'Programme' as a metaphor for structured creativity in design

- A G Rao

Fig. 1a

1b

N.10 A.150 R:0.7 N:0 Y:0
1c

Computer Science has brought many new 'concepts' into focus. It has expanded meanings of several 'words', often imparting new meanings to them. In fact few words like memory, programme or data-base we only associate with the computer. booking at 'programme' as a metaphor for structured creativity in design is the aim of this paper.

What is a Programme'?

A simple dictionary meaning would say 'a plan of proceedings' or a 'statement of the order of proceedings'. In the computer context programme is a series of logically related instructions to the computer, to solve a problem or to process data. For example we can write a 'programme' in one of the computer languages to draw a 'tree'. Here the programme is a series of specific instructions, exactly telling the computer to draw lines of given length, in given orientation, with a given sequence of order. This 'programme' to draw a tree can create a specific graphic image of the intended tree. But the interesting thing about the computer programme is that it can be written in terms of 'variables'. A 'programme' to draw 'tree' need not have specific instructions on the dimension or direction of the item to be drawn. The programme can be in terms of 'sides, angles and increments'. Such a programme provides only a structure and not the end result. Many tree images can be generated using this programme by varying the inputs. The tree illustrations(Fig. 1) of Izuhara [1] shows such possibilities.

In fact computer programme could be more sofisticated to allow larger variations, like the programme for METAFONT. Donald, E. Knuth, a famous computer scientist and originator ' of METAFONT would say :

METAFONT Programmes are one quite different from ordinary computer programmes because they are largely "declarative" rather than "imperative". In other words, they state relationships that are supposed to hold: they do not tell
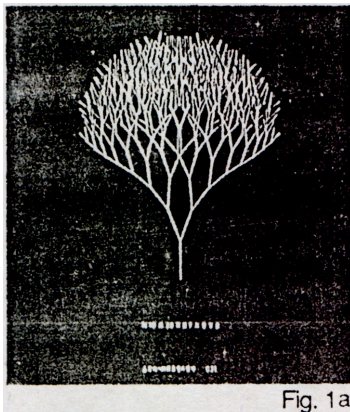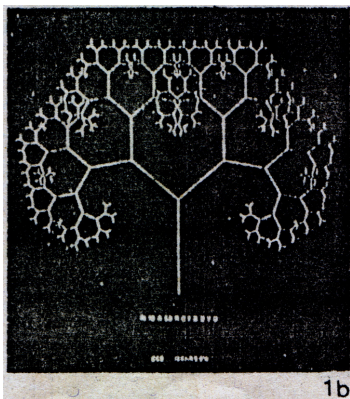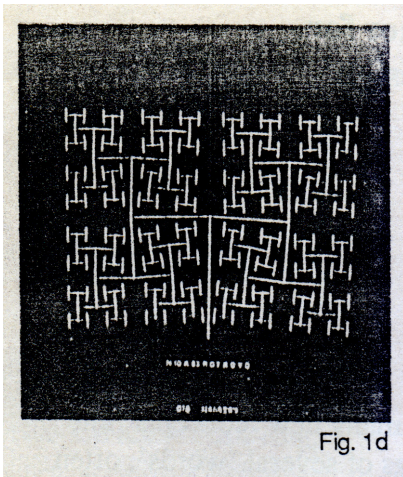
Fig. 1d

the computer how to satisfy these conditions. For example, a METAFONT description might declare that the left edge of a line should occur one unit from left; the programme does not need to state that the centre of the pen should be positioned one unit from the left, plus half of the stem width, because the computer can figure that out. Similarly, it is possible to state that a certain point lies on the intersection of the two lives; it is not necessary to specify how to compute the intersection point." [2]

So a tree programme or METAFONT programme can provide a structure in which the intended images can vary. And these variations can be, as we can see in the tree illustrations, aesthetically pleasing, pleasant surprises.
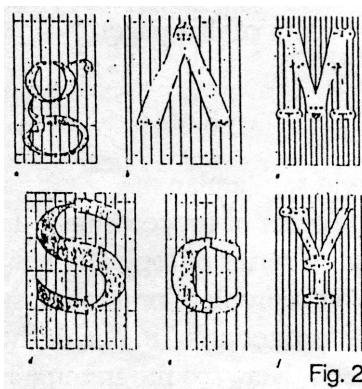

Fig. 2

Similarly Knuth's metaflops (fig. 2) from his METAFONT programme show the unpredictable surprises. With further developments in ' programming techniques' one could predict a greater amount of openness and consequent unpredictability. No doubt, the 'tree' programme or METAFONT programme can only give certain type of variations. These variations are controlled by the type of programme which acts as the boundary.' We can even talk in terms of 'degree of freedom' a programme can provide. Conceptually by creating a suitable programme one can control the 'degree of freedom' in that programme.
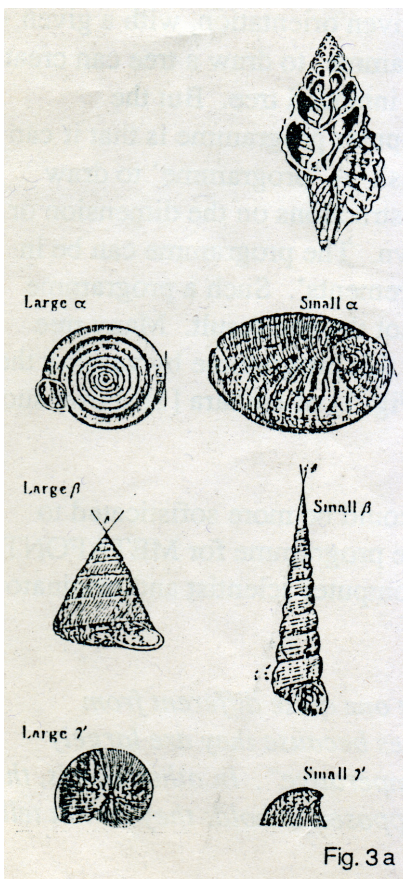

Large α   Small α

Large β   Small β

Large γ'   Small γ'

Fig. 3 a

Nature, which has been the greatest source of creative ideas for designers, exhibits the concept of 'programrne' in a fundamental sense. D'Arcy Thompson,[3] in his classic work 'On Growth and Form' has brought out many examples which illustrate a 'basic geometric programme' in Nature. Variety of shells and homes in Nature (Fig. 3) exhibit a basic spiral programme. Such basic programmes get exemplified when we see the variations in the species related to wood louse.[4] (Fig. 4) ,

We can choose the thought processes of eminent designers for the next area of search. Some of the graphic works of the famous dutch artist M.C. Escher [5] (Fig, 5) is a good example. When we look at Escher's work it becomes obvious that he has a 'programme' behind his works. It does not require great expertise to identify this type of Escher's work. Escher has produced a basic programme with which he has created widely varying master pieces of graphic art.

Once the creative designer is aware of the basic 'programme' of his thinking, he/she may be in a position to invent new programmes. Eminent japanese- graphic designer Sugiura
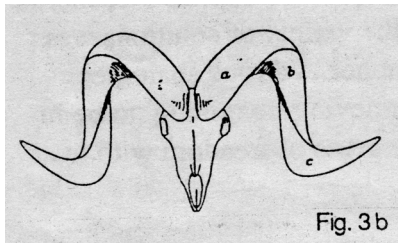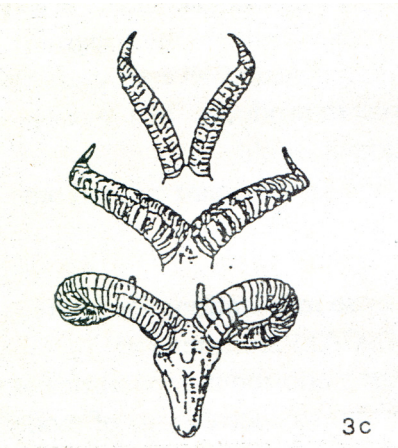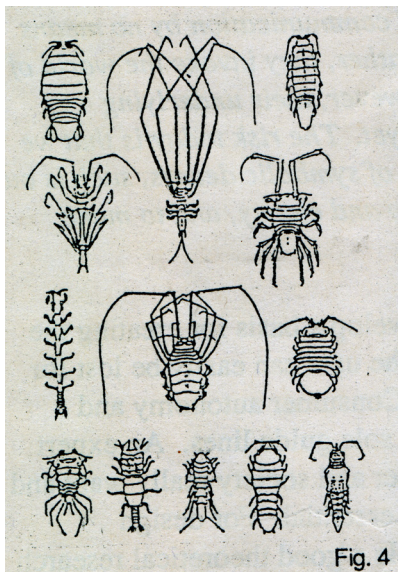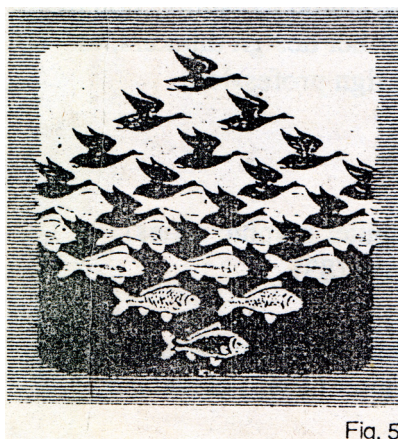
Fig. 3 b

3 c

Fig. 4

Fig. 5

Kohei [6] is such an example. Sugiura is not only clear of "programme metaphor", but does a great deal of research to invent such programmes. In seventies he brought out 'map of a dog' which shows a fascinating way; of representing a perception. But Sugiura's ability to see it as a 'programme' rather than one time creative act is very significant, as it has led to a series of revolutionary perceptual maps. His distorted globe (Fig.6a) has many dimensions of communication. In that 3-D map big cities like Bombay and Tokyo get pulled out to peaks and become nearer, as one can reach Tokyo from Bombay in few hours. Bombay remains farther from a nearby village as it takes more time to reach. His time axis map of japan turns Japan into fragments (Fig.6b). Another of his fascinating works is the map of showing the taste of food.' Sugiura has evolved a programme by which he has produced variety of unique results . Once understood such 'programmes' can be used by other designers to produce creative works. Similarly we can observe 'programmes' being used over long periods in oriental traditional design. Several creative artists have created for generations in the same programme producing significant creative works.

With the above examples and arguments, 'programme as a metaphor' to structured creativity especially for designers seem to have substance.

What are the implication of such a notion to design profession? Two areas, 'design education and future design could benefit from the 'programme metaphor'. I shall describe how this concept had implications in some of the basic design tasks undertaken at Industrial Design centre, Bombay.

An initial task given to Master of Design students [7] with back ground in engineering or architecture was, " To create a flower in square'. Constraints were, to use black and white geometric elements. Figure and ground effects were brought to the focus during discussions in the class. Each student was encouraged to explore the concept of flower in variety of ways, contexts, structures, etc.. 'The results (Fig.7) showed a remarkable variety with in those constraints.

Later the same group was asked to 'create a flower in a cube to be made in plaster'. Again constraints were to utilise the 'cube-space', symmetry and surfaces to full extent. The Results were rather stimulating in terms of variety and Ingenuinity

In the above examples the 'problem with its constraint was a programme. It restricted the students to be with in a boundary.
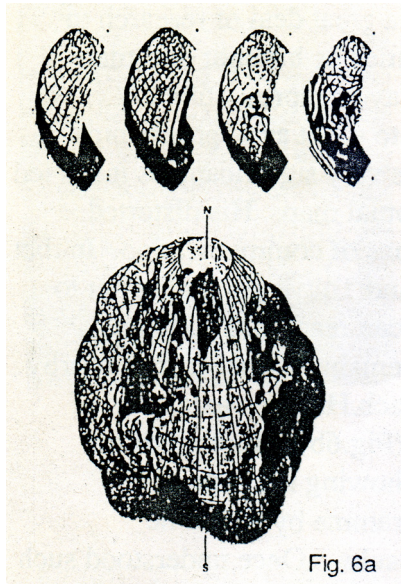
Fig. 6a

6b

Fig. 7

The 'boundary' had a great significance in terms of 'pedagogic content, time & material resources'. An experienced teacher is familiar with this boundary. But the variety of solutions was facilitated by the programme metaphor. Various analogies from Nature, different ways of perceiving imagining to be in an empty cube, etc were seen as degrees of freedom with in that programme.

Earlier I have shown how 'expressions' could produce variety of designs in 'pen'. [8] But later experiments have brought in more clarity to see "expressions in a product" as a programme to learn and create form- variations in products. In a task on "telephone with expressions" students could systematically analyse expressions like soft, hard etc. to come with variety of forms in telephones.
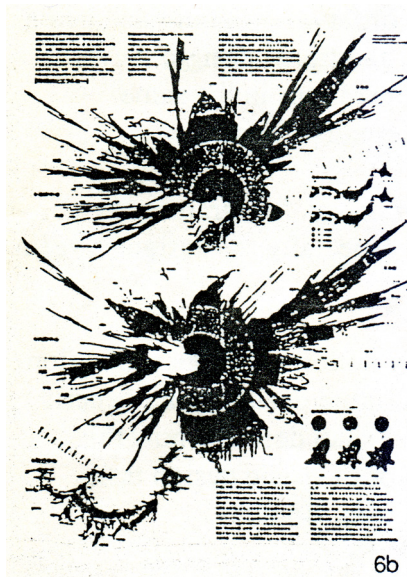
'Programme metaphor' has immense implications for future design. With availability of CAD-CAM facilities and robotisation, Industries are acquiring enormous capabilities of production. It would be possible to introduce dozens of models of a product at a time. We can see the deep concern expressed by intellectuals like Phiilippe Lemoine when he says : " These technologies of information and communication by no means create a clinical atmosphere : rather, they invoke the world of the baroque, of the theatre. However, their underlying aesthetic has no subtle basis as yet. The risk today is that we will be over whelmed by a flood of symbolic decors, such is our need to find identity, authenticity and clarity, and to make signs and signals". [9]

It would be designers task to develop a basis for creating the variety. The manufacturer and the user can easily be lost for lack of reference frame works. Consumer autonomy and manufacturers ability can not be sole guide lines. An expert participation in terms of what user and society really want and articulation of their need will be essential». For design profession to take such expert role a 'good theoretical research base would be a necessity. ' programme metaphor' could easily offer a starting point for further design thinkers, to restructure the creative role of design profession.

References:

1. lzuhara, Eichi; TREE (computer graphic series), Tsukiji shokam Co. Ltd., Japan (83).

2. Knuth,Dona1d. E ; Lessons learned from Metafont, Visible language, vol. xix winter (1985) cleveland, OH 44126.
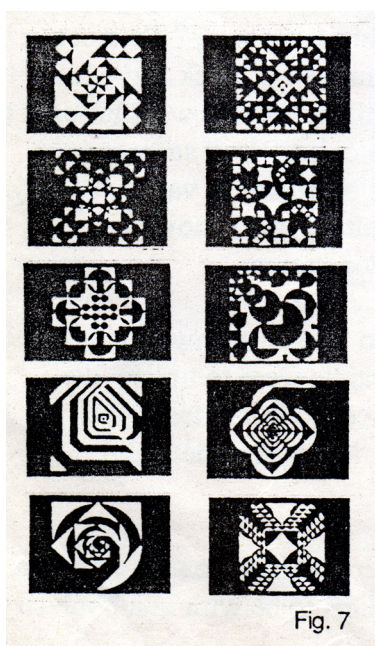
3. Thompson, D'Arcy ; On Growth and Form, Cambridge University Press, London (1961).

4. Waddington, C.H.'; The Modular Principle and Biological Form, in Module, Symmetry, Proportion Ed. by Kepes Gyorgy, Studio Vista, London (1966)

5. Emst, Bruno'; The Magic Morror of M.C.Escher,Ballamine Books, New York (1976).

6. Kohei, Sugiura ; Personal discussions and lectures at I.D.C., I.I.T. Bombay (1971 to 86).+ Rassegna 19 (The legacy of Ulm), sept. 84, C.I.P.I.A.s.r.l,Mi1an. Basic

7. design tasks 'at I.D.C. meet: done with the instruction of A.G. Rao and A. Gaffoo: (@1985-86).

8. Rao A.G. ; Expressions as of -new form in Industrial Design, Abhikalpa l (Ian   Industrial Design Centre, I.I.'I'. Bombay - 400 076.

9. Lernoine Philippe ; ' The demise of classicle rationality' in Design after Modernism, Ed. John Thackara, Thames and Hudson, G.Britain (88) D