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SPACE NETWORKS: TOWARDS HODOLOGICAL SPACE DESIGN

FOR URBAN MAN, STARTING WITH A COGNITIVE/PERCEPTUAL NOTATION.

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ACKNOWLEDGEMENTS

Work on Space Networks, which began in the Academie Royale des Beaux Arts, Bruxelles, Belgium, during and after the 1968 Contestation -des-etudiants, has been continued in this University from October 1971. It has been supervised, briefly, by P. Crofts, senior lecturer in this Department, then, bravely, taken over by Professor of Architectural Science, Director of Building Science, C.B. Wilson.

Research of course isn't done in a vacuum, and in this case, both long term vision, and day to day survival have been very evident. The concept of Networks determined also the way work was structured, done and written. Many people answered queries, related, gave encouragement. Among them, Ekistics (Athens, Greece) Vice-President P. Psomopoulos, and University of Seattle (Washington, U.S.A.) Arch. Professor Ph. Thiel, and research student (previously of Kingston Poly, now U.C., London) Linda Clarke.

This University, through my supervisor, supported the research financially for the last two thirds of time (as well as my participation to the LUND, Sweden, 2nd Inter. Arch. Psychology Conference). Also and although unfortunately, the mechanism for interdisciplinary work isn't here, the people were. Dr Trevarthen of the Psychology Department, has been generous, and his work stimulating. In addition, my relationship to a group of students of this Department, as tutor, researcher, and friend, has been (for both I can claim) fruitful and enduring.

My supervisor, Professor Barrie Wilson, told me lately, after having patiently read, corrected and advised on this thesis, that my work requires faith on the part of the reader. So it does. It also demands participation, and a sharing in the belief that Architectural

Research should go beyond the-Art-of-the-possible. Or as otherwise he, and Chris Jones, (Professor of Design, The Open University) put it in a February meeting here: "You have more permission than you think".

Future work on Space Networks, especially Design application, remains my responsibility.

Mit,

June, 1974.

ABSTRACT

The main purpose of this thesis on Space Networks is to make a contribution to urban design. Aiming at the level of the urban designer's or architect's prestructure (after the site has been seen, and before any plan/section/elevation drawings are done), it is meant for those designers involved in research themselves, and who accept the idea that they are, in a way, the first users of what they design. The additional purpose is to provide a sociological, psychological, and spatial scale context for dynamic design. Space is looked upon as a network. Where the space-of-possible-movement (taking the shortest/most agreeable/most energy demanding/etc way, depending whether you are in a hurry/strolling/exercising yourself/etc respectively) is called Hodological Space. Movement -through-space-with-intention is used as a generator for design. We start with a proposed cognitive/perceptual notation of four spatial conceptual components: First with Section-Perspective (by which we do away with the facades, and considering the building not in isolation--in the form of an endless isometric). Then the Tube (employing the anticipation, cognitively, of the projecting brain of man for his path of action), and also the Sequential (progressive sequences) and Binary (visual contrasts of 'wholes')--these perceived as man moves through his Hodological space.

There are six Chapters and an Appendix. Chapter I is introductory, and its three parts are extended in the Chapters that follow: Movement Through Space in Chapters 3 and 4, Space-Movement Notation in Chapters 5 and 6, and the Intended Fieldwork And Pilot Questionnaires in the Appendix. In Chapter 2 the clarifying distinction is made between space for activity and space for profit. Which issue, far from a refinement, shifts the problem back to where it belongs: the society values--of which the designer himself partakes. In Chapter 3 man is not seen from the stimulus-response, but the co-

gnitive psychology side: not passive, but projecting his intentions into his environment—and if it goes a bit too far in that direction it is in compensation for the opposite view. In Chapter 4 a comprehensive classification of space, into Hodological, Ambient, and Personal, is made for the designer's understanding and use. All three spaces are more fundamental to him than Euclidean space which is significant only in relation to them. In Chapter 5 the four-component Notation is articulated into the cognitive/perceptual anthropological model of cognitive anticipation (see Tube), and perceptual experience (see Sequential and Binary), together with a comparative discussion of the other notators' work, ranging between the scales of landscape design (Halprin) and microspace behaviour (Hall). In Chapter 6 the proposition of using the present anthropological model of a cognitive/perceptual notation of design-for-movement has been taken up as a process employed in experimental design. The program of designing for Hodological space—as well as for Ambient space which accompanies progress through Hodological space—links psychological research to design for the pedestrian.

## PREFACE

Coming from Design (and now going back to it) and observing the present and anticipating the future, the uniqueness of the urban situation has been taken to be: the increasing complexity of systems, and the social-physical fragmentation process. Work on Space Networks has been to research into the pedestrian's movement as his basic activity, and using this anthropological model to design for behavioural space.

Having started with 'Space' (an improvement admittedly on the definition of architecture I was given in the first week of my first undergraduate year as: *la lutte contre l'humidite*), I ended up with people - in an urban world, where not only houses are designed to keep you in them, and streets designed to keep you out of them, where private property itself determines to a great extent planning and architecture, and buskers are defined (and fined) as 'obstructions', and social change comes slow, or is equated to chaos, anarchy and irresponsibility. But also, where architecture self-criticism (to an extent equalled only by Mao's millions) has resulted in that whilst looking for the problems within architecture, to look for the answers outside it. Having myself looked early on into almost a dozen of directions-disciplines in this University I can report a Sociology where there isn't much of 'social networks' work, and a Psychology full of contradictions itself. What I have found invaluable were the conferences, and the Lund Sweden 2nd International Architectural Psychology one especially. Where having put my work to the test of presentation, and having placed the Space Networks work within the wide and up-to-date research context, I was able to structure it, and take tactical decisions. Architectural Psychology research was shown to be, Firstly: lacking social context. Secondly: preoccupied with data collection (and elaboration of

manipulatory techniques for those data) of a complexity well below the level of human behaviour. Thirdly: the almost total lack of design directions, taken or attempted. I want to emphasize at this point that this Space Networks research effort has been done with design in mind.

The Space Networks notation (Chapter 5) does present (naturally) evaluative possibilities, but (although not a blueprint, or specifications-minded) was conceived originally, and here developmentally, as generative, which is not the case with Halprin's, or Thiel's, and even more so of course with Castex-and-Panerai's, for example. In Chapter 5, when I give a short account of the Benesh dance notation, it is to show the complexity building up, first within that notation, and then by speaking of Halprin's (which is related to Benesh's more than Thiel's is - the latter an otherwise more architecturally relevant notation). This complexity (or, 'simplicity problem') makes design use problematic. Which scores a point for (non-physical) notations like Lynch's - or that of Space Networks, as being with more generative possibilities, although Lynch hasn't made any design attempts.

of

The series/Chapters, although having sprang out as parts from the total Space Networks concept work, they were written as separate individual papers, and disseminated as they were being done, seeking feedback, that was extremely useful, however limited the response. Comments were then taken into account (corrections apart) in the writing of the next chapter, which has been in the same sequence as their final presentation, with Chapter 1, written April, 1973 (presented in Lund, June 1973), and Chapter 2, written November 1973 (published in E.A.R. 1st February 1974). You can therefore start from any one of those Chapters 2 - 6 according to your preference, and you won't miss the point, as the ideas are carried

over from Chapter to Chapter. Whereas Chapter 1 is introductory (and different in structure, as with the Appendix), Chapter 6 remains the central as well as the concluding one. The linearity of the written medium has of course been an imposition on a non-linear subject and its treatment, but then, you can go quickly through the compact text once, so as to grasp its totality. There is also a 'secondary text' in italics, which refers each time to the point of the text from which it follows, and you can read/skip/or go back, to any of this secondary text as you wish. Every Chapter and the Appendix have their own references separately, all assembled together under 'References', whilst the Bibliography (which as with the References is mostly papers rather than books) is part of the diverse material under 'architectural psychology' and also information through the everyday university interactions.

You can group the Chapters together in several ways. My working clustering has been: Chapters 2, 3, 4, 5 are theoretical, with '6' being on actual design, and Appendix on using Videotape equipment. Chapters 2 (linking use of space to a society for profit), and '3' (linking the brain to behaviour), refer to the allied disciplines of Sociology and Psychology respectively - whilst '4', '5', and '6' are more 'architectural'. Chapters 2 and 4 clear up the 'space' concept. Chapters 3 and 4 (movement through space, and that space) as with '5', '6' (notation, for design) are in direct continuity. So with '3', '5' (the notation of movement through space), and '2', '6' (the social networks of chance-meetings along the designed networks). Chapter 4 has been the most popular, but to myself it is Chapter 3 that remains the courageous effort outside my own background. Finally, Chapter 5 is not, to me, just a behaviour-rich entry to the small family of notators, but mainly a generative approach to the urban design-to-come, as put forward



in Chapter 6 - my personal experimental design contribution as an architect in Architectural Research, as well as my own learning which I enjoyed.

In the April, 1974 York 'Space and Activity' seminar, the main difference to me between Space Networks and the other work presented/discussed/etc. was that in my case I have taken Movement-through-space as the activity, and that unlike 'a room', a room isn't a room isn't a room, but is part of a sequence of spaces. On the other hand, the main similarity which was also the (basic one to my knowledge) common point between half a dozen of the other presented research (whether on Universities, Schools, Hospitals, big, or, small Offices) was 'Barriers', or what was otherwise referred to as Boundaries, Walls, Partitions, etc - in Space Networks see both Chapters 3 (affordance of movement) and '6' (the Together/Separate principle). Movement-through-space Networks and Barriers, will be, what I'll concentrate on after this research in Edinburgh University: in further research, practice, and experimental design.

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## CHAPTER 1

Submitted April 1973, then presented at the 2nd International Architectural Psychology Conference, Lund, Sweden, June 26 - 29. To be published by same.

## SPACE NETWORKS: TOWARDS A SPACE NOTATION FOR USE IN COMPLEX URBAN SYSTEMS

The research has been broken down into Space, Spatial Perception-Spatial Behaviour, Notation of this interaction. The space-as-defined-by activity Notation was originally developed through undergraduate design work, as the conventional tools of Plan-Section-Elevation, then Axonometrics, Central Perspectives were proven inadequate for the conception and communication of complex urban environments based on activity, Movement as its basis. The notation was used by this writer for designing a multipurpose building for his finals. The research remains firmly design-orientated, seeking out general principles.

MOVEMENT THROUGH SPACE (1)

A good way for the pedestrian to get and structure information of his urban space is to move through it. J. J. Gibson (Gibson 1952) has pointed out how human depth perception is dependent on locomotion, and D. Appleyard (Appleyard 1965) refers to it as Apparent (v. Real) Motion of the Environment.

On the design level one can subdivide the environment into Physical and Human Space Networks. A Physical Space Network is the 3-dimensional information that has never been forthcoming, and will depend on a change of our Planning mentality. On the other hand, a Human Space Network, what we are here concerned with, although covert, it has always been there: it is the volume of the wake of a pedestrian as he moves through space.

In doing so, and leaving behind him this hidden trail, he at the

(1) See Chapters 3 and 4

Note: This series of footnotes-references is necessary since Chapter 1 has been written long before (April '73) Chapters 3,4,5,6 (Jan, Feb, March, April '74 respectively).

same time goes through a sequence of perceptual frames. But for him, in order to have this experience, there is another mental corridor connecting him with a visible goal, or non-visible destination. This mental corridor may be (and the hypothesis is that it is) an erroneous one directionally and dimensionally, but permits him the behaviour of movement all the same.<sup>(2)</sup> Heidegger (as referred to by C.N. Schulz (Schulz 1971)): "When I go towards the exit of a room I am already there".

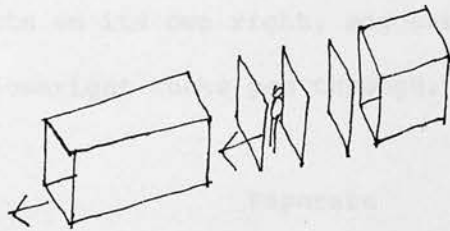


FIGURE I. You start thanks to the mental corridor, you experience in a sequence, and leave behind you the hidden trail.

In that manner Space is defined dynamically. As a network.<sup>(3)</sup> But when no movement, or other human activity is of influence, then, to use Kurt Lewin's term as referred to by C.N. Schulz (Schulz 1971), Hodological space (space of possible movement)<sup>(4)</sup> approaches Euclidean space.

And although the designer has to decide upon the Euclidean space, and communicate through it to the builder, he conceives, or ought to, through the Hodological one.<sup>(5)</sup> The former<sup>(6)</sup> is only the built part of the latter which remains the pedestrian-user's experience. And the level at which designer and user can communicate, and where their prestructures can pass the baton, relay race fashion (Hillier 1973). For those designing with the anonymous user in mind, of a high density urban scale, the multipurpose buildings, and assuming changes, and allowing for choices, an Exploratory experience, rather than a Habitual

(2) See page 38 line 2 from top

(3) See page 45 line 9 from bottom, and page 56 line 3 from top

(4) See page 46 line 13 from top

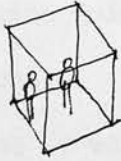
(5) See page 95 Figure 8

(6) See page 47 line 2 from bottom

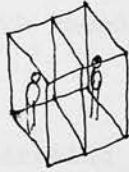
one (Robert Bechtel's terms (Bechtel 1967), ought to be anticipated. On that level, new design tools are needed in order to notate this experience.

The space elements leading to the development of the Space Networks Notation, all three, show a positive space. As Van Lier puts it: *"Le caractere entourant que l'architecture reside d'abord dans le volume d'air qui colle a notre peau que nous traversons de tout notre corps (aucun objet ne nous touche aussi completement)".* (Van Lier). This space exists on its own right, suggests movement in it by its structure, or downright sucks you through:

Together



Separate



Together-Separate

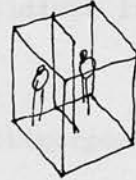


FIGURE 2. Together-Separate: <sup>(7)</sup> A contradiction to live in.

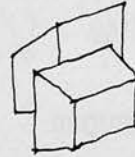
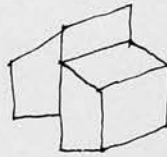
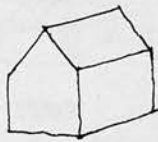


FIGURE 3. Articulation: Not more space, but a structured one.

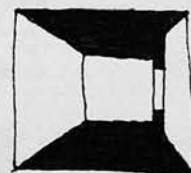
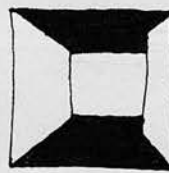
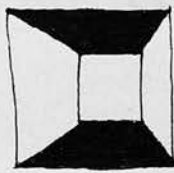


FIGURE 4. Kinesthesia: The space that induces movement: The space-indepth quality of the films - and hasn't the Danish director Carl Dreyer rightly called architecture the cinema's closest relative?! (drawing from published paper of same writer (Mitropoulos 1969)).

THE SPACE-MOVEMENT NOTATION (8)

The effort has therefore been to notate the space as it is given meaning by the activities (9) in it. Primarily the movement through it that makes it perceivable. The notation (in fact this is its second level of development) (10) consists of four spatially defined conceptual components: The TUBE, (11) which is the corridor that connects where you are now, with where you have come from, and where you are going to. The SEQUENTIAL, (12) which is the perception frames you experience in succession. The BINARY, (13) that relates to the pair of a corridor and a big space (this comes close to the first level of development of the notation), and where a balance is obtained by contrast of volume and activity (in that the corridor is mainly for passage). And the SECTION-PERSPECTIVE, (14) where you can imagine doing away with facades: see buildings in the process of demolition.

Defining by way of illustrating from the multipurpose building designed:

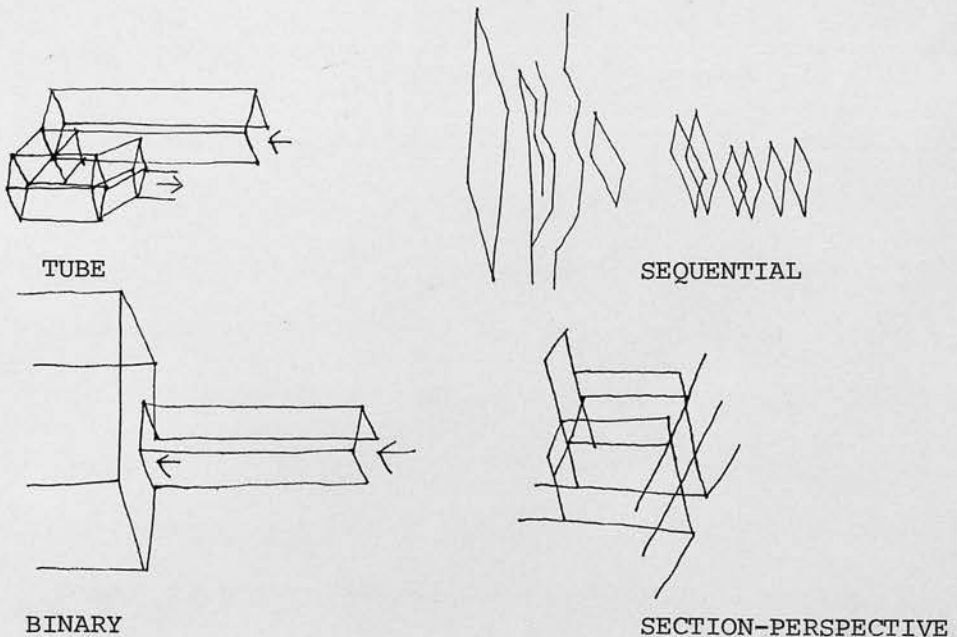
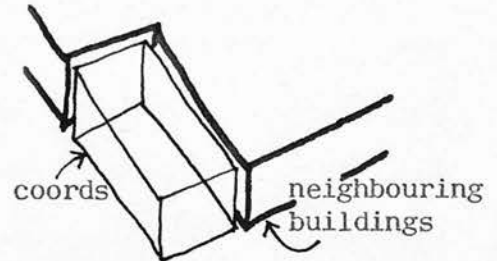


FIGURE 5. All four components may be used for same part of the building. This allows for the difference in cognitive-perceptual structures of the pedestrian-users. (15)

- (8) See Chapters 5 and 6
- (9) See page 19 line 11 from top
- (10) See page 64, and page 93 line 11 from top
- (11) See page 67 line 3 from bottom
- (12) See page 56 line 9 from top
- (13) See page 68 line 10 from bottom
- (14) See page 71 line 8 from bottom
- (15) See drawings page 71

Additional explanatory information on:

FIG.6 (of page 14).In FORM 1 the arrows indicate the various possible Human and Physical connections that the existing environment could provide—at levels from '0' ground floor, to +5, fifth floor. Also compare with Figures 6,7, of page 95:



In FORM 2 (also compare with Figure 9 of page 95) having drawn in physical evidence the arrows of FORM 1, we have added the Hodological spaces designed according to the brief (also compare with Fig 8 of page 95) resulting in the whole of the space-activities Shell, container of the activities desired/needed, extending in three dimensions beyond the site given.

