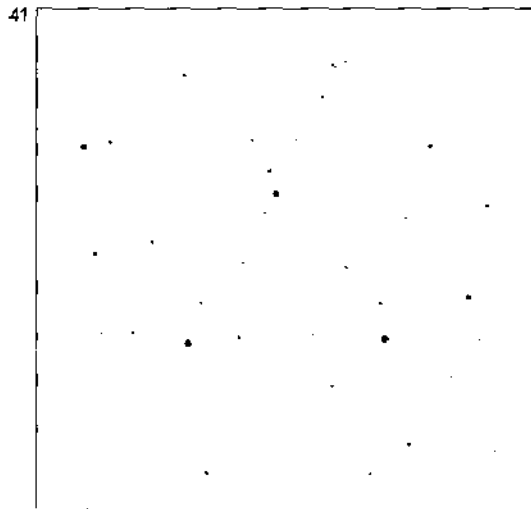
Variations I  
by John Cage  
for David Tudor, on his birthday (tardily), January 1958

Six squares of transparent material, one having points of 4 sizes: the 13 very small ones are single sounds; the 7 small but larger ones are 2 sounds; the 3 of greater size are 3 sounds; the 4 largest 4 or more sounds. Pluralities are played together or as "constellations". In using pluralities, an equal number of the 5 other squares (having 5 lines each) are to be used for determinations, or equal number of positions, - each square having 4.

The 5 lines are: lowest frequency, simplest overtone structure, greatest amplitude, least duration, and earliest occurrence within a decided upon time. Perpendiculars from points to lines give distances to be measured or simply observed. Any number of performers; any kind and number of instruments. J.C.

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Figs:  
41 the square with dots, 42 one of the 5 squares with 5 lines, 43 the lined square placed over the dotted square and 44, the dots connected by perpendiculars to one of the lines.



Again: Programm as music

Nr. 14 "Plus Minus" by Karlheinz Stockhausen, 1963

Explanations:

1. There are 7 pages of notes and 7 pages of symbols.
2. One or several interpreters can realize one or several layers with these 14 pages. Up to 7 layers can be combined.
3. A page of symbols is to be applied to each page of notes.
4. Symbols in a square signify one musical event.
5. The symbol pages and their numbered events should follow each other continuously.

○ "Zentralklang" (centralsound) corresponds to one of the chords (I-VII) on a note-page.

- ▼ short
- ◆ medium
- long
- ?

"Akzidentien" (accessories to the Zentralklang) before, with the beginning, during and (or) with the end of the Zentralklang are indeterminate in pitch, but should match the register of the Zentralklang.

1 2 3 4 5 6  
"Nebennoten" (secondary notes) correspond to the groups 1-6 on a note-page. They are used before, with the beginning, during and (or) with the end of the Zentralklang.

- as fast as possible
- accelerando
- ritardando

6. There are 7 types of events.

⚡ = Kurzes Trämolo (Triller); bei IS schnell repstieren.

entweder  
either

oder  
or

*Programme as architecture*

Building system by Schwarz, Gutmann and Gloor, architects, Zurich, and Heinz Hossdorf, engineer, Basle, with Plensky + Zblner, building contractors, Frankfurt.

To programme dwelling units is first and foremost an economic problem. The smaller the number of elements, the more economical the system the ideal solution: a single "building block"-a cube the size of a minimal living space.

This cube in turn is determined by economic criteria: how big must it be if transported, erected and lived in with reasonable comfort? Here the dimensions are: 4x4x2.5 metres; dimensions of a room and equally the modular unit of the system-Fig. 1.

The cube is made of reinforced concrete. The four corner columns bear the total vertical load. They are joined together by thin walls ribbed for extra strength, a load-bearing interfloor, and a thin non-load-bearing slab in such away as to make the cube a spatial supporting structure.

This cube can be used to extend the room at will. Cubes can be added horizontally, the space between the cubes being used for insulation and to accommodate services-Fig. 2. Vertically the cubes can be inserted one into another in the manner of coffee cups, the number being limited to eight storeys for static reasons-Fig. 3.

The possibilities of the cube may be specified as follows: it may be used as a frame for building un-walled rooms of any size-Fig. 4. Or it can itself be subdivided-Fig. 5. Doors can be inserted at any point between the ribs of the walls-Fig. 6-or windows put in as required-Fig. 7.

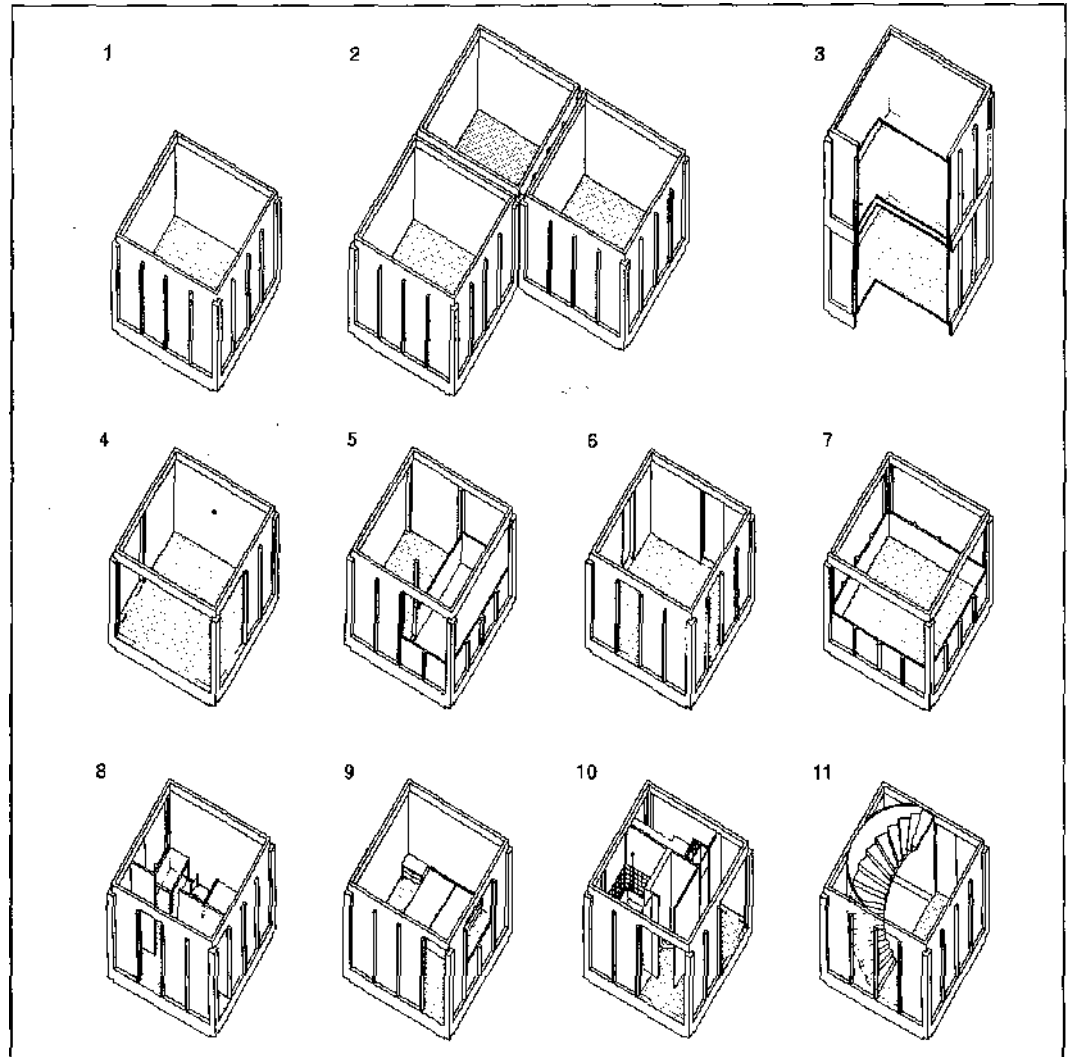
The units can be designated as a living area: as day rooms, work rooms, bedrooms and living rooms-Fig. 8.

Or kitchen and terrace in one unit-Fig. 9.

As bathroom and corridor-Fig. 10.

As a staircase-Fig. 11. And so forth.

Fig. 12 shows how units can be combined in "double harness".



*Programme as production process*

The aim of programming the housing system of Schwarz, Gutmann and Giooris in principle to produce the maximum variability with the fewest possible units, developed from the basic functions of living and with the aid of these the most diversified demands can be satisfied.

If this kind of architecture is to be put into effect, it must be programmed not only with the idea but also with the process as the starting point. It is not only the result that counts but also the route by which it is reached: industrial mass production. A word on the subject of production and programme.

On this point we might quote Peter Behrens and H. de Fries: "Evidence of the correctness of these statements... may be found in Edison's experiments to cast whole houses including bath, staircase, and chimney-piece by pouring a concrete mixture into prepared iron moulds. The inventor believed it would be possible to accomplish the work in twelve hours." Taken from an essay "Vom sparsamen Bauen"- c.1918.

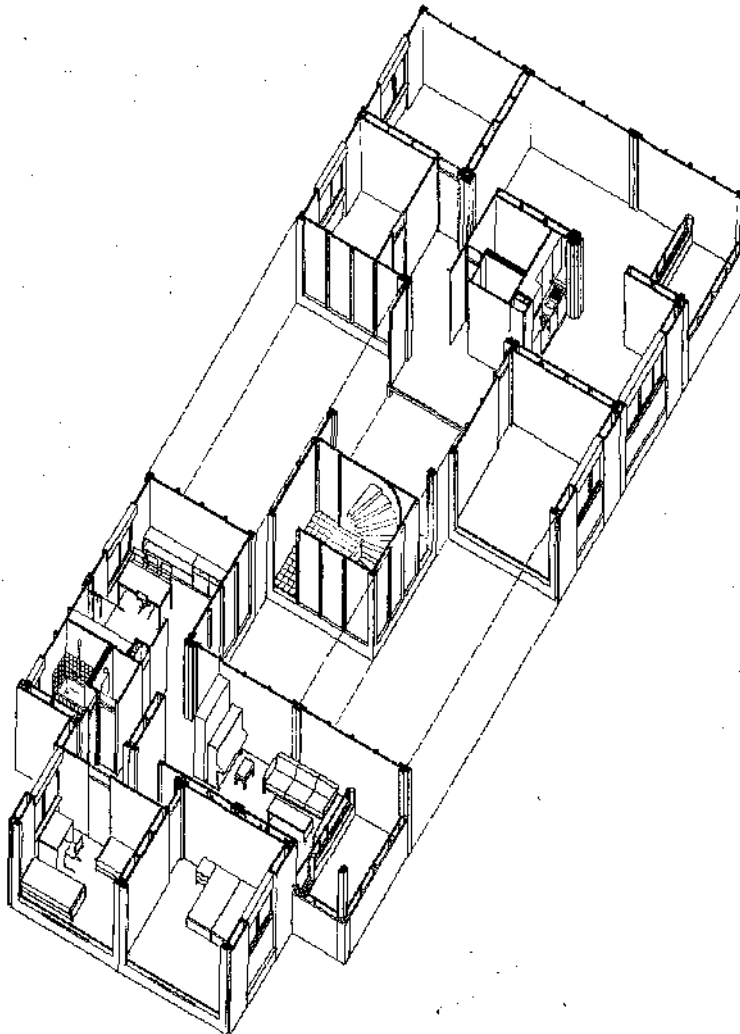
However fascinating Edison's experiment might have been at that time, large series of products in the early days of industrialization were inseparable from monotony of form. Today the position is quite different. Electronic control now makes it possible to design programmes, i.e. processes, which combine optimum rationality with optimum freedom of choice.

In every instance the principle consists in developing elements to the highest possible technical and aesthetic standards and evolving the rules for arranging them in any desired combination.

In this connection another principle leaps to mind when we think of architecture. A house is not to be built just for a lifetime (and the following generations); it can be constantly altered from top to bottom to meet changing needs virtually without anything being forfeited in the process.

*So programming does not merely rationalize life in the sense of cramping it; on the contrary it makes it richer, it is processes that are rationalized. The result is freedom and movement. And deliverance from the need to make decisions "for good".*

12



Programme as city planning

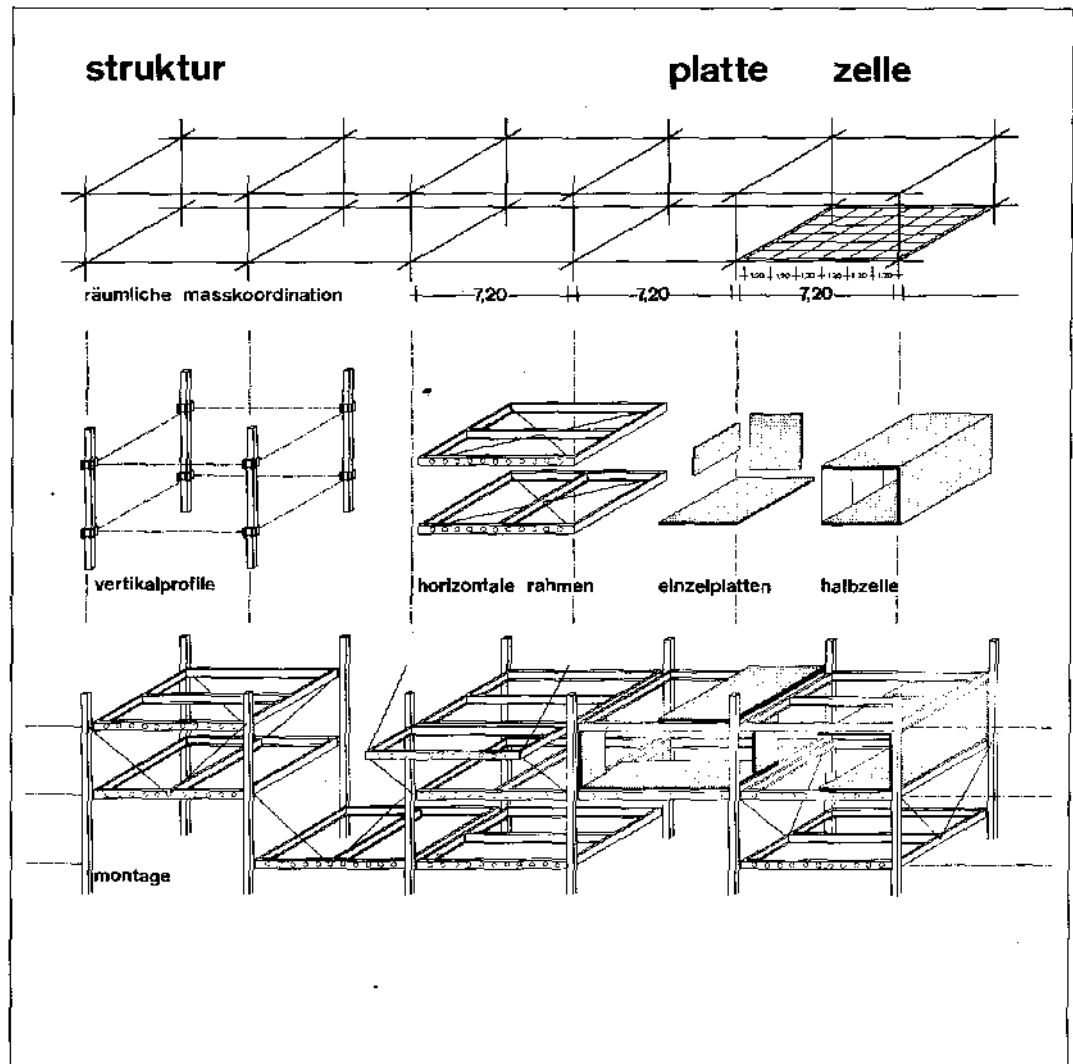
Extract from the periodical "Capital" (No. 3/1967)  
"At the beginning of April a helicopter will fly six plastic capsules to the grounds of the Otto Graf Institute of the Stuttgart Institute of Technology. This is the start of a new adventure in architecture: technicians, sociologists and psychologists will test what life is like in synthetic living units measuring 7.2x 3.6x2.8 metres.

"Whole cities are to be erected with these plastic capsules. To this end three architects last summer founded the 'City Planning Systems Company for Research and Development Ltd.' in Wiesbaden. They are Rudolf Doernach, 38, formerly assistant to the famous American architect Buckminster Fuller; Hans-Joachim Lenz, 41, winner of the first prize in the competition for the Euratom Institute for Transuranic elements in Karlsruhe; and Eckhard Schuke-Fielitz, 38, Deubau prizeman of the City of Essen.

"These way out architects have discovered affinities between man's biological system and the living conditions he desires. The human system of bones/organs/brains is paralleled by the urban system of framework/living-unit/control.

"City planner Rudolf Doernach has concrete ideas as to how such a dwelling system will look. He says: 'To start with, one buys one's living capsules for, say, 30,000 marks and hangs them up on the framework near the centre of the city. Later one can load them on a truck and take them to the quieter outskirts. On retirement, one loads one's living unit on a helicopter and flies it to Majorca.'

"The supporting framework for these living units will consist of steel or concrete posts and beams. Instead of renting flats or rooms, one will hire space in which to hang one's living unit as one wishes. 'There will be plenty of scope for variety,' architect Lenz promises us; 'for instance one room can be rigged out as a front garden'."



*Programme as design for the future*

"City planning systems" do more than just provide dwelling houses. "Paths and roads will also be incorporated in the supporting framework as the volume of traffic requires. AM service mains such as hot and cold water, heating, power, telephones, antennae and drainage will run along the posts and beams."

The illustrations below show the system as projected for the University of Bochum. The upper picture clearly shows that even contingencies are programmed: the complete flexibility of the structure enables the university to be altered inwards and outwards in every direction as its various needs develop.

The example of this university clearly spells out the principle: "in this new conception of city planning man is no longer adapted to the layout of buildings and town but these are adapted to man."

Doernach, Lenz and Schulze-Fielitz see their programme in the context of the complete urbanization of the earth.

Today 50% of humanity live in cities: by the end of the century the population of the earth will have developed and 90 % of them will be urbanized. Population growth will be concentrated in existing megalopolises and agglomerations; small towns will decay; villages will become extinct.

Under the pressure of this development new social structures will come into being and these will find expression in new city planning programmes. Schulze-Fielitz: "Our task is the development and production of *spatial* city-planning programmes with the maximum possible adaptability." He believes that the density of utilization should be maximized not only for economic but also for psychological reasons: "to step up social intensity as a remedy against desocialization and to obviate the malaise of our new towns."

Above all it is mental and spiritual density that is involved: the city of the future is to be literally a framework, objective and neutral, into the voids of which individualized living space can be filled.