FORM 3 (also compare with Fig 10 of page 95) is the part of FORM 2 that we have to build so as to complete in physical terms this FORM 2 container of activities.

TABLE 1 (of page 15). Superceded by Chapter 5, this is a first attempt to work out the four components, by comparing them to each other, and with respect to the architectural or planning scale, or, the concern of the designer or the user. The most important outcome of this Table leads towards the cognitive/perceptual model (T/S, page 68 line 2 from top) becoming T/(S,B), (page 69 line 1 from top). That the projecting mind (T) affords the sequential experience (S) and the perceptual 'wholes' (B) by preceding them (pages 67 and 68 referring to items B., C., and D. of the Table). For discussion of the four components see: for Tube (T) page 67 line 3 from bottom, for Sequential (S) page 56 line 9 from top, for Binary (B) page 68 line 10 from bottom, for Section-Perspective (S-P) page 71 line 8 from bottom.

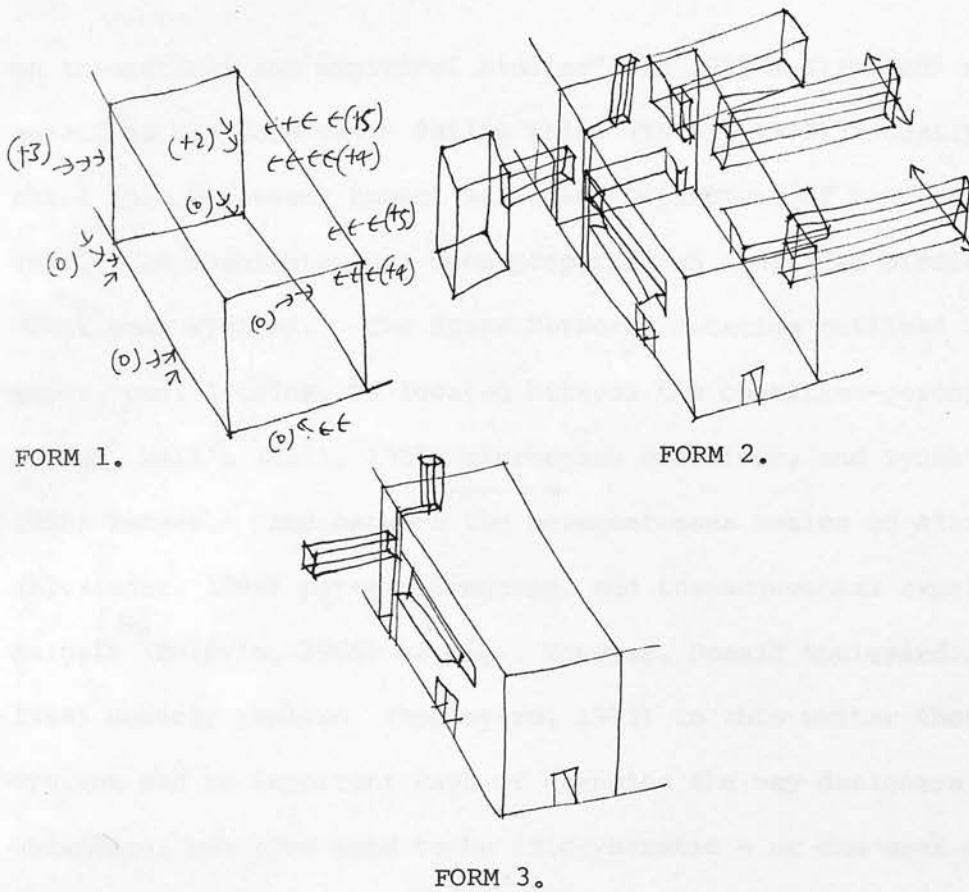


FIGURE 6. Taking the multipurpose building as an example, by using the Human and Physical Space Networks, the designer is allowed an early holistic appraisal of the possible building (FORM 1). He then proceeds to freeze these networks in a form by way of which he can communicate to other designers and the public. He therefore conceives through Hodological space. FORM 2 is the inside, the guts of the building and its physical and human lifelines with the environment. He then can in turn communicate to the builder through Euclidean space (FORM 3, which is the built part of FORM 2). And although the building is structured by the use of the notation (based on the broad, but limited, cognitive-perceptual areas people share), a high degree of looseness in design is permitted.

Back in 1955 Jackie Tyrwhitt (Tyrwhitt 1955): "Here is our contemporary urban planning problem. How to find the key to an intellectual system that will help us to organise buildings, colour and movement in space, without relying entirely upon either the introspective intuition or upon the obsolete and static single viewpoint based on the limited optical science of the Renaissance". Since then, and even before Thiel (Thiel 1961) started on his "development of a comprehensive system based



on theoretical and empirical studies", in 1951 a (limited) number of notations has come out - Philip Thiel (Thiel, 1973) recently communicated that Professor Robert Buchanan, Department of Landscape, University of Washington has been preparing an annotated bibliography on notational systems. The Space Networks notation outlined in this paper, can, I think, be located between the cognitive-perceptual scales of T.E. Hall's<sup>(16)</sup> (Hall, 1963) microspace behaviour, and Lynch's<sup>(17)</sup> (Lynch, 1960) Images. And between the movement-uses scales of Alexander's<sup>(18)</sup> (Alexander, 1968) pattern language, and the sequential experiences of Halprin<sup>(19)</sup> (Halprin, 1965) *et al.* However, Donald Appleyard (Appleyard 1964) soberly replied (Appleyard, 1973) to this writer that: "Notation systems can be important ways of changing the way designers think about buildings, but they tend to be idiosyncratic - no one uses anyone else's". Which calls for a comparative analysis to bring out their common denominators and complementariness.

TABLE 1. To point out some of the properties and characteristics of the four spatial conceptual components:

	TUBE	SEQUENTIAL	BINARY	SECTION-PER
A. ARCHITECTURAL SCALE	--	-- X	-- X	
PLANNING SCALE	X			-- XX
B. MIND	--			--
SENSES		--	--	
C. BASIC COGNITIVE-PERCEPTUAL SYSTEM	--	--		
D. DESIGNER	--	--	--	--
USER	Whole	In parts	In wholes	
E. EXPLORATORY				
LOCOMOTION		--	--	
HABITUAL LOC.	--		--	
F. ORIENTATION	--	--	--	
PERCEPTION		--	--	
G. PERSPECTIVES		Series of Centrals		Endless Isometric
H. TUBE			Quicker than Binary	
SEQUENTIAL	Depends on holistic Tube. Quickly becomes Tube.		Continuity breaks down on Binary level.	
BINARY	Articulates Tube through senses. Quickly becomes Tube.			
SECTION-PER.				

In Figure 5 we saw how all four conceptual components were used for the same part of the building. However, each one of those four spatial representations of 3-dimensional experience is distinct. And anyone of them may relate specifically to a particular section.

Example:

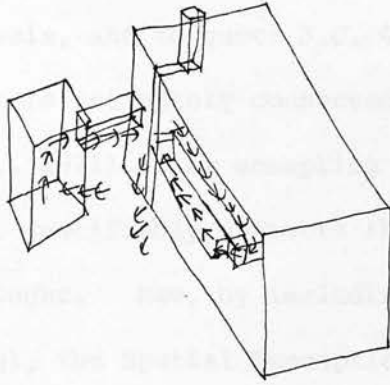


FIGURE 7. In this case a Tube (activity:exhibition gallery), which was subsequently checked by the Sequential.

In Table I (refers to (H)) we may notice how the element of speed can bring out a polymorphous property. And there is also an hierarchy (refers to (C)): the Basic Cognitive-Perceptual System of Tube and Sequential. That is, the sequential experience, and the mental corridor in front of us, which allows it.<sup>(20)</sup>

#### INTENDED FIELDWORK AND PILOT QUESTIONNAIRES <sup>(21)</sup>

When, at the beginning of the paper, the above mentioned mental corridor was called 'erroneous', it was meant that it is distorted being the subjective Image of the physically objective measured space the pedestrian is moving through. This Image is influenced by intended activity, then subsequently structured by experienced activity. Even so mental space will still not correspond to the physical one. It will in fact remain characteristically distorted depending on the activity that is giving it identity (: a friend did two drawings of her telephone, the first observing perspective laws - a true architect herself paying

(20) See page 38 line 2 from top, and page 67 line 3 from bottom

(21) See Appendix

homage to Brunelleschi and Alberti. The second drawing, distorted as it was, gave away its scale, its nearness and an invitation to grab it - assuming you could read the cues).

Vision has been taken as the dominating factor in perception, and mediating kinesthesia, and to quote J.J. Gibson (Gibson, 1952):

"Spatial behaviour is intimately connected with spatial perception".

Rapoport (Rapoport, 1971) after accepting the undeniable effect of design on behaviour, justifiably suspects it to be less than what the designers have thought. Now, by including cognition (:faculty of knowing and perceiving), the Spatial Perception-Spatial Behaviour interaction becomes that of Image-Activity, which in turn is the relation between Tube and Sequential. In order to orientate, pedestrians will need more than a point-to-point experience, although it will distort their Tube, or mental corridor (like they will do with any illusion) so that it will fit these perceptions. By Orientation is meant (a) where one is (Position), (b) where one is going to (Direction and Distance of goal or destination), and (c) the space one is to pass through - which may for instance give the choice between a destination and a goal.

Example: "Mobilization wanted Washington Boulevard or Jefferson Davis Highway for their March from the bridge since each large road had a bold unimpaired view of the Pentagon. The Government insisted on Boundary Channel, a narrow road". (Mailer)

To the designer asking what makes Hodological space possible, the mental corridor, the sequential experience, and their relationship, is the theoretical ground that after having stemmed out of design can provide directions of research: In what distorted continuity form is mental space information stored on the scale of the large public

building? In other words how do people orientate, and how do they subsequently behave in an Exploratory, and after a period of time Habitual manner.

From what is known to me (and summarily seen from Rapoport (Rapoport, 1971) and Goodey (Goodey, 1972) sizing up the field, and confirmed by Kevin Lynch (Lynch, 1973), spatial cognition and perception work is mostly at the larger scale of the environment. Unless confined in a static situation.

Preparing for Space Networks fieldwork, a multipurpose area has been located which will hopefully prove spatially suitable. Complex from the point of view of orientation, it is the basement connection of three Edinburgh University buildings, and still retains contact with the outside environment. Questionnaires will be used (in fact pilot surveys on daily networks, and directions connecting the street scale with a particular room in a building, and mental mapping of an area, are being shown useful at this stage). And the Portapak, portable Video, will be required for observation and recording, in such an 'identity' simulation (to use Harman's term, as referred to by Gary Winkel (Winkel, 1966) taken to mean: the real world is used to obtain knowledge about itself. Versus the 'analytical' highly abstractive simulation).

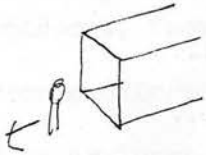
The aim of this research is to reach a high enough level of complexity to identify with real life situations, but also a low enough level so that the designer can in fact use it. All at the risk of course of trying hard on every Psychologist's patience.

## CHAPTER 2

Submitted November 1973, then published February 1974. E.A.R.1  
(Edinburgh Architectural Research, Edinburgh University).

THE SPACE-ACTIVITY-PROFIT LINK

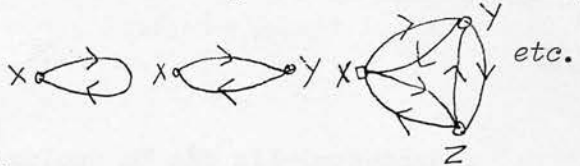
Looking at the deterioration of the urban milieu from the area  
of my concern, which is Space Networks,



*Man's volume of wake as he moves through  
space. This was the starting point and remains  
the conceptual basis for the author's research  
(See Chapter 1)*

I would like to put forward the argument that the urban architect is  
left with the job of designing a space ultimately defined by activities  
which are themselves 'a priori' determined not by the Social Networks,

*You may be familiar with,  
but  
as it was pointed out in*



*Suzanne Keller's qualitative*

*arguments, on the Scale Two relationship, it is necessary both  
to agree to set it up, but only one is required to break it.*

upon which Space Networks depend, but by profit. And that the over-  
development of the profit link (to Space and Activities) is, in my view,  
the deterministic reason for this environmental deterioration.

*Richard Sennett, in reviewing J. Mitchell's Women's Estate  
in the New York Review of Books, presents Mitchell's  
similar treatment of an analysis of society as linked  
structures (Mitchell, 1973). He then suggests that  
she is proposing the family as the link to attack; to-  
wards a general transformation of society.*

SPACES FOR THE PEDESTRIAN MAN: HODOLOGICAL, AMBIENT, PERSONAL

Let's think of an urban environment as a 'whole': as one non-building building.

*The non-building building doesn't have the kind of facades, roofs and foundations that we associate with the word 'building'.*

The pedestrian man moves through it from confined-indoors to confined-outdoors, from administrative to leisure, from 10th floor to basement, from public to semi-public to private, and so on, in a continuous way - or at least he tries to. With him in mind we can say that there are three experience-spaces to the single Euclidean one of the bricklayer. These are Hodological,

*To use Kurt Lewin's term, referred to by C. Norberg-Schulz (N-Schulz, 1971).*

Ambient

*See below. Also see the analogy of the all-important supporting role of peripheral to focal vision.*

and Personal.

*Sommer's and Hall's term and what others call Territorial Space. It is necessary to be aware of its vital importance (a property to which even Marxists agree) but it remains difficult translating it into design. However, recent work has been doing away with the notion of the 'static bubble' (see, for example, M. Efran's "Study of Movement and Effect in Territorial Behaviour"). Another study (Thompson, 1973) has taken the case of three culturally different groups of people ( $o_1, o_2, o_3$ ). When  $o_1$  and  $o_2$  are*

standing conversing,  $o_1$  is trying to reduce the distance, with  $o_2$  retreating. Whilst when  $o_2$  is with  $o_3$ ,  $o_2$  advances and  $o_3$  retreats.



Hodological Space seems to me to be the 'structuring' one of the three. Meaning by 'structure' not, for example, man's muscle-and-bones capacity for standing up, but his beliefs, social contacts, aspirations, etc. This space, that welcomes you to explore it by seducing you into looking around the corner, that connects your starting point A with B (B being goal or destination), that contains, defines, stimulates, even becomes, at times, the very *raison d'etre* for your movement. To give an architectural example (however limiting to the idea of networks): what Peter Hall in a recent (November, 1973) Observer article, calls the 'Fourth Auditorium' in the three-auditoria National Theatre: "... the terraces, the bars, the foyers, and where Denys Lasdun has seized the potential of the best view in London". Whereas Hodological Space is more cognitive, in the way that Personal Space is more perceptual, it appears that both depend on Ambient Space, as if the latter is allowing them to be. So, while giving Hodological Space its important place in urban dynamic thinking, and trying to make Personal Space relevant to design, Ambient Space has emerged as the interesting newcomer. Now, if one tries to design for the pedestrian man and his three experience-spaces, one ends up neither with more

*The 'more' fallacy, I think, is the result of the one-specific-space-for-one-specific-activity type of design resulted in the space not being reusable, therefore 'more' space is automatically asked for. But by assuming that*

*the space is being reused, even by its first user, we as designers, avoid the one-to-one space-to-activity relationship, and concentrate on space articulation instead.*

nor better

*See on Eiffel Tower quarter below.*

space but with different space: with a non-building building. But let's make clear what I mean by Space. We will examine it in relation to at least one other connection: Activity. In fact, we will try and see the relationship of space-activity as an initial totality rather than as a second level of development, some kind of result after the 'systematic' list of activities has been worked out, and the physical spaces have been dimensionally defined as 'bedrooms', 'halls', etc.

A Seifert facade (see Pawley 1971) and the new quarter *Characteristically, when I visited the quarter while it was still under construction, photographers were snapping at haute couture models using it as background. It looks as good as you can get, even better on paper I am sure, but 'structurally' it is no different to any other aspiring blocks of flats that we know don't work.*

being built near the Eiffel Tower, prove that no solids-and-voids, nor buildings-and-the-spaces-that-occur-between-them (Stephen Gardner, Observer 14/10/73) are valid criteria and definitions of 'better' and 'environment' respectively within a social framework.

#### THE SPACE-ACTIVITY MANY-TO-MANY RELATIONSHIP

The Space-Activity relationship is a many-to-many one: several different activities can take place in one particular space, and several different spaces can accommodate the same particular activity.



This range finds itself between the Shed ↔ Close fit bipolarity.

Respectively,

*The erroneous, but popular, belief that leads to design irresponsibility/impotence, that all the designer need/can afford to do is to build his client a shed and the user will do the rest within it. My first criticism would be that once again architects get stuck in their 'Shells' role instead of being Network-minded, and secondly the user needs a structure provided, which he, in his turn, can manipulate to his advantage.*

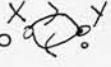


and

*The one-to-one relationship of Space and Activity where in fact Activity is reduced to need.*

Contrary to what many deterministic designers think, Spaces don't generate Activities

*Proshansky, Ittelson and Rivlin's report (Proshansky, 1970) on an attempt to increase the therapeutic effectiveness of psychiatric facilities through appropriate design (referred to in Willems, 1973) points out that all the designers succeeded in doing was to change the location of the isolated standing behaviour of patients, previously using the now improved solarium, to the other end of the corridor. Luckily, the report continues, these environmental designers didn't restrict their observations to the solarium but studied the whole environment behaviour system.*

as, oddly enough Grammar doesn't generate Sentences. Spaces may even hinder or inhibit behaviour, as Laws may with Life. It is also true that one must reduce complexity in order to be able to study it. But,

I would think that researchers (especially Architectural ones, having the additional responsibility of getting their research back into design) cannot afford to reduce any further than a relationship of Two . If you reduce it to the scale of One  then the least one can say is that it assumes determinism. If we take this relationship of Two , and examine it, we can see how culturally we are up against a current conceptual trend: "The pathological overbelief in the self-sufficiency and independence of the individual" that Alexander spoke of as the 'autonomy-withdrawal syndrome' (you can afford to withdraw, and do so when under stress) (Alexander, 1968). A relationship between X and Y is different from the simple addition of X + Y.



*In fact a designer does assume some kind of stereotyped relationship (even Unconsciously) when he designs, say, for a family. Or they might never make a 'home' out of his 'house'. Taking housing, it can be stated categorically that the Space-Activity relationship implies Space Standards based on relations of people. Their Social Networks rather than their strength in number. After all, landladies do it (consciously) already: Furnished flat to let, Balfour Street, suit couple or 3 girls.*

*(Edinburgh Evening Chronicle, 1/9/73).*

Take Dateline (a computer dating service) announcing that it: "operates on the basis of mutual compatibility and we are sure that Alison would look forward to meeting you" (letter to author). Dateline's four-grade questionnaire however makes no mention if Alison (or myself, presuming Alison received my four-grade answers) would be prepared to give up any of her 'very interested' activities, or take up any of her 'no-preference' ones, or a new one altogether. Singer

Melanie's world seems better than Dateline's or at least a wiser one:  
Where something is gained, and something is lost.

*Ruby Tuesday, in Melanie Featuring Lay Down, won't be  
"chained to a life where nothing's gained and nothing's  
lost".*

Similarly (to take another example of a Social Network, scale Two)  
with the Women Libber's trying to liberate women  they are bitterly  
surprised to find out they are up against a dead end. Surely if there  
is need for any Lib it is a Man-Woman  Lib.

So the effort has been to define Space by Activity  
*It depends whether you rush in and out of a Hall, making  
a corridor of it, or go through it in a paced sequence  
of events (this latter experience has been the common  
denominator for the various Space Notators like Theil,  
Halprin, et al).*

with as its basis, Movement.

*Usually omitted from professional lists of activities,  
I was amused to see it included (even on the domestic  
scale) in Gavin Millar's (British Film Critic) review  
of Chabrol's 'Just Before Nightfall': "dressing-un-  
dressing, preparing food and eating it, mixing drinks  
and drinking them, walking out of one room into  
another".*

Why Movement? Because as J.J. Gibson would put it, we move about  
when there is light. The controlling stimulant for 'locomotor be-  
haviour' is mainly optical. And it is through visual perception that  
we basically structure the 3-dimensional space we inhabit.

THE PROFIT CONNECTION

In Designing for Movement the man-made distinction between Planning and Architecture disappears. And although it is interesting to note buildings like the Copenhagen airport and the Louisiana Museum (south of Helsingør, Denmark) that make exemplary use of Hodological Space, the current architectural crisis, like our research interest, lies at the urban scale. Its uniqueness is complexity which can turn either into richness or confusion. When a building is demolished, apart from the unexpected perspectives opened up, one can also see the covert connections cut off and "hanging" so to speak over the sides, some networks diverting themselves, and the Hodological Space stopped. In other words, an empty site is no vacuum at all. So when the architect is faced with the brief for such a site, he is also facing the question, or rather the question is facing him, can the building-to-be, apart from not obstructing the networks, contribute to them? Is such a building required and welcome in such a place, that is, by anybody else except the profit-making client? If we take a situation like Athens, which seems as appropriate an example as any, the blocks of flats bound to be put up are already architecturised (*deja architectures*). But not by the architect. His job-satisfaction comes in having his fat salary, his status myth (of his being a *metier-libre* and a creative one,

*The cinema has cashed on this myth also. They always scriptwrite an architect when they need someone securely trustworthy (within The System) but with a pregnant mind and time-table free so as to fit the heroine's demands.*

and his name put up on the site scaffolding (an advertisement for the next such job). Because the site, with the Human and Physical networks ignored, has been treated as a vacuum. With the Space-Activity

relationship broken, Social Space has been neutralised down to its geometry, then measured

*The number of rooms and their square footage. But never their articulation, that would give some indication of Hodological, Ambient and Personal spaces.*

and sold and brought for profit. And a surplus one at that.

So instead of Space for Activity we have Space for Profit.

*Malcolm MacEwan, reviewing 'Social Justice and The City' by D. Harvey, puts the author's point of view thus:*

*"uses being determined by land-values, rather than vice-versa". Harvey's concern is with the interaction of politics, economics and other ideological and cultural factors with space and urban form. He goes on to state that the rich command space while the poor are trapped in it (and so are the architects) until production for use replaces production for profit. The economic and political context in which Computer Aided Design (C.A.D.) is being introduced to the design environment is the concern of M.J.E. Cooley's paper 'Dialectics of Man-Machine Interaction', presented (or what he was allowed to present) in the Design Activity conference (August 1973, Central Polytechnic, London). Cooley, a senior designer in the aircraft industry, projects the industry's experience to the architecture profession thus: "I do not deny that the introduction of C.A.D. could liberate designers from the routine, soul destroying tasks, and provide them with more time in which to engage in creative work. What I fundamentally question is that this will happen in our profit oriented society".*

Designers of course can and should get better, and more aware, for instance, that the user doesn't measure space but experiences it. And it is no mean feat for the pedestrian-man concerned architect to give dimensions to Space that hasn't any. . . But in my view, blaming the designers won't get the environment nor us anywhere. I also fear that the present user-participation trend is just another white-wash generated and contained by the system. Could it be that society (that is the users themselves) cannot afford to face the truth?

*Mary McCarthy, reviewing David Halberstam's The Best and the Brightest (Halberstam, 1973) makes the point that given the civilian aims (victory at all costs was wanted in Vietnam) the generals were right. Bomb the North, mine Haiphong, hit the dikes. We are also told of the blasted careers of those (Hattenburg, Sarris, Col. Porter) who assessed the situation correctly, if only darkly. Similarly how can anyone blame Seifert while he himself is part of a profit-crazed society. M. Pawley is precise: "By far the most coherent and incisive criticism of Seifert's work that has ever been published was written from the standpoint of finance and administration by a financial journalist who used no architectural terminology at all - Oliver Marriott in the Property Boom" (Pawley, 1971). Admittedly, this is a rather helter-skeltering, but necessary, move from Perceptual Psychology to the world of estate agents, valuation experts and merchant bankers.*

Anyway, since Space has become a public issue, there is no turning back now.

Henri Lefebvre (Lefebvre, 1972)

*He argues at the level of the user, speaking of the fragmentation of space for its selling and buying, i.e. the production of space. "L'espace est artificiellement rarefié, pour 'valoir' plus cher; il est fragmenté, polarisé, pour le vendre en gros et en détail". He finally pins his hopes of the designer's contribution on the scale between macro-architectural and micro-urbanistique. The scale, I would say, of the pedestrian - along his space network.*

(starting from a Marxist's point of view, which I clearly don't) observes that "*La science de l'espace se cherche vainement depuis des années*" (The science of space has been vainly soul-searching for years).

No wonder the inability of the Newcastle Space conference last spring to define Space. In the same breath he would suggest why: because space is neither neutral, indifferent, nor objective.

## CHAPTER 3

I would like to thank Dr Lee and Dr Trevarthen, and their students at the Psychology Department, Edinburgh University, for having me in their seminars-lectures on Perception, and Perception And The Coordination of Movements respectively, and those on the occasion of visits by Gunnar Johansson and J.J. Gibson. Responsibility however, for any statements referring to the above events and people rests with this author.

MOVEMENT THROUGH SPACE: THE ACTIVITY YOUR BRAIN 'AFFORDS' YOU

It seems important to me, for the designer giving dimensions to space (and time), to investigate the relationship of that space to the brain of man. We can start by pointing out the arbitrary use of the objective-subjective model that was meant for other work rather than the conception of urban space based on behaviour.

INFORMATION BEGINS IN THE HEAD

When people make the distinction between objective and subjective they forget to add that they are limiting their description within the terms of Euclidean geometry.

*Rainville and Dusek of University of New Hampshire*

*(Rainville, 1972) point out that Euclid's is only one of many geometrics, and that if we apply non-Euclidean principles to the measurement of patterns, the difference between subjective (how objects appear), and objective (what are the facts regarding those objects, in Allport's terms) disappear, as is the case with Herring's illusory pattern discussed in their paper.*

But space, apart from being measured for the buying and the selling (See Chapter 2) is not just perceived by pedestrian man, but experienced.



What's more, for an architect researching the human experience in the man-made environment, and trying to design according to that experience, the above distinction is neither necessary nor useful - once I make my position clear through Perceptual Psychology as a generative link (Cunningham, 1972) between behaviour and urban environment: in the Man-Environment interaction, I start with Man.

*Edward V. Evarts puts forward the possibility 'that understanding of the human nervous system, even its most complex intelligent functions, may be enriched if the operation of the brain is analysed in terms of its motor output, rather than in terms of its sensory input' (Evarts, 1973).*

As he moves through space.

In the Perception background work, for instance, I believe in the Unitary View,

*The terms Unitary View, and Separate Event View, as used in Cunningham 1972, where whilst the latter defines perception in terms of detecting stimulus, the Unitary View 'is a form of biology or psychobiology recognising that there are two converging hierarchies of process in the organism: The body process of maintenance, and the Relationship of organism to the surroundings'.*



rather than the Separate Event View, to which J.J. Gibson would subscribe - keep this in mind when he talks about the 'objective world out there', or 'the two poles of experience, objective and subjective', as he puts it (Gibson, 1968), which point he avoided discussing - or, are we "mixing up phenomenology with optics?". Although he remarks in his 'Affordances' paper (Gibson, 1973), on how egoreception and exteroception are reciprocal (the inseparability of proprioception and per-

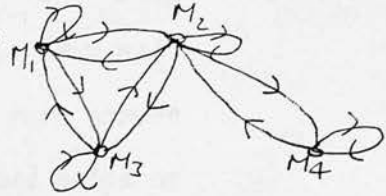
ception of the environment: 'when an observer perceives the possibility of locomotion he perceives it in relation to what his locomotor system is capable of'). Gibson during his recent visit to this University, further took the view, that you perceive the affordance rather than the object itself ('the activity of perceiving as a problem for psychology as distinguished from physics and optics - namely to classify the environment in terms of what it affords animals rather than in terms of the classes of physical objects that are supposed to exist). In spite of these, he still (disappointingly to me) tries to objectify, like he does in all his work. Like for example in his 'picking-up-information', when he speaks of a light array, not objects, although the structure of array of light is specific to its origin, i.e. the environment. However much he would stick to information rather than stimuli (which are physical), he speaks of information as if it is objective and independent of Man. But, to be information it implies the human process of intention.

*"Objectivity should become an intention and not a fact", said Art critic-novelist John Berger in his lecture Documentary and Fiction (University of Edinburgh, 6th December, 1973). He criticised Zola's experimental novel, where he tried to observe objectively (from the outside, but close to), leaving out, all the same, the subjectivity of those living that reality, and the limits of Zola's own objectivity overspilt... He went on to accept Agee admitting his own subjectivity - which, however, remains a different thing from self indulgence. And here we come naturally to Norman ('left conservative', Novelist - his own capitalising) Mailer. "I think", he replied to BBC2 (Second House, December, 1973) interviewer Melvyn Bragg, "that there are lives that*

depend entirely of fact". Like Nixon's. But that Monroe's (Marilyn, Hodder & Stoughton, £4.95), was 'amorphous', and whenever he tried to find out about a particular fact in her life, two opposing facts would come up.

In Intelligence work, the collection of information involves the briefing of the officer on what is desired/required to be collected. But let's therefore return to the 'Affordances' paper, where although there is no mention of human 'intention', he comes closer to the Man end of the Man-Environment interaction

The difference in the Man  $\leftrightarrow$  Urban Environment/Object interaction is that Man interacts with himself , whilst the U.E./Object doesn't  $E/O$  ..... And so we have . Hence of course the complexity (richness/confusion) of human relationships: "Behaviour affords behaviour", as Gibson puts it.



:from the object, to the information specific to that object in the light array, to the affordance of that object. He gives his definition of affordance as 'a combination of chemical or physical or geometrical properties of the environment that is uniquely suited to the nutritive system or the action system or the locomotor system of a given animal'. The Gestalt psychologists, Gibson tells us, recognised that the meaning or value of a thing seems to be perceived just as immediately as its colour. He quotes Koffka (Koffka, 1935): 'Each thing says what it is. A fruit says "Eat me", and a woman says "Love me"', and that Kurt Lewin termed it Aufforderungscharakter (translated as 'invitation-character'

by J.F. Brown in 1929, and as 'valence' by D.K. Adams in 1932). This of course agrees with the notion of space that invites/almost sucks you through (see Chapter 1), a space that invites/demands behaviour, a space linked to activity by definition (see Chapter 2), from its conception, not merely a space affording you passage. Then, predictably enough, Gibson goes on that, although his 'concept of affordances is somewhat related to these concepts of valence', there is a fundamental difference to the 'phenomenologist' Koffka that 'the affordance of something does not change

*Zola (see above) was mistaken by a static notion of subjectivity (believing on static processes that deny the possibility of change and intention).*

as the need of the observer changes. An affordance is not bestowed upon an object by a need of an observer and by his act of perceiving it'.

*And so the 'objective world out there'. But no!*

*Page 5 of Part III.A.: 'An affordance cuts across the dichotomy of subjective-objective and helps us to understand its falsity. The affordances of the environment are facts of the environment, not appearances'. This definition (check with Allport's) places Gibson (however he may have always been implicit of the opposite - see Ecological Optics) on the Environment end of the Man-Environment interaction. Quote: 'the organism depends on its environment for its life, but the environment doesn't depend on the organism for its existence'.*

But a space does in fact get its meaning through the activity that

takes place in it (see Chapter 2), and although those activities are less than infinite in variation of possibilities, they are surely more than one, and definitely not predictable. Example: Adhocism of an object

*Koffka is criticised that when he asserts that 'each thing says what it is', he neglects to mention that it may lie. I, would add that it lies further if it just said what it was.*

and Re-Use of space. The notion of re-use extending to include even the first user (the family moving in) of an articulated space designed by someone else (the architect). To me, it is not so much what the Environment, but what your Brain 'affords' you. That (side-stepping of course Developmental Psychology) expectancy precedes experience. That information begins in the head. But not, I may add, as J.J. Gibson might fear, exclusive of the environment. Summing it up, in voluntary exploratory locomotion, like movement through urban space, there is a cognitive expectancy ahead of perceptual feedback (see Chapter 1), and that the individual, like with time,

*See 'Biological Clocks': the internal clocks which tell us when to get up and when to sleep, and govern the rhythms of most of our other functions (BBC 2, Horizon, 9 pm 10th December, 1973, and Ornstein, 1969).*

he comes with space too.

#### THE TWO SPACES YOU COME WITH, AND THE ONE YOU DON'T

Gibson of course doesn't agree that you come with space. Which is understandable, since he wouldn't accept the Unitary (biological) approach. However, as a designer one can realise the argument simply to be about different kinds of space. The word 'space' has been badly

treated along all of its range from Pop group Hawkwind's (Outer) space, to Erik Erikson's Inner one. The space we are preoccupied here with is the urban pedestrian's one. For design purposes. From that point of view, there are three spaces (see Chapter 2): You come with 'Hodological

*K. Lewin's term translated by N.-Schulz as 'space of possible movement'. Of course K. Lewin means more than that too. N.-S. refers to the Der Richtungs-begriff In Der Psychologie. Der Spezielle Und Allgemeine Hodologische Raum (Lewin, 1934) - a paper in a collection, with K. Koffka being one of the five editors. Lewin in his Field Theory in Social Science (Lewin, 1952) speaks of 'the first prerequisite for a scientific representation of the psychological field is the finding of a geometry adequate to represent the spatial relations of psychological facts. We know from the history of physics that an empirical space might be represented by different geometries: at first Physics used Euclidean, more recently Riemannian geometry'. Whilst in his Contribution to Psychological Theory (Lewin, 1938), he presents Hodological Space as one of the Geometries Applicable in Psychology (for instance, where Euclidean and Riemannian spaces use the shortest connection between two points, in Hodological Space it will vary according to the situation).*

and Personal Space. You don't come with the Ambient Space. Crudely, you build the Ambient, accommodating the Personal, and allowing for the Hodological. But, on the scale of urban design, it is the Hodological that is critical. It is the space that invites (almost demands)

the behaviour of passage through itself. Personal is territorial in character, although not of fixed boundaries,

*This is due to cultural reasons (see Chapter 2 on how different subcultural groups prefer different spatial relationships when interacting). Also see conclusions of D.M. Pedergem, of Brigham Young University (Pedergem, 1973): 'The personal space of a person is affected by the personal space of another person, and both the personal space of the self and the other determine the personal space between them in that it is consensually obtained'.*

and as opposed to Hodological and Personal, the Ambient space is a negative one. Gibson's space. His work on perception of time has changed into 'event perception', and that of space, into 'perception of surfaces and their layouts'. Ambient space is surfaces and their layouts.

*Page 9 of the 'Affordances' paper: 'In the layout of a complete enclosure an observer is imprisoned. There are barriers to locomotion in all directions'. Imprisonment, in fact, is taking away your Hodological space, and bringing Ambient space to be equal, or less, than your personal one.*

Page 10 of the 'Affordances' paper: 'The progress of locomotion is visually guided and it depends on the avoidance of obstacles. The steering of locomotion, the control of it, depends on the progressive perceiving of these features of the environment, their negative affordances'. Here it is again this mixing up of spaces Hodological (see locomotion), and Ambient, the latter implying activities depending somehow on the awareness of the layout of surfaces that are perceived

mainly by peripheral vision. Because locomotion doesn't start due to the negative affordances of barriers. Expectancy does it. Nor does it solely depend for its continuation on the progressive perceiving of those barriers. I maintain that the sequential ('Sequential', see Chapter 1) vision,

*The reasons of accepted approximation in referring to vision (focal and peripheral) alone, are (apart from 'the more information coming in through the eye and at a faster rate', and Page 3, Part III.A of the 'Affordances' paper: 'we pay the closest attention to the information that specifies what the other person is, what he invites; etc.), the reasons are that we are investigating movement through space, i.e. visuomotor activity, where, what is more, the eye is invaluable as a 'distant receptor' (Sherrington's term). Any visual experience is nevertheless coupled with the other senses, and therefore visual information alone is implicit of them too (not pointed out in the oversimplification of The Affording Of Concealment, Page 10, Part III.A). Sound for instance could distract you from seeing something (or accentuate vision, or create anticipation of), may even be the only information of someone being behind an opaque surface, or around the corner. For design purposes this is particularly important (see Chapter 1, Fig. 2).*

together with saccadic efforts to take in the whole ('Binary'), are coupled with, and preceded by expectancy ('Tube'), whether towards a perceived goal, or an unseen destination. In that manner, adding the cognitive dimension to the perceptual experience of moving through



space (see contributions by Thiel, Appleyard, Halprin *et al*). This led to 'Hodological' space as one of the three urban spaces. The term borrowed from K. Lewin via N-Schulz (see above), adding to it the notions of invitation, at a scale between the architectural and the urbanistic, and towards a destination - which requires a mental map for getting there. This undergraduate-initiated speculation of mine, based on observation of behaviour and methodology of design (see Mitropoulos, 1969, 1970, & 1971) was at that time fruitfully used for designing a complex building. It was therefore encouraging to hear of others' concepts fitting with my designer's approach. That anticipation and feedback, synchronised as they may be, the programmed patterns are a unit of time ahead of the reflex reactions. Dr Trevarthen's position,

*"... we cannot agree with Gibson that perception of objects in space can be understood without reference to the cerebral apparatus and its contribution to space perceived" (Trevarthen, 1972). Also see Trevarthen, 1967 and 1973.*

that 'you come with space', putting biological knowledge into Gibson's work that you've got to have predictive mechanisms in the brain, and his model of man with relation to space: starting with a body that determines the form of the nervous system, first muscles and skeleton, then brain connecting to all this, the brain ending up having a body, establishing as it were a field of potential acts, which will also depend on what it can receive from the environment, the visual field positioned with a definite relation to the body, and having the same structure as motor-space. Surely, he speaks of fish, but he then adds that you can think of man as so many fish put together (and didn't Gibson say that "the whole body is an organ of vision"? And of course, his references

to Psychophysicologist N. Bernstein's 'motor image' (Bernstein, 1967),  
*Bernstein tells us of how in the brain, integrated motor images of goal are necessary in voluntary coordination of complex acts. 'What is important is that the motor image of a movement (that has been termed by neurologists 'the program of movement') must necessarily exist in the C.N.S. in the form of an engram'. And that, 'we affirm that at the moment when the movement began, there was already in existence in the central nervous system a whole collection of engrams'.*

and Ch. Sherrington's 'projiciency' (Sherrington, 1947)

*Stedman's Medical Dictionary defines 'projicient: relating the organism to the external world'. 'The brain', Sherrington says, 'is always the part of the nervous system which is consulted upon and evolved upon the 'distance receptor' organs'. Those receptors 'which acting as sense-organs initiate anticipatory, i.e. precurrent reactions'. 'The motor train behind, the elongated motor machinery of the rest of the body, is therefore from this point of view a motor appendage at the behest of the distance-receptor organs in front'.*

J.J. Gibson (Gibson, 1957) in a very stimulating 1957 Cornell paper (you can see where the 'Affordances' paper came from!): 'An animal nevertheless can learn in some degree to go to places and objects outside of these limits (of enclosing surfaces)', Page 192. And on Page 193: 'Hull's theory of maze learning asserts that it is the acquiring of a sequence of movements. Tolman's theory asserts that it is the acquiring of a cognitive map of the maze'. I hope to contribute to

Urban Design, by suggesting a way to dynamic space conception, through approximate anticipation (3-dimensional space corridors, with bearings, turns, and loose dimensions: TUBE), and assumed feedback (series of perspectives of two kinds. Of progressive movement through: SEQUENTIAL, and as-a-whole: BINARY). The way a pedestrian experiences Space-Activity.

The subject of the research was the way in which the human mind anticipates the way in which it will move through space. The research was carried out by the Newcastle University Architecture and Town Planning Departments, and the results are presented in this report. The research was carried out over a period of two years, and the results are presented in this report. The research was carried out over a period of two years, and the results are presented in this report. The research was carried out over a period of two years, and the results are presented in this report.

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## CHAPTER 4

SPACE IS.....

Investigating the concept in dynamic urban design, the crucial point was in realising the inseparability of space to activity. Also, that the Behaviour space man experiences and the designer conceives is not the same as the Euclidean space the latter communicates to the bricklayer. My aim has not been to optimise, but to achieve an articulated, comprehensive range of spaces, shared by the users, and understood by architects-planners working on urban complexes.

TELL ME YOUR SPACE AND I'LL TELL YOU WHO YOU ARE

The failure of the Newcastle SPACE conference to define 'what space is', was in fact its very success. The 2-day March 1973 event organised jointly by the Newcastle University Architecture and Town Planning Departments, asked the non-question, and got, in my mind, the silent answer that was brief and to the point: Space is not. Not today anyway. Because with the current social concerns and anticipating the future there cannot be abstract, absolute, architectural space. The conference, by not establishing at its outset the necessary social context, forsook its very reason for being, i.e. the designers' frustrating inability to fulfil today's social needs and anticipate tomorrow's hopes, which reason was explicitly evidenced by the fact that whilst the psychologist Architectural Psychology speaker was allowed his static-interior, technique-oriented design concept-free analysis, all criticism fell on sculptor Anthony Caro who was the only 'synthesiser' amongst the speakers.

*The reason wasn't because he thought (and said) that architects often use sculpture when they get stuck (to slow people down for instance), but more because of his*

*idea of using an art gallery as a setting (to put you in a frame of mind - as opposed to Moore's work doing away with galleries), and mostly because he thought sculpture should now be less available to touch.*

*Finally, Caro: "I'm a bit weary when you talk about values. Social values? Donatello tells you about your body, but Robert Morris invites you to come and have an experience".*

The word 'space' has quite different meanings, if at all, and if only all of them debatable, for the painter (the surface of the painting), astronomer (total area of the universe), typographer (blank interval between words), etc., which like the conference presentations is all very interesting but equally confusing. Unless the question is given a context like for example: what is man's urban space as far as the designer is concerned? It is only then that one can afford/make sense of/use space information input, whether it is Huxley's mescaline experience,

*'Place and distance cease to be of much interest. The mind does its perceiving in terms of intensity of existence. I saw the books but was not at all concerned with their existence in space' (Huxley, 1954).*

an anthropologist's suggestion,

*'Disco dancing' says Sue Jennings, former dancer and dance therapist 'has the appearance of several hundred people expressing themselves in a void. Body movement is at a minimum, and it often seems irrelevant whether one is partnered or not, since one is doing one's own thing, eyes*

closed. It could be said to communicate non-communication in a desperate fashion. It suggests the lack of space, and overcrowded living conditions in our environment'. (Jennings 1972).

outer space station research measurements,

'Next to a dull diet and the lack of female companionship, the lack of privacy is probably the largest source of irritation to men in restricted environments. The problem was to arrive at an optimum size. How large a volume could be afforded, and how small was too small?' The answer was a 7 ft cube, which is about the dimensions of human form with arms outstretched (Progressive Architecture, 1969).

the multitude of combinations with the ordinary german language word Raum,

*Raum Flache* - space, *raum trupp* - demolition party, *raumlichkeit* - locality, etc.

Aldo Van Eyck's definition,

*Space, in the image of man, is place, and time, is occasion.*

or the endless adjectives in relevant research literature, some often conflicting,

*Inner Space: under-ocean research article (Architectural Design, February 1967), and Kate Millett (Millett, 1971) referring to Erik Erikson (Erikson, 1964) speaking of the 'inner space' that is harboured in the somatic design of women.*

or one's own experience,

*In deep sorrow I have perceived space approaching its geometrical dimensions.*

My interest doesn't lie on the space that falling snow fills, where dandelions float, and domestic dust or church incense lingers, but man's experience of space. My own observations of the pedestrian's daily behaviour, friends' on-paper descriptions of the places where they live, or space data collected from literature

*'Myri and the others followed the three men out of the sphere, across a gritty floor that might have been concrete and up the steps, a distance of perhaps thirty feet. They entered a corridor with artificial lighting and then a room into which the sun was streaming...'*

*From Kingsley Amis' novel My Enemy's Enemy.*

made me realise man's dynamic sequential experience, and so look at buildings as simply one part of man's network. Of Space as a Network.

*By combining Shells and Networks, two of the 5 Ekistic elements (the others: Nature, Man, Society), during the Athens Center of Ekistics seminars and Delos Eight Symposium, Summer, 1970, a continuous, structured, stimulating interaction on 'Networks and Human Settlements: Policies for the Future (see Mitropoulos, September 1970).*

This eventually led to the 3 spaces for urban pedestrian man: Hodological, Ambient and Personal (see Chapter 2).

BEHAVIOUR SPACES NOT FOR SOCIAL ORDER: HODOLOGICAL, AND ITS TWO  
COMPLEMENTARIES, AMBIENT AND PERSONAL.

I have referred to in the past (see Chapters 2 and 3) to N. Schulz's (N. Schulz, 1971) translation of the Kurt Lewin term 'Hodological Space' as 'space of Possible movement'. This (through the intermediary of a German Maths student), is as I suspected not quite true, and surely misleading. For one thing, it confused (my terms) Hodological with Ambient, both being spaces of possible movement, (although in all other respects my initial borrowing of the term Hodological had turned out to be realistic when comparing Lewin's concept and mine). Because, whereas Ambient space is of possible movement (where you can say you move by avoiding barriers - as J.J. Gibson has it: what movement barriers afford you (Gibson, 1973)), Hodological is the shortest/most agreeable/most energy demanding/etc. space of possible movement, depending whether you are in a hurry/strolling/exercising yourself/etc. respectively.

*Hodological space, which you come with as with Personal space and in contrast to Ambient, is identified with the activity of movement through space. Not only towards a visible goal, but also towards a non-visible destination, which requires a mental map.*

Since there are many paths between A and B, the character of the distinguished paths varies according to the situation, says Lewin.

His main argument (closely referring to Lewin, 1938) is of course against the idea that Euclidean geometry is *a priori* valid and the only one, and points out at its unsuitability for behaviour representation - the person and his psychological environment. For instance, Euclidean

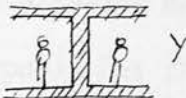


space uses as the distinguished path the shortest distance between two points. In Hodological space, on the other hand, the character of the distinguished path varies, as mentioned above, according to the situation, the concept of direction referring to the distinguished shortest path.

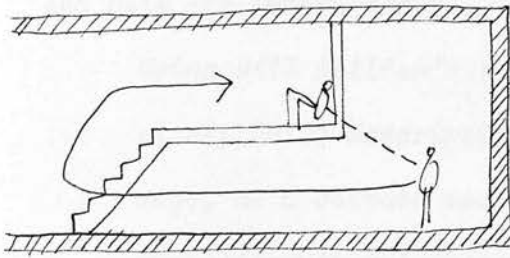
*In a Table comparing Between Some Properties of Hodological and Euclidean Spaces, Lewin (Lewin, 1938) says that, which path is the distinguished one, depends for Euclidean space, upon the immediate neighbourhood of the path, in contrast to the total field and its cognitive structure, for Hodological space. And whereas Direction for the former space is between two points, for the latter is between two regions. The connection determining the direction is a straight line for Euclidean, but a distinguished path for Hodological space.*

Euclidean space, unlike Hodological space is not a Behaviour space.

*For example, you may be up in your 6th floor room. Euclidean wise you (X) could be one yard away from someone (Y) on the other side of the wall, himself in his own 6th floor room, next door. In Hodological terms however, you are probably several minutes apart all the way down, out from your front door, into next door, and six floors up, to meet*

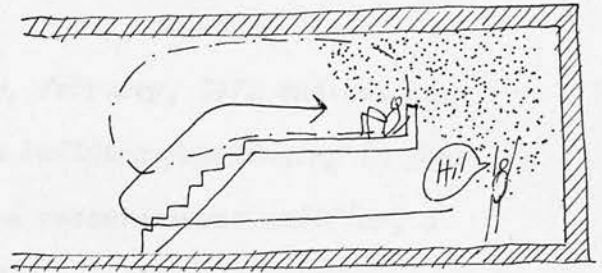
*'Y' in his room* X  Y .

For my concept of urban design Euclidean space is significant only in relation to Behaviour Space: Hodological, Ambient, Personal.



← Hodological

--- Euclidean



← Hodological

○ Personal

□ Ambient (example: visually separate acoustically together).

You perceive through activity/intended activity, along Behaviour space (itself influenced in turn by that perception) which is only part of Euclidean space. The question whether space is visual, tactile, etc., doesn't arise, because you don't perceive space, you experience it, and through your activity space takes its meaning,

*Robin M. Haynes (Haynes, 1969) views the Man-Environment interaction from the geographer's standpoint, on the urban scale, and remarks on 'how behaviour space was assumed to be euclidean but evidence was found that perception space was related to the non-euclidean downtown axis bias' (as suburban dwellers perceived their environment in a non-euclidean way: 'Midland City', by T. Brennan, 1968, Dennis Dobson Ltd., London). He suggests that "relevant spatial facts" are selected not directly from the "true" map of euclidean space, but from behaviour space - that part of euclidean space which is available for action. Mental maps or "perception spaces" are the perceived part of behaviour space, and behaviour itself is influenced by mental maps'.*

and gets its *raison d'être*.

Using Bill Hillier's (Hillier, February, 1972 and Hillier et al, 1972) description of a building functioning in four ways, as a climate modifier, a resources-use modifier, a symbolic-cultural object, and a container of activities, I must point out that this paper (as well as the whole of *Space Networks Study*) is concerned with the last function - which however connects with the semantics of the users of the building. Also, we could define the container-building on/of a place, as its space.

A cave, or an old windmill, becomes a home for you and family, if you choose to live in it. That sounds reasonable and common sense. Until one looks into common architectural procedure and built environment-human behaviour commentary. Edwin Willems of the Department of Psychology, Houston, Texas (Willems, 1973) tells how Bruner (Bruner, 1965) noted, "I am still struck by Roger Barker's (Barker, 1965) ironic truism that the best way to predict the behaviour of a human being is to know where he is: In a post office he behaves post office, at church he behaves church". Willems also mentions Proshansky, Ittelson and Rivlin (Proshansky, Ittelson and Rivlin, 1970) arguing that even though behaviours often deviate from the *a priori* administrative plan for a setting (e.g. that people "should" sleep in a bedroom), actual observed molar "patterns of behaviour in response to a physical setting persist regardless of the individuals involved". He, Willems, then comments that 'In the conduct of everyday affairs, not only do we depend upon behaviour-environment congruence for predictability and social order, but we often use departures from such congruence to label and diagnose persons

as being sick, crazy, deviant, hyperactive, depressed, etc., and in need of help and control (see Barker, 1963; Wicker, 1972). It seems, I would add, that after a certain behaviour has been imposed by labelling one specific space with one specific activity,

*To paraphrase Charles Jencks (Jencks, 1972), every space has more uses than are socially desirable. He puts the case for adhocism and gives examples of re-use (grounded airplane-restaurant in Finland), and different use at different times (inverted rubbish can-baby cage). As he doesn't give an example of more than one activities at the same time (usually the additional one being clandestine), I will take one from this University, where in the David Hume Tower region (containing cafeteria, restaurant, shop, lifts and frequent passages) the women's toilets doubled successfully as inter-student advisory and counselling service. Until the walls were painted a graffiti-impossible slippery surface.*

then, 'objective' observations have been made of that behaviour (!)-outside the social context which determined that certain behaviour in the first place. If man behaves post office in a post office it is simply because he is there for that particular functional activity, and if he doesn't behave anything else, along the range of activities that could take place in that space, it is because no other activity is allowed. The distinction of course should be kept in mind between re-use (one activity substituting another after a period of time), and multipurpose space (different activities at different times of the day/week, or several activities at the same time). Bill Hillier (Hillier, 1973)

replying to O. Newman's (Newman, 1973) *Defensible Space*, points out how during the last century the possibility was debated of using space as a means to stabilise social order. The use of space to impose social order is evident in both space standards,

*Space standards, which are not to be confused with Ambient Space since they do not take into account space articulation, nor do they concern themselves with allowing for Hodological space and accommodating Personal space. Instead, they allocate space, broadly, speaking, in increasing amounts of privacy and volume as you go up the hierarchy ladder.*

and the Territorialists' space.

*Territorialism, which is not to be confused with the Personal space, which like the Hodological space you come with (see Chapter 3), organises space not for social relationships but for social order. It operates on the unacceptable scale of: between man's tower-of-clothes (safeguard for his privacy and keeping out people he fears) and the 1870's invention of barbed wire that highlighted the organisation of space argument, of whether spaces for containment (the cowboys said), or spaces for exclusion (the farmers said). Hillier (Hillier, 1973) attacks territoriality as the universal explanation of spatial behaviour avoiding 'the main issue in the study of the social evolution of space, which is to discover how urban space transcends territoriality and constructs a functional and semantic field of such richness and density that it is one of the most pleasurable experiences known to man to walk through it, or live in it'.*



Not so with Hodological space design, accounting for 'many stairs and back doors'.

*Sir Balthazar Garbier, 1663: "Too many stairs and back doors make thieves and whores". (See Hillier, 1973).*

To get back to the Space-Activity, the multitude of Ambient space activities are all along a wide range, which the Hodological and Personal Spaces establish at either end. Connected intimately, the three spaces certainly aren't a case of you sitting behind your desk (the wrong interpretation of Personal). In a room (the wrong interpretation of Ambient). At the end of a corridor (the wrong interpretation of Hodological). One relationship discussed before (see Chapter 3, referring also to Dr Trevarthen's work) is that man comes with Hodological and Personal spaces, he doesn't with Ambient. That, starting from man creating a context for himself, his behaviour space will depend both on the field of potential acts, and also on what he can receive, i.e. the information from the Ambient space he doesn't come with. The other basic relationship, also based on personal observations, is that peripheral awareness (see Ambient space) plays the invaluable supporting role for both Hodological and Personal space activities: The projective-exploratory activity of movement through space, and the concentration-requiring activities at the variable, non-bubble personal space region. This, agreed with the notion of the two visual systems, Ambient and Focal Vision, when discussed between this author and Dr Trevarthen, Spring, 1973. Trevarthen (Trevarthen, 1973, but also see 1968, 1972), makes the distinction, 'for all active perceiving between two levels of sensory-motor coordination in percepto-volitional systems: Level 1 - generation of the primary temporo-spatial frame or context by cerebral adjustment

to feedback within a whole primary field of information appraised simultaneously' (the Ambient vision), 'and Level II' (the Focal Vision) - selective percept-building by intermittent or serial processing of foci that are taken by sets of successive focalization inside the primary context.

*Trevarthen outlines 'the structure of generative motor functions regulating information uptake by vision, because' as he says, 'its main features are universal for all perceptual systems. Essentially the same pattern of action is found in other systems that are served by different sense organs. Automatic regulations of posture, orientation, and locomotion by sensory feedback, and subconscious perception of space relations are closely related brain functions at the sensory-motor level of intelligence. For acts of seeing I have called this level of functions Ambient Vision'. Where information is mainly obtained 'from continuous transformations of features in the visual field at large that are produced by surging or smooth forward or sideways displacements of the eye when one walks about or shifts posture'. 'In contrast to this highly proprioceptive vision, which serves to perceive overall structure in each individual's behaviour space, and to interpret its usual changes, the conscious seeing of detail that is necessary for accurate recognition of the innumerable goals of our more intelligent and critical acts, demands fixation of perceptually isolated objects after they have been oriented into a restricted central part of the binocular visual field. This seeing of things is carried out by Focal Vision'. Which,*

*'depends on saltatory or saccadic rotations of the two eyes in unison, with minimal intervals of time in which the image of a small part of the visual field is held "fixated" or drifting very slowly in relation to the fovea. Meanwhile the body down below is kept still, or its displacement is accurately compensated by opposing eye rotation'.*

When discussing (see Chapter 3) the movement-through-space programmed patterns being a unit of time ahead of the reflex reactions, it was stated that Bernstein has shown that the integrated motor images of goal or purpose in the brain that are required in voluntary coordination of complex acts, is the same application of distinction of levels of integration to the synthesis of voluntary acts.

On the Hodological level of space-activity on the other hand, and referring to the Architectural Psychologist (of Psychology descent) being exasperated at the Newcastle conference by "the architects' pre-occupation with movement", my comment would be that this is what man does: moves in, and through space. There are various movements to be registered, writes J.M. Fitch referring to J.J. Gibson (Fitch, 1972). Kinesthesia is also interesting as an example of information detection without a special modality of sensation. Vestibular kinesthesia for the movement of the skull (up and down the stairs). Articular Kinesthesia for the body framework (sitting in a chair, or lying in bed). Cutaneous kinesthesia for the movement of the skin relative to what it touches (whether we cut across the lawn depending on the grass being wet or dry). Visual kinesthesia finally, for perspective transformations of the field of vision enabling us to anticipate. Which is essential



for the architect using the dynamic concept of Hodological space and designing 'by anticipation'. But the current urban situation is contrary to this concept. It ignores/inhibits/restricts the two spaces man comes with (Hodological, Personal. See Chapter 3) by territorial and space-standardised manipulation of the one he doesn't: Ambient (but unstructured) space. Man is trapped in it by profit (see Chapter 2), and social-order determinism. Resulting in an isolated-building Architecture within a chopped-up 2-dimensional solids-and-voids Town Planning. It is a marvel that pedestrian man manages to establish his daily continuum at all. But he still does. After all, Space Networks resulted from observation of these covert corridors trailing behind and projecting ahead of man moving through space.

I would like to define space as a network, man's network, and to suggest that the future of urban design lies with Hodological space. After all, we all come with it.

## CHAPTER 5

A COGNITIVE/PERCEPTUAL NOTATION FOR URBAN DESIGN BASED ON THE CONCEPT OF SPACE NETWORKS.

Taking a dynamic conception of space, as a network, meaningful only with respect to activities, and considering movement-through-space as basic activity of man and as a means of organising his city, the need for an abstract representation of this 4-dimension experience, to replace the conventional static means, becomes obvious, when designing complex environments for movement.

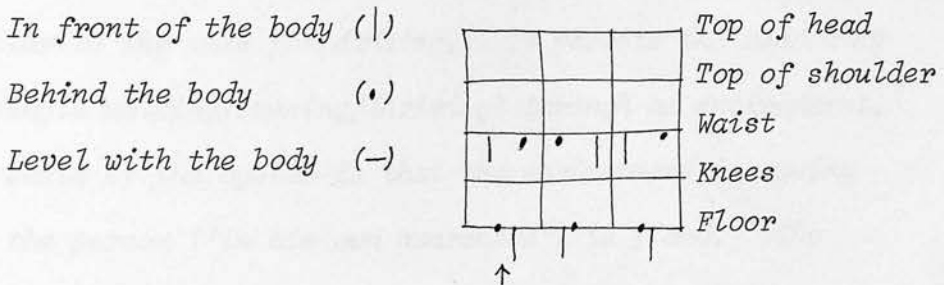
BEYOND THE SEQUENTIAL EXPERIENCE OF THE MOVEMENT-THROUGH-SPACE ACTIVITY

As we walk along the urban setting, we are said to 'move through the sequential experiences of an urban path system' (Foster, 1974). That 'the evaluation of environments and of the feeling of enclosed space is not absolute but dependent upon the variation and sequence in which it is experienced' (Brodin, 1973). T. Lee (Lee, 1970) speaks of 'long sequences of images. This is experienced as an impression of the self moving through a static image'. J. Joedicke (Joedicke, 1968) defines space as the 'sum of successive perceptions of places'. J. Zeisel (Zeisel, 1970) talks of 'sequences of experience' too. We are even urged 'To make a Sequential Path by arranging buildings, or parts of buildings in a sequence of useful activity. And to reinforce it by any means necessary to propel persons along a general designated path' (Maki, 1964). The path itself is defined (Rose, 1968) as 'a continuous sequence of spaces through which an observer moves'. Then of course there are those 'sequentialists' that have also notated this choreographic experience

*Choreographers by analysing movements and pauses of the human*

body, have, long ago, elaborated notations for recording those successive postures and movements between them.

Rudolf and Joan Benesh (Benesh, 1956) on Walking: 'In a natural walk the weight of the body is so evenly floated between the legs as to be conveniently considered to be always between them. A walk then becomes a series of fourth positions (one foot being in front and the other behind - there are five positions) with alternating feet, the arms being in opposition'. Example: Writing steps within the stave of five lines (and omitting here positions and movements of body, head, etc.), for right foot in front (left one behind), then left in front, then back:



A stylised walk will then be written in detail with movement lines (the part of movement of the foot through the air is traced) as in the *posé* (a step with transfer of weight).

Running, explains itself, as a series of jumps from one foot to the other. When writing with the music, the steps are written under the notes of the music to which they belong.

J.J. Gibson (Gibson, 1966) commenting on the richness of skeletal space perception obvious from the elaborate set of symbols, remarks that 'the input could better be termed

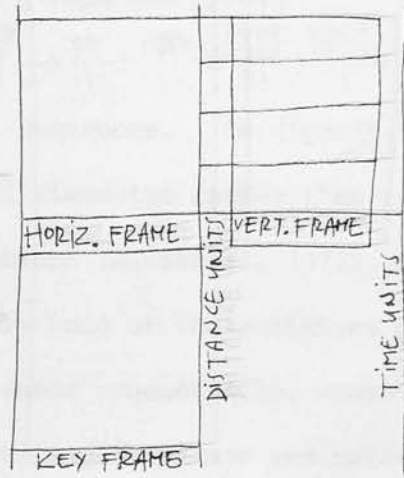
*osteoesthesis than kinesthesia'. For an earlier statement on osteoesthesis he quotes (L.T. Troland, 1929): 'Posture is reducible primarily to patterns of relative angular disposition of the various portions of the skeleton'. That 'movement may be regarded as ordered successions of progressively different postures'.*

of man in space-and-time: Lawrence Halprin (Halprin, 1963) sees the city as an art form demanding movement through its spaces and he choreographs

*He scores environments and people together in a choreography of motion. His (Halprin, 1965) 'motation' (movement notation), for use in evaluating a given design, but also to develop new ones for kinesthetic experience, is similar to the ones for dancing. It permits the recording of people walking/running/(driving) through an environment. The basis of the system is that the environment is moving and the person ('in his own awareness') is fixed. The basic unit of this system is the "frame" which is comparable to motion picture film. There is a Key Frame, two Tracks (an Horizontal and a Vertical), and two Strips (on either side of the Vertical Track) one for Distance (to indicate rise and fall of surface, and also sound/smell/colour/rain/other events) and one for Time, where the irregular spacing of dots indicates change of speed. The Key Frame, where the basic outline of the trip is drawn, is at the bottom of the Horizontal Track. The Horizontal Track is used for mapping, segmented in successive frames*

the path (outlined in the Key Frame) through the environment (turns, directions, motion relative to other mobile elements). It repeats only the section of the journey notated in the corresponding frames of the adjacent Vertical Track on the right. The Vertical Track, itself of smaller frames, is a record of our visual horizon -

what we see ahead of us as we walk (dead ahead only). Basically of 26 symbols (General- vertical/horizontal element, Structure - high/low building, Landscape, Moving Things, Direction - of movement), but many more auxiliary ones are used.




that movement: 'The essence of our urban experiences is the process of movement through a sequential and variagated series of spaces'.

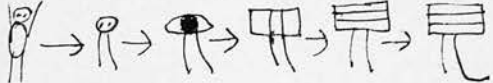
Philip Thiel, states that each space exists in a sequence-context, proposes (Thiel, 1961) a Sequence-Experience Notation, and assumes, similar to film editing, music and dancing, a movement line drawn on a time base as the fundamental referrent. 'Architecture' he says 'may well be "frozen music". But man is the pickup whose movement realises the experience'. His notation for 'Architectural and Urban Spaces', that goes developmentally back to 1951, is indeed remarkably thorough - but perhaps only too thorough.

Kevin Lynch himself (Lynch, 1960) favours what he calls the organisation in terms of sequences. Concluding on the comments made by the subjects taking a walk around a Boston Block (an excellent Lynch, 1959) he tells of how 'sounds and smells were both equally low

in conscious awareness'.

An interesting comment for singling out 'seeing' from the other senses in the movement-through-space studies, came from Professor Thiel (Thiel, April 1973) mentioning the suggestive Japanese Kanji character miru  "to see"

that represents a two-legged eye. A Japanese friend

explained further the stylizing: 

But in fact Lynch goes beyond perceptual sequences. He (Lynch) "has given to his 5 elements a new existential dimension rather than reducing them to aspects of a "visual" problem' (N.-Schulz, 1971). In fact Lynch talks of the Images inhabitants hold of their cities, and of organising a 'whole', which will be sensed sequentially, whose parts will be perceived only in context. That people arrange and relate Edges,

*The linear elements not used or considered as paths by the observer, Boundaries between two phases, linear brakes in continuity: shores, railroad cuts, walls. Important in holding together generalised areas, probably not as dominant as paths.*

Districts,

*Medium-to-Large sections of the city, conceived of as having two-dimensional extent which the observer mentally enters "inside of", and of common identifying character. Most people structure their city to some extent in this way, with individual differences as to whether paths or districts are the dominant elements.*

## Nodes,

*Are the strategic intensive foci to and from which an observer is travelling: junctions, places of a break in transportation, a crossing or convergence of paths. Related to the concept of paths, since junctions are typically the convergence of paths, events on the journey.*

## and Landmarks,

*Point-references, external to the observer: Distant (towers, domes, hills), mobile but slow and regular (the sun), or local (signs, shore fronts, trees, door-knobs). Increasingly relied upon as a journey becomes more and more familiar.*

as they move along the predominant element that a Path is.

*The channels along which customarily, occasionally or potentially man moves: streets, walkways, transit lines, canals, railroads. Occasionally, paths were important largely for structural reasons. Where major paths lacked identity, or were easily confused one for the other, the entire city image was in difficulty.*

In his discussion of notation systems, Stuart Rose (Rose, 1968) differentiates between those that appear to be notating the physical characteristics of space, and those concerned with the non-physical ones ('images, impressions, meanings, or experiences'). He then, rightly, points out how Thiel's and Halprin's (physical characteristics), although of individual components 'reasonably clear and

readable', encounter a 'simplicity' (Rose's word) problem (that is complexity. See how it builds up from Benesh's to Halprin's), in terms of Rose's own criteria,

*Clarity, of readability of individual components, Simplicity of its structure, and Completeness of the subsystem in providing for an array of spatial possibilities.*

and in terms of usage - the latter, I would add, being for design purposes, and for mine, crucial. That, Rose continues, 'in viewing the final array of (the two) notational sub-systems (symbols and their recording) immediate comprehension of the actual spatial sequence was found to be, at best a difficult task'. Rose's own notational proposition suffers much in the same way.

*Where most terms employed are associated with either Thiel's ('physical') or Lynch's ('non-physical'). He first refers to Thiel (indicating in the past on how much of our experience of space is derived by association of meanings to elements perceived) and then goes on to superimpose Lynch's image notation to his own use of the observer's path. His contribution extends however to the selection of an appropriate simulation system. The notation was actually 'developed with a constant eye towards the "reading" capabilities of the computer graphic system so that realistic simulations could instantly be derived from the notation symbols'.*

so  
Not/though, says Rose, with Lynch's (non-physical characteristics), and Rose is right again, the simple reason (to me) being that the Environment is complex, whilst the way Man structures it in his mind isn't. As expressed before (See Chapter 3) in the Man-Environment



interaction (and for Design-form-Movement purposes) I start with Man, expecting, anticipating, projecting. His behaviour space will depend on his brain/body field of potential activity - as well as on what he will receive from the environment. David Stea's opening passage, as late as 1965 (Stea, 1965) shows the position in the past and the slow gradual shift, in investigating this interaction, from the Environment end towards Man: 'We tend to regard space, in the designed environment, as defined by physical barriers which are erected to restrict motion and the reception of visual and auditori stimuli'. Erich von Holst's (Von Holst, 1974, translated by Robert Martin) ideas of control theory in neurological models of behaviour, have however, indicatively replaced Pavlovian reflexology. By deciding that man's reflexes were not sufficient to account for the plasticity of his locomotion, he put forward the "reafference principle" according to which hierarchies of control centres govern behaviour by comparing the "expected" effects of motion (efference) with the real consequences detected by sensory feedback (reafference). My aim has been a conceptual notation beyond sequential experience, and so, transcending man's sensory input, to fuse it with his anticipating brain.

#### THE NOTATION TOWARDS HODOLOGICAL SPACE DESIGN

S for Sequential ('perception frames you experience in succession', see Chapter 1) is one of the four elements in the Space Networks notation. The others are Tube (T), Binary (B), and Section-Perspective (S-P). Originating developmentally since 1968,

*At first the sequential experience was seen both as man's movement through space (Mitropoulos, 1970, 1971) but also*

as the built environment unfolding in front of static man, and bearing down on him, and seducing him to experience it (Mitropoulos, 1969). The first level of development (the second being the notation S, B, T, S-P) was a network for human movement - a pedestrian's path (notated A2, and pointing to the subsequent Sequential, then finally the Tube when the path is traversed at high speed). This pedestrian network of paths eventually became the comprehensive network of paths, and places (A2/A1, pointing to subsequent Binary). Reflecting Y. Friedman's vision of a mobile architecture, and the approach to Piazza del Campo (Sienna, Tuscany) from Via de Pantaneto (a dark and narrow street, and into the square where the medieval pageant and horse race is still held). A relationship of linear street and enclosed square, of corridor and hall, of buildings straddled along the network. Noticeably, an A1 itself was a continuous series of A2 units (N.-Schulz describing Scharoun's Berlin Philharmonic Hall: '... wonderfully concentrated interior in turn surrounded by a labyrinthine foyer which in a fascinating way, expresses the action of coming from outside in, and being 'distributed').

the four elements make up a cognitive/perceptual structure for use as a creative organisation of the environment for immediate application to urban design. An "intuitive hypothesis" Mogens Voltelen (Voltelen 1973) would call it,

*Except for the conventional experimental scientific*

method (derived from the natural sciences and characterised by controlled experiments) and the 'artistic approach' he proposes to widen our insight, Voltelen speaks of the 'methods used in the humanistic sciences which cannot introduce experiments but have to rely on collection and interpretation of existing facts and very often on intuitive hypotheses that can be discussed and tested, accepted or rejected, but hardly proven in the sense of the natural sciences'.

derived from observation (one of the 'three logical ways perception and behaviour may be studied', says Peter Smith, 1973), then currently, 'drawing on evidence' (the second of Smith's proposed ways - the third being questionnaires) 'from inside the system, its *modus operandi*' (see earlier mention of Von Holst, and Movement Through Space: The Activity Your Brain 'Affords' You, Chapter 3). So that the notation, articulated (as a cognitive/perceptual system), and in context (social, its design for movement spatial scale, its place along the range of other notations) be better understood by its originator (myself), and, for communication to, and future use by other designers, as well as by myself - in fact only design applicability testing (like with the Multipurpose building design - see Chapter 1) will show the notation to be explicitly useful to what degree (or not). This notation is for pedestrian man's ego-centric experience,

*In an investigation of the 'sense of direction', Trowbridge, 1913) differentiates between 'two radically different methods: one used by civilised man (Ego-centric), and the other chiefly by living creatures of a lower order'*

*(Domiecentric). Except in the neighbourhood of his dwelling (where he nearly always relates to the home), man orients himself by the four points on the horizon corresponding to the directions North, East, South, West. Lines from these points always intersect at the ego, the intersection moving with the ego.*

at the macro-architectural and micro-urbanistic scale of Hodological space: You move through Behaviour space, along which you perceive, and which is part of the measurable Euclidean one (see Chapter 4, also Chapter 2 for the designer having to give dimensions to the space that hasn't any). Your activity of walking is not in space-of-possible movement but your own Hodological (intention) space - that as an experienced and purposeful adult you 'come with'. Your mind and your body senses are in fusion. You, as a combination, anticipate (T), and check by feedback (S). This conceptual model is both Cognitive and Perception-based. It admits the importance of perception, although 'stressing the cognitive processes which follow - or precede' (Rapoport, 1973, commenting on the Cognitive Image-based model presents it separate from the Perceptual one in his survey, amongst a group of twelve different models.

*Competence and Adaptation, Information Flow, Ecological, Ethological, Evolutionary, Socio-Cultural, Preference in Environmental Quality, Performance-based models.*

It observes the city through 'experience in motion' (one of the five of Williams (Williams, 1954) categories of perception. The others: panorama, skyline, vista, urban open space). But as with Ethnomusicologist J. Blacking,

*John Blacking, Professor of Social Anthropology, Queens University, Belfast, in his Munro lecture, Edinburgh University, 'Exploration in Space and Time': 1. Venda Girls' Initiation (a film with music, 11th March 1974), and 2. Dance And Music As Keys To the Science of Man (paper presented on the 12th).*

it accepts 'walking' as (his words) a species specific capability: a human activity that is in man's own nature, a discovery (as given) rather than an invention (to be constructed), where the intellectual and the physical are fused. This notation proposes a design process through the anticipation that makes walking possible. This anticipation refers mainly to D.C.D. Pocock's third of the three inter-related aspects (Pocock, 1973 subdividing 'the Image'). The other two: first, a designative aspect concerned with description and classification - see Lynch, and a second one, appraisive aspect, concerned with feeling, value and meaning attached to the perceived. The third, 'relates to predictions and inference which give to the image a depth, continuity, pattern or meaning beyond that justified by experience of a particular scene alone'. 'The basis for this component' Pocock continues 'is the sum of experiences of similar situations, inferential structuring from the inherent laws of organisation, and, thirdly perhaps logic'.

So, in addition to the progressive sequence of frames (S), that seeing and kinesthesia make you aware of as you move through space, your projecting brain is taken into account, itself allowing that sequential experience by preceding it (T). To continue on a quotation (used in the past, see Chapter 1, 'When I go towards the exit of a room I am already there'): '... and would not be able to go there unless I was

already there' (Heidegger, 1954). This is the cognitive/perceptual model, T/S. But whereas T is the cognitive 'whole',

*Outside design, with Halprin (using a Key-Frame), Thiel (speaking of a sequence-context), and Lynch ('organising a whole'), this 'wholeness' - among other things - has also preoccupied experimental music notators. Because, says Pinder (Pinder, 1972) 'Notational systems determine what is composed. Yet composition determines notation all along'. It is a long and international list, with Xenakis (Greek, born Roumania, 1922) striving graphically to be able to see the entire shape on one page, something a musical score would not allow. Same with Kagel (born Buenos Aires, 1931), Cage (born Los Angeles, 1912), Stockhausen (born Modrath bei Koln, 1928), Busotti (born Florence, 1931), Andriessen (born Utrecht, 1939), and Tom Phillips (born London, 1937).*

is

which/necessary for the structuring of S to be experienced, the third of our notational elements B (Binary) is a perceptual 'whole', a series of visual contrasts, which is similar to Gordon Cullen's (Cullen, 1961) point that although the pedestrian walks at uniform speed, the city often reveals itself in 'a series of jerks' that he calls 'serial vision', as 'a sequence of exposures and enclosure, constraints and reliefs'.

*'... If the environment is going to produce an emotional reaction, with or without our volition, it is up to us to try and understand the three ways in which this happens'. He lists them as Motion (Serial Vision), Place, and Content.*

The T/S model now becoming T/(S,B), with you being the connection of points of departure and goal/<sup>or</sup>destination along your human space network.

Like with Tom Phillips' (see above) musical notation, being mixed, in that conventional notation, graphic notation and photographic instruction for mime are present, Stuart Rose (Rose, 1968) remarks on how when Lynch's symbols were 'actually employed in demonstration they were accompanied with a worded description which was essential in providing the reader with a clear and more specific image'. Without which the symbol system 'may have been somewhat too general or too vague'. T, S, B (and S-P) is a system representing the Space Networks concept that demands graphics to convey meaning. It is after all a notation specifically for design, made up of spatially defined images, where by having linked behaviour to space, the cognitive dimension has been added, and space is considered as far as it makes sense to the pedestrian moving through it.

*There is no intention to review the literature, but among the notations I traced, one, which is more of a methodology (David, 1973), didn't link with behaviour at all. On the other hand, Edward T. Hall notates (Hall, 1963) how man unconsciously structures micro-space (at the other end from Lynch's outer scale - see Chapter 1). He sees Proxemic behaviour as a function of eight different 'dimensions' (with their appropriate scales), one of which is 'Kinesthetic factors'. The others being: Postural-Sex identifiers, Sociofugal-Sociopetal orientation, Touch code, Retinal combinations, Thermal code, Olfaction code, Voice loudness scale. He assumes that one of the most basic forms of relating in space, imbedded in man is the potential to*

strike, hold, groom, or caress, and he codes kinesthetic relationships as one of four distances, or, as one of the four distances plus some space: within/just outside (of body contact distance, easy touching distance with only forearm extended, touching or grasping distance with the arms fully extended, and reaching distance).

There are several notations dealing with movement. Apple-  
yard's (et al, 1964) highway experience is strictly not for pedestrians (at least not those inside the highways...).

Carr (and Schissler, 1969) did a complementary follow-up, not on highway aesthetics but 'on the way people organise the sequential perception in forming a representation of such experiences'. Proshansky (Ittelson and Rivlin, 1970 as referred to in Schulberg, 1971) logged behaviour data of patients inside psychiatric wards, converted graphically for Schulberg's article by Design & Environment. 'Walking' was one of the 6 listed activities (the others: Visiting (talking), Social (card playing), Mixed Active (watching TV), Isolated Passive (sleeping), Isolated Active (Grooming).

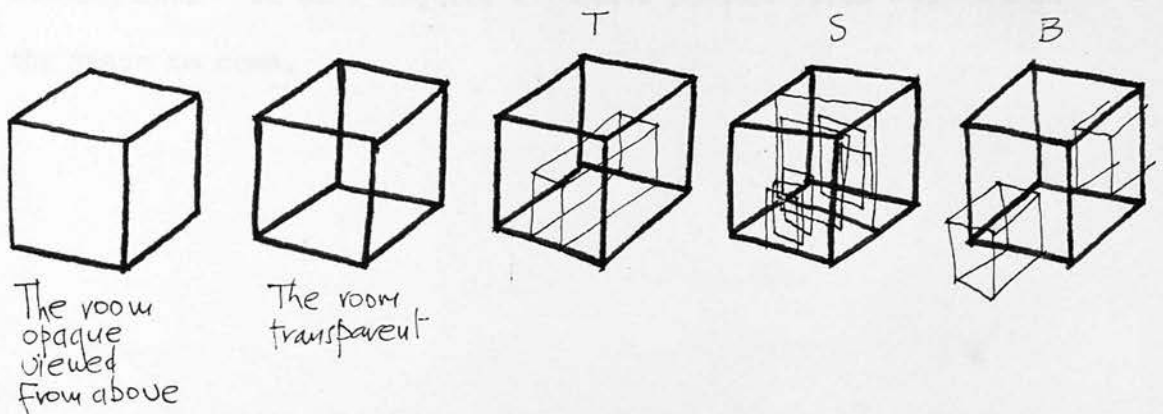
Cullen's (Cullen, 1967-68) 'The observant layman's code for his environment' would require 'a Code Book' from which 'a sophisticated Pattern Book' would develop 'down to such details as ...'. Mostly for recording the environment (even with some notations with design aspirations), but rarely stated as analyses only, like with Castex (and Panerai, 1970, 1971).

Alexander (Ishikawa and Silverstein, 1968) on the other hand, is a designer's notation. Although isolating the building,



*and not with movement at its basis (unlike Halprin's - see Chapter 1), it has admirably proven itself in design. It is made up from behaviour-oriented, user-requirements patterns that are pre-designed component images, not quantitative performance standards, which a designer 'must digest and internalise, so that he can work intuitively in generating a design', Montgomery, 1970).*

Legitimately-approximate graphic interpretation of T is a corridor. For S, a series of architectural sections. For B a passage-and-room pair. Taking in a room (although it doesn't give the same importance to Hodological space movement, as the non-building macro-architectural micro-urbanistic scale where it belongs), we have



You can actually see a Section-Perspective (S-P). It is an indicator (like T) of the complex urban scale for which the notation is meant. It tells you that, contrary to the buy-and-sell conception of space, presenting a void when for example a building is demolished (see Chapter 2), physical (like human) space networks are there in the built environment neighbouring the part to be designed and waiting to be connected up. It takes us back to the nineteenth century ideals of urban design, where, as Peter Collins (Collins, 1965) tells us 'before 1919, an urban

building was almost always considered as part of a street', and then extends this concept further to include the surrounding buildings in a truly 3-D design, for movement. The use of this notation will influence both type and size of 'building'. It is not a substitute for the necessarily static Plan-Section-Elevation of Euclidean space, which you need to communicate to the brick-layer. Nor for the Sequential Notations which, subsequently to the networks structuring you can use to elaborate on details. Consisting of 4 elements all sharing the common concept of Space Networks (Physical sp.net. (S-P), Human sp.net. (T,S,B), perceptual (S,B), cognitive (T)), the notation proposes a structural design for the urban milieu modelled on the pedestrian's mind/body experience when moving through that behaviour space- termed Hodological. It will require effective feedback from such design in the years to come.

## CHAPTER 6

DESIGN FOR PEDESTRIAN MOVEMENT

There has in the past been designing for the pedestrian. Then, of course a lot of behavioural research has, and is being done. The effort here, myself a designer, is to attempt, explicitly, the linking of the two,

*The Japanese Telecommunications pavilion in the Osaka Expo was designed for pedestrian movement. So are 'Aeroways' passenger access at Heathrow Airport, London, the Charles (Charley) de Gaulle Paris Airport itself, the elevated sidewalks in Stockholm, the Shinjuku Center in Tokyo, Kenzo Tange's Yamanashi Building, the Cumberland New Town centre, and so with Columbia's Mall shopping centre, London's Royal Arcade, the Galleria in Milan, the Galleria in Houston, Gallerie Ravenstein in Brussels, the Chisteter Theological College, Sussex 'to act as a visual and pedestrian link between the existing school and church', with 'appropriate sequence of spaces'. Buildings as 'connective tissue': Student Union, State College, Iowa, then also University of Toledo, Ohio, Performing Arts Centre. Corridor links above Paris streets, and Edinburgh streets, and Manhattan streets, the pedestrian streets (doesn't it sound odd somehow?!) in central Copenhagen, and down to Jane Jacobs' sidewalks ... Naturally adding the proposed National Gallery Train, which would in fact mean the gallery becoming the British Rail network.*

*John Zeisel on the other hand (Zeisel, 1970) states that 'In fact there is a great deal of behavioural research al-*

ready completed which, although it has significant implications for design, has never been used'. He goes on to put the blame squarely on the designers (who doesn't these days?) of which only 'few have bothered to look (sic) into this research'. He classifies behavioural research in four types. One: Sociological, based on finding out what he calls 'desires and needs' (by what I think he means the french - elusive in any language - 'besoins', and 'desirs'). Two: Psychological, reducing all into 'territorial behaviour'. Three: Perception, where he rightly refers to Donald Appleyard's (a designer himself) work on people structuring the city in three ways (Topographically - through a sequence of experience, with continuity all-important, Positionally - with distance and sense of direction predominant, Associationally - where knowledge of the pattern of urban character is most useful), this research however, directed to highway and sign system designers. And finally the Fourth type: Psychophysics, the relationship of physical attributes, such as light, air and sound, to sensory responses, such as sight, hearing and feeling'. Clearly John Zeisel believes in the conception where research was (and still is) 'carried out by "disciplines related to architecture" the results of which were to be applied by architects' (underlying by authors Hillier and Leaman, 1972). This pair of R.I.B.A. Intelligence Unit writers go on to indicate how this background has produced the architectural research effort of Building Science, Systematic Design, and the establishment of Performance Standards (for thermal, acoustic, and visual conditions).

*From their conceptual 4-function model of research that they put forward themselves, it is the 'container of activities' one that relates to Design for Movement, and Hodological space structuring seems to agree with their call for research to 'guide the designers' pencil in the early stages of design', and justifies their 'suspicion that buildings have tended to become overdesigned from the point of view of the relation between activity and its spatial containment'. Design for movement conflicts however with their contention that activity containing 'is one of four, all of which are equally important'. (The other three: climate modifier, resource modifier, cultural/symbolic). Brian Goodey's (Goodey, 1972) and Amos Rapoport's (Rapoport, 1971) reviews of the literature, remain, to my knowledge, (together with Downs' (Downs, 1970)) indicative of the various approaches in the perception-behaviour studies.*

however moderate the contribution, into a cognitive/perceptual model (see Chapter 5), of the 'brain-afforded' activity of man (see Chapter 3) to move through his Hodological space (see Chapter 4), along his social networks-dependent space network (see Chapter 2). The proposition having been to use this anthropological model, of the pedestrian's urban structuring, to design for that pedestrian, and make the attempt myself - experimentally.

#### HODOLOGICAL SPACE FOR STRUCTURING FORM-2 OF THE THREE FORM-GENERATION STAGES

Having started with the concept of space as a network (Mitropoulos, 1970, 1971, also see Chapter 1), I was interested in Jay Farbstein, who whilst defining the fundamental dimensions of human activity in the

physical environment, reviews activity studies (Farbstein, 1974) and critically points out how, in the attempt to make the task-generated communication system more efficient (with efficiency optimized in relation to some goal, usually set by the owner/employer): 'movement is treated as instrumental, not as an activity in its own right', sometimes even, 'as an undesirable activity which should be minimized and allocation methods have been devised which seek to accomplish this end by manipulating the relative location of people and facilities'. However, he adds (these efficiency-oriented movement-minimization studies apart) 'movement can also be regarded as valuable, e.g. in extending experience of the environment, in facilitating informal contacts, etc.' Farbstein goes on to mention Tzonis and Salama (Tzonis and Salama, 1972) suggesting even 'inverting the institutionally efficient association pattern

*Some 'studies seek to use activity, and especially contact data, as the basis for layout or space allocation exercises.*

*In these, some measure of the "association" or level of communication between persons and/or areas is used as an*

*indication of the likely patterns of movement in a building'.*

as a way of fostering socially desirable contacts'. Likewise, he mentions Watson (Watson, ? ) generalising 'the communications approach, calling for a strategy of matching types of locations in a building, based on a more general demand for contact or privacy, rather than on the simple minimization of movement'.

'Architects', says Michael Leonard (Leonard, 1969) 'have been obsessed with the physical form of building, often at the expense of the life lived within. The reality of a building has been seen only in its physical substance, and yet the experience of a building in time, as movement through its space, is equally real. There is a form in

the architectural structure, and equally a form in the pattern of experience'. It is the latter form that I refer to as Form-2, a 'new form',

*Looking like a kind of 'Metro Architecture' (Victor Prus, 1967, on Montreal's underground system with 'its crowds, accidental encounters, and unrelated individual purposes - a typical street scene'). But, above the ground, and without the optimal fit of a rapid transit system, providing the 'ability of the patron to make his way from origin to destination in an unobstructed non-circuitous manner' (Rehab Path, a report on the project for rehabilitation of the Port Authority Trans-Hudson Corporation, AD/8/73).*

an anti-form in fact, which is partly the Form-1 'frozen' (the human and physical space networks of the neighbouring environment.

*The AD/7/72 report on the Piano & Rogers Centre Beaubourg project, emphasizes the 'being in contact and communication between the individual and individuals', speaks of the activities within the social complex, 'plus the activities along the edge of the square, such as shops, cafes, restaurants, children's areas, current events and information rooms, etc., that will link the centre with the rest of the city. This linkage is the key to the success of the scheme and will need study and control'. Much as I enjoy the Piano & Rogers social complex, and totally agree with the (human and physical space networks) 'linkage' awareness, the priority seems again to be with the new building first, and then, subsequently the connections. (It was reported, however, although in a by-the-way manner (Sunday Times, March 10th,*

1974) that 'on the far side of the piazza old houses are being converted into studios for visiting artists accompanying their own works').

Where, finally, Form-3 is the built part of Form-2 (see Chapter 1). Hodological space, which is the shortest/most agreeable/most energy consuming/etc. space of possible movement (depending whether you are in a hurry/strolling/exercising yourself/etc. respectively) completes the Form-1 networks and finally structures it into Form-2, through designing by anticipation, expectation and the projected desired activity of movement, a design requirement predictable to a good level of approximation. Form-2, basically movement-through-space, may be called (by Alexander, 1966) 'the abstract ordering principle' required in the modern conceptions of the city, or 'inner mapping' (by Mary-Jean Eastman Hunter, 1972, whose paper 'is based on the feeling that even for relatively simple buildings, this type of activity-space mapping, where the tool used, and still is, to carry out the inner mapping is the space standards, is unsatisfactory, and for complex buildings it is completely inadequate').

'Movement', seems to De Long (De Long, 1972) to be 'the generic factor underlying environmental communication and environmental intelligence. That, through it, experience so necessary to the development of intelligence is acquired'. He then refers to Piaget placing sensori-motor development requisite to the acquisition of intelligence.

'Communication' concludes Sinclair Gauldie (Gauldie, 1974) is an activity which must inevitably fail of its effect if the sender's knowledge of the receiving apparatus is defective. And our prime duty now is to see to it that the outcome of this communicative activity of ours is to help reconcile man with his environment, not alienate him from it'. Fatouros



(Fatouros, 1973) sums up: 'If the goal of the perceptual organisation of the environment which is mainly the architect's work, is to organise physical stimuli, which include objects and distances and leads to different degrees of complexities and interrelations, then architecture in each specific case, must consider the eventual "reception" of these stimuli, i.e. the cognitive "schemata of the user". Hodological space, by structuring Form-2 does just that. It is a behavioural space, a space-activity, the activity being movement through that space which, for instance, is both going up (or down) the slope, as well as turning around the corner, for satisfied expectancy (or surprise, or shock) - that is, a visuomotor activity. So that the physical designed environment, starting with movement, will become relevant to man's cognitive/perceptual mechanism, for learning, diversion, orientation,

*Rapoport (Rapoport, 1969) refers to Abraham Moles' suggestion in the latter's discussion of the implications of information theory for perception, that 'symbols are used to structure information from the environment which otherwise would become unmanageable due to its fantastically rich sensory bombardment'. Same, of course, with the activity of movement.*

*David Stea (Stea, 1965): 'Human movement is closely related to the general problem of topographical orientation' (location, navigation, pathfinding, etc.). Then refers to John Barlow (Barlow, 1964) suggesting that 'von Uexkull's three sensory spatial cues (von Uexkull, 1957) could be reduced to two: sense of direction and sense of distance'.*

and interpersonal relationships, etc. This designing-for-movement using the concept of Hodological space, is clearly based on user-requirements, and it establishes its own man-and-his-Hodological-space scale:

'urban'. In the Jan/Feb 1968 *Archit. Forum* article *Urban Form and Urban Function*, it is shown how 'the form of our cities and the flow of traffic within our cities are inextricably linked'. Hodological-space-structured Form-2 will hopefully do to the urban future what the car has done to the present and answer the question posed by Diethard Engel, Rainer and Ute-Theodora Jagals (Engel *et al*, 196-?): *La voirie permet, dans une certaine mesure de terminer l'organisation de l'espace; en fait, la formation des espace urbains s'est presque totalement detachee de la voirie pendant les dernieres decades et les premiers indices d'une nouvelle forme de relation apparaissent. La question se pose alors de savoir s'il est possible de completer le plan fonctionnel et celui des circulations par un "plan de conception de l'espace" permettant une interpretation architectonique libre dans un cadre tres large*'. In other words, looking for an architectural space-structuring conception at the scale macro-architectural and micro-Town Planning, that I refer to as 'urban'.

That scale today, both exists (covertly), and doesn't (overtly), see Lefebvre :

'L'Urbain, c'est-a-dire la societe urbaine, n'existe pas encore et pourtant existe virtuellement; a travers les contradictions entre l'habitat, les segregations et la centralite urbaine qui est essentielle a la pratique sociale se manifeste une contradiction pleine de sens' (Lefebvre, 1972).

Francois C. Vigier (Vigier, at the time, early 1960's, Assistant Professor Urban Design at the Harvard Graduate School of Design) reports on the limited definition proposed by the Urban Design Committee of the American Institute of Planners that 'Urban Design is focussed primarily on

*aesthetics rather than the total perceptual experience'* (American Inst. Planners, 1963), then further explains that to him 'Urban Design links all three' (Planning: long term decisions affecting the overall structure, such as transportation, land use, and the policies to effectuate them. Architecture: detailed design of individual buildings or groups. Landscape architecture: design of environment between buildings, groups, or built-up areas) 'to the extent that it fills whatever gaps may exist among them'... I suggest that in fact it is the forgotten pedestrian doing that filling, and in that respect Vigier is ironically right, referring by implication to the man-and-his-Hodological-space 'urban' scale!).

Lefebvre would find legitimate this linking of behavioural considerations and design, based solely on user-requirements, considering, literally, the man in the street. He would say, that today more than at any other time, there is no (hopeful/imaginative) thinking without utopia.

'C'est aujourd'hui plus que jamais, il n'y a pas de pensee sans utopie' (Lefebvre, 1972). Of course it all depends whether you are looking at it from the point of view of active participation in a changing situation, or, 'knowledge', or establishment-suitable demands to answer, like another whiter-than-the-last-one detergent. Peter Cook (Cook, 1970) classifies *The Utopian* as one of his Six Current Orthodoxies (the others; Organic, Methodic, Opportunistic, Scientific, Tasteful), and complains that 'the sinister usefulness of the utopian label is that the timid pragmatists can dismiss any experiment or any new concept as "utopian", and thereby remove

it from the discussion of practical issues'. But hopes that 'experimental architecture may mature and merge with the credence that is now being given to the pursuit of "Futures" (see Kahn and Weiner, 1967)'. Thus 'gain in gaining a context - and it will be impossible to pigeon-hole away'.

Stephen Carr (Carr, 1967) puts forward nine criteria for environmental form, and urges us to have them 'tested both by attempting to apply them to design, and by further research'. He then realistically adds that 'although such utopian design research is needed, significant advances could be made now in the practice of city design'. The most relevant (for us, here, now) of his nine criteria: 'Structure the city form to facilitate the various modes of structuring mental representations'.

Robert B. Bechtel (Bechtel, 1972) implicitly pins his hopes on experimental design by rhetorically asking whether (should economic and social considerations fail us) 'designers will have the courage to create designs that change policy'.

#### FORM-2: A TOOTHPASTE ARCHITECTURE BY LINKING THE BRAIN TO BEHAVIOUR

The Hodological Space model shown in the photographs 1 - 8 is a process. (1) Not a 3-dimensional expression of Plan/Section/Elevation, or a physical representation of a brief, and the scale in this case is most often than not varying between 1 and 2 cm per m. The wooden floor-to-ceiling, and balsa-wood structures are the general and local coordinates within which the urban model is then generated (using packaging material) and pinned into place (using ordinary pins).

(1) See explanations opposite page 85



PHOTO 1. General view of structure and model, with 2' 2" stool indicating size.

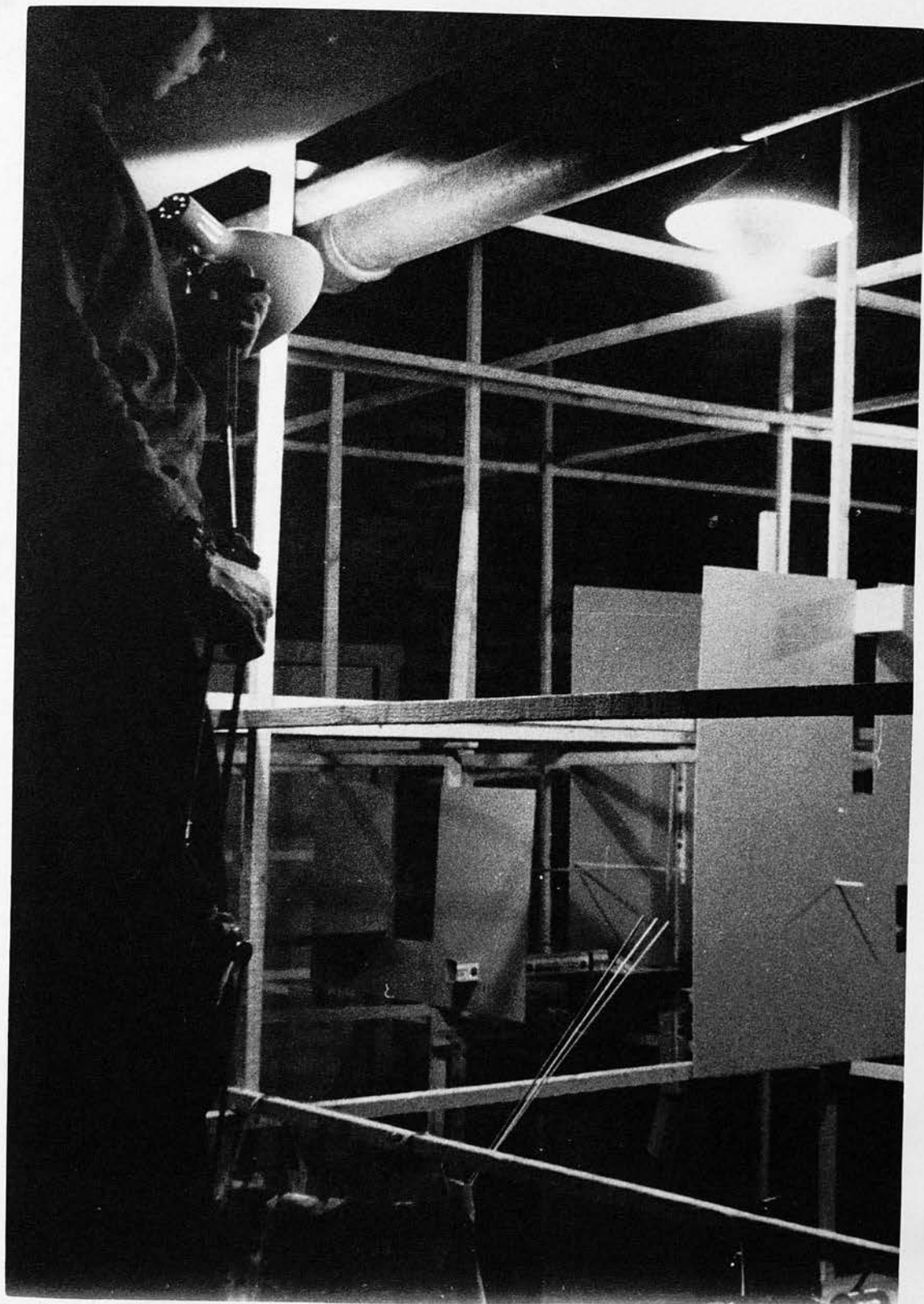
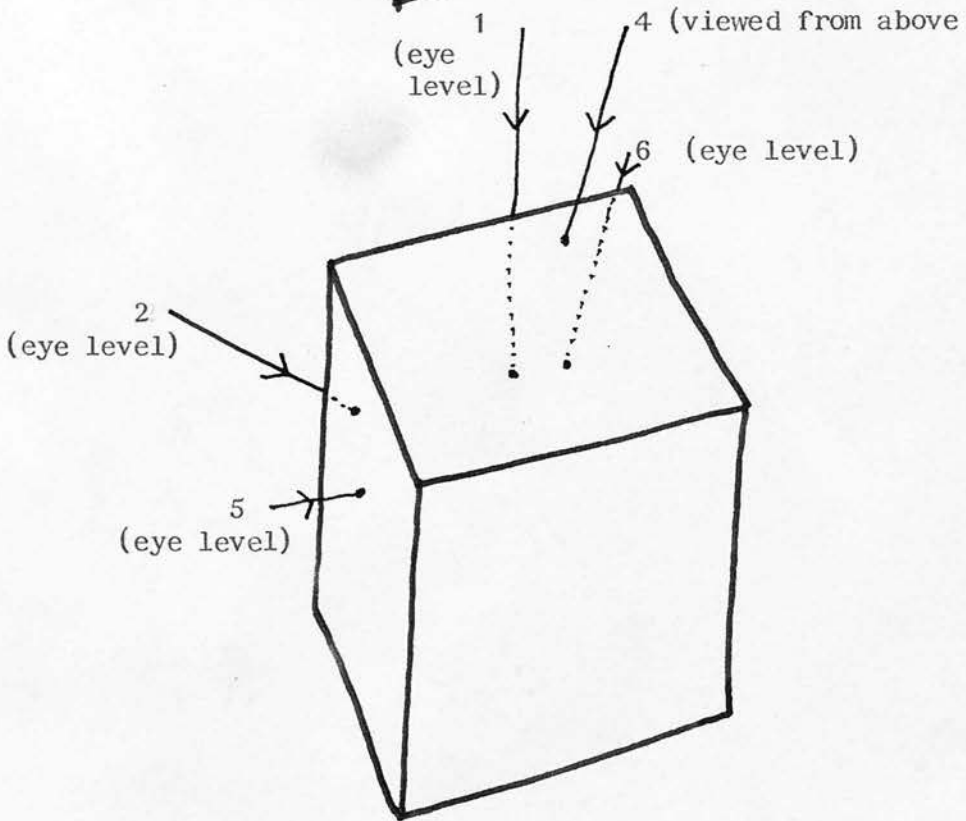
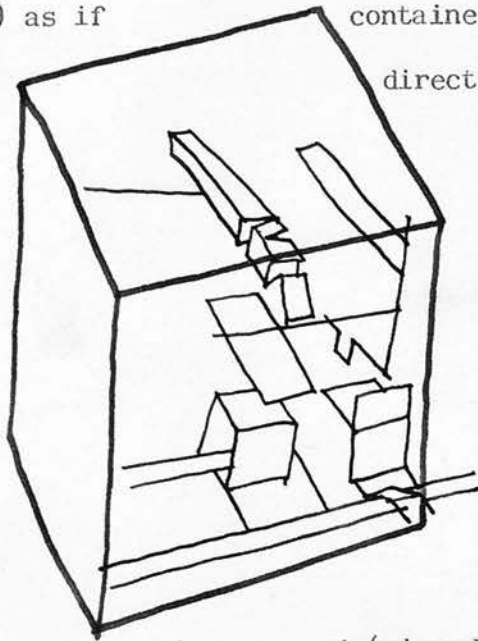


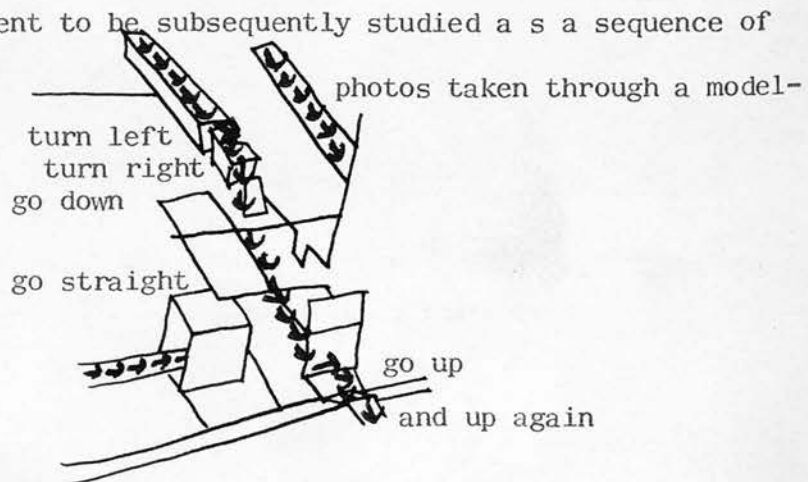
PHOTO 2. Midshot on wooden and **balsa** wood structure, and cardboard model (from the right of PHOTO 1).

Taking PHOTO 3 (page 85) as if  
 cube, so as to show the  
 photographs were taken

contained within an imaginary  
 directions from which the



The various paths of movement to be subsequently studied as a sequence of  
 perspective drawings (or  
 scope)



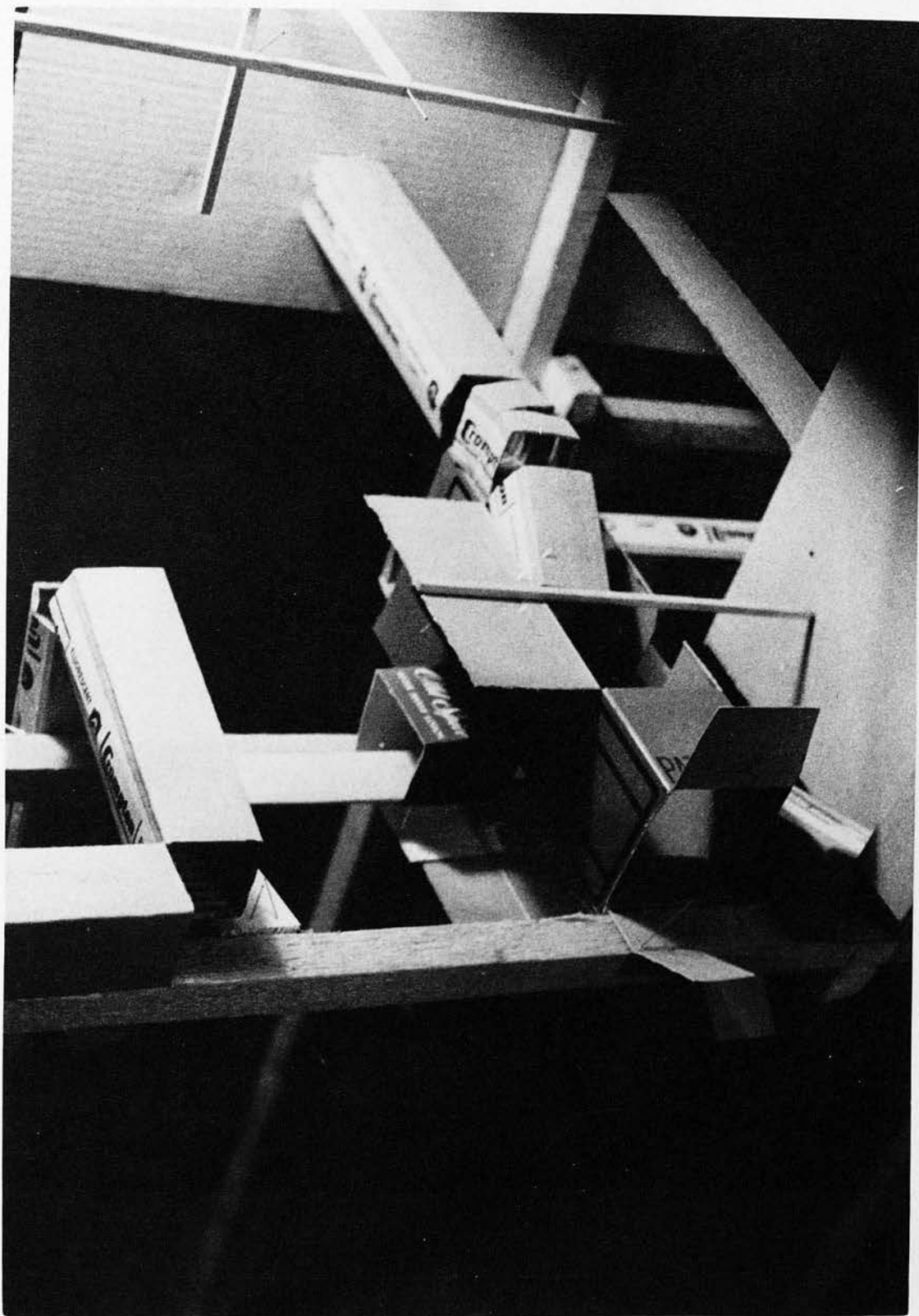


PHOTO 3. Close up on model of ready-made packaging material  
(from behind, and on the right of PHOTO 2).



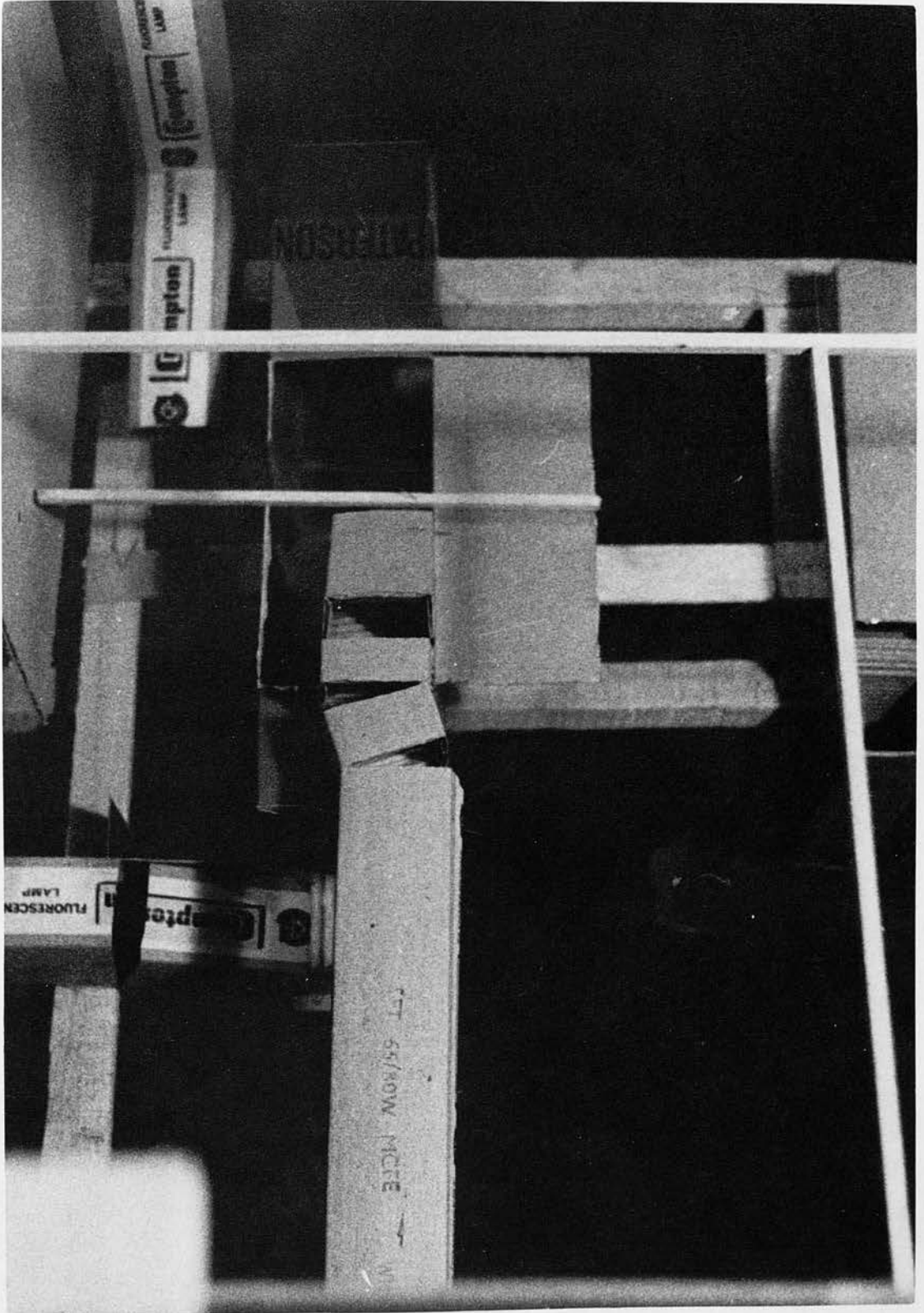


PHOTO 4. Close up (from behind and above of PHOTO 3).

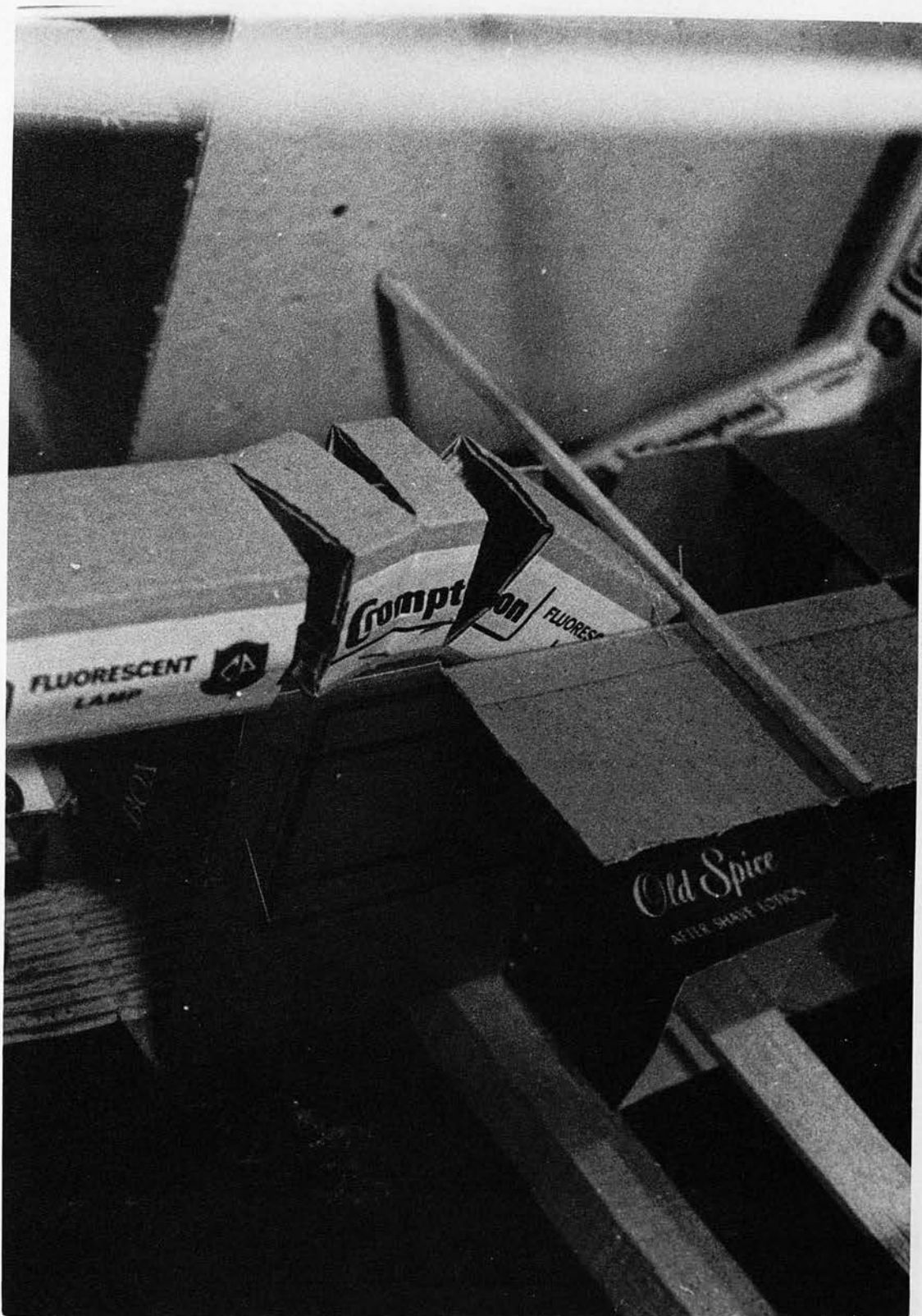


PHOTO 5. Close-up (from the left and more level with, of PHOTO 3.)

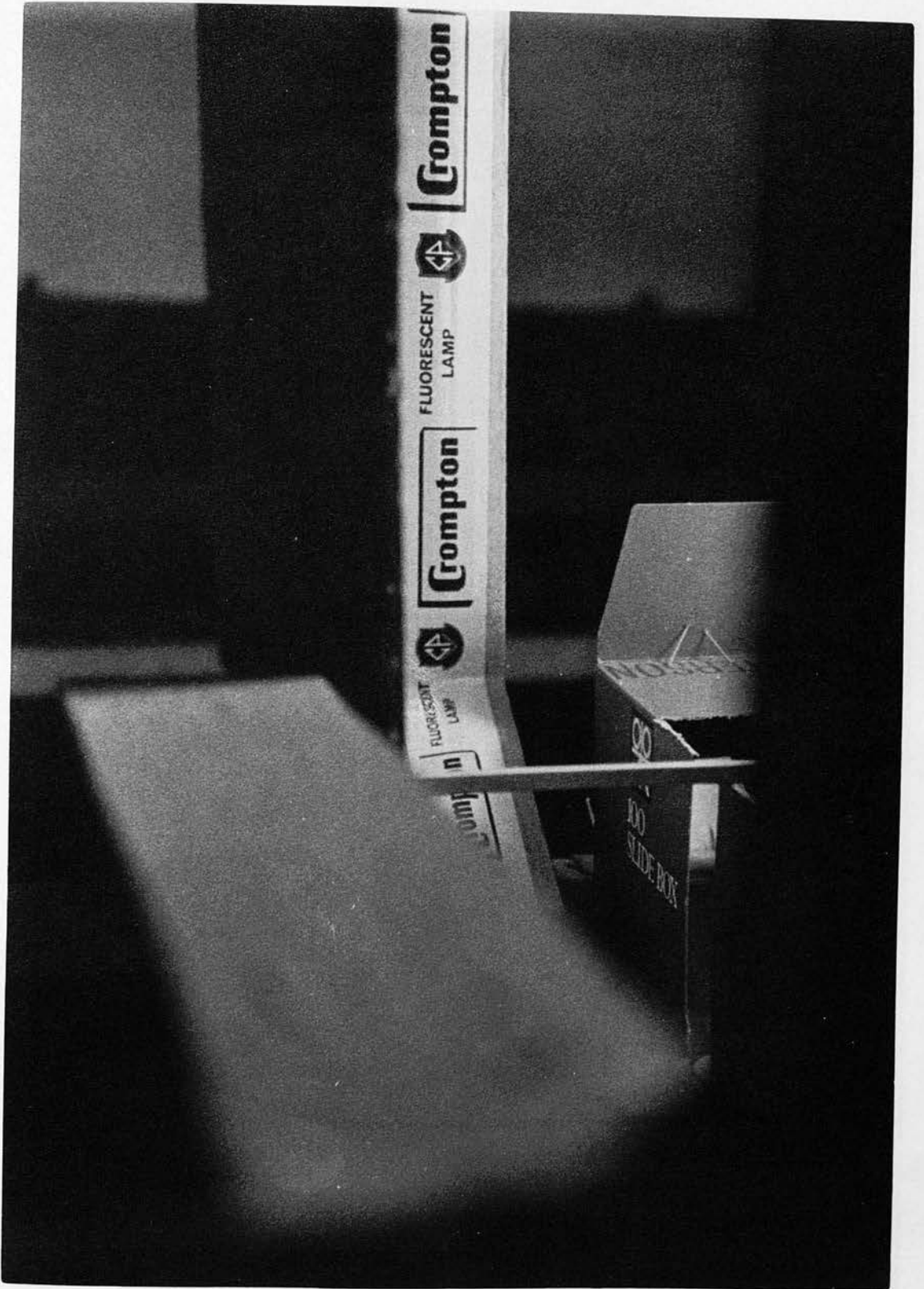


PHOTO 6. Pedestrian's eye-view of passage way (from behind, on the right and more level with, of PHOTO 3).



PHOTO 7. Pedestrian's eye-view of passage ways.

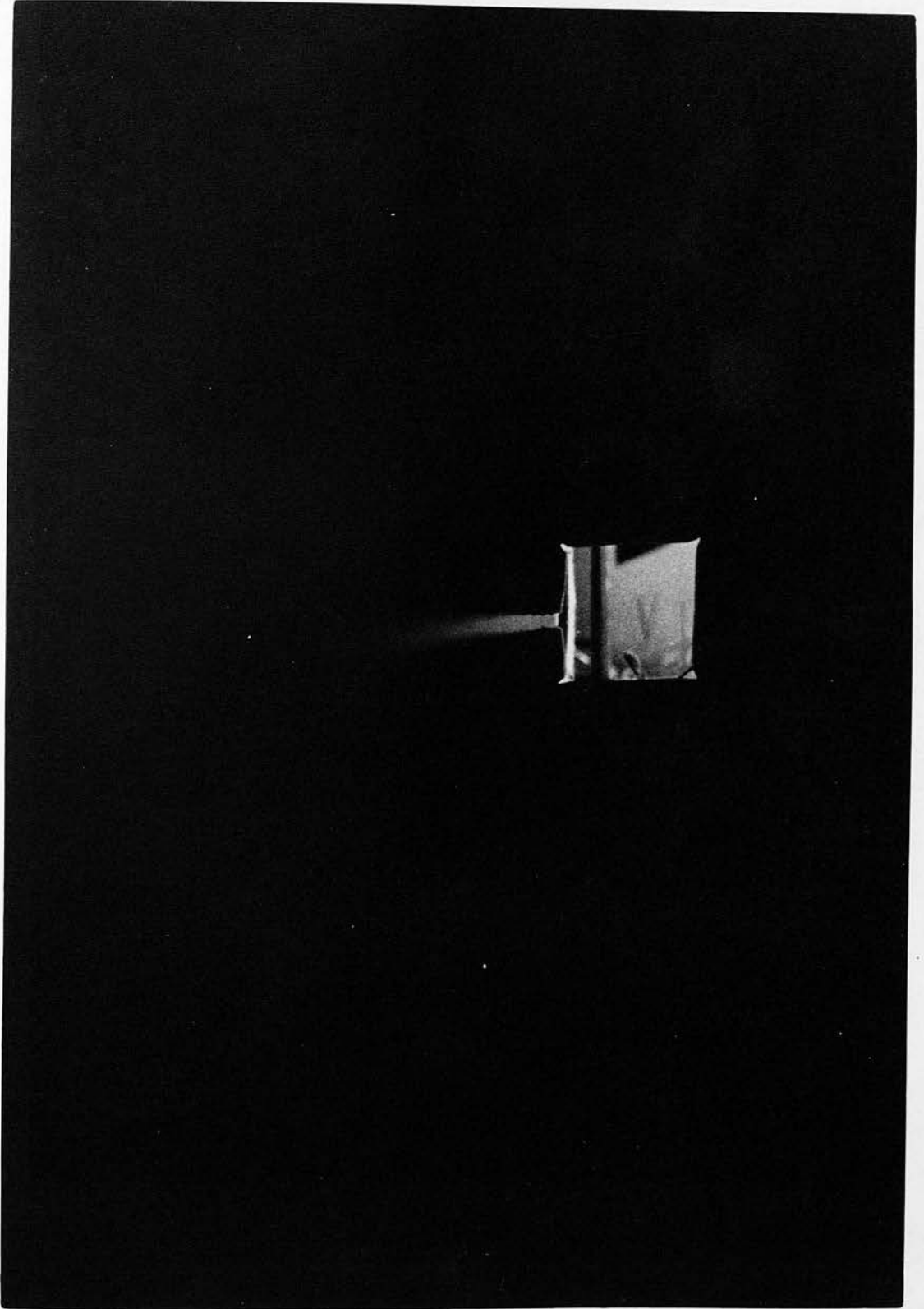


PHOTO 8. Pedestrian's eye-view from inside a corridor, out.

It is a process, where, starting with no brief, and after having established a neighbouring network environment extending into architectural scale, went back for more outer scale connections, then returned to better definition of immediate pedestrian environment. However, the structure and model having been found removed and destroyed, adequate recording was not possible and work itself was abruptly discontinued. Drawings to have done would be similar to those of Hodological and Ambient spaces appearing in this paper (see Fig. 9, and Fig. 12) and the combination of the two, as man moves through urban space (Fig. 11). For instance (Fig. 1) taking one preferred path of the pedestrian, where for clarity, the notation is shown in a clear-cut order and not simultaneously:

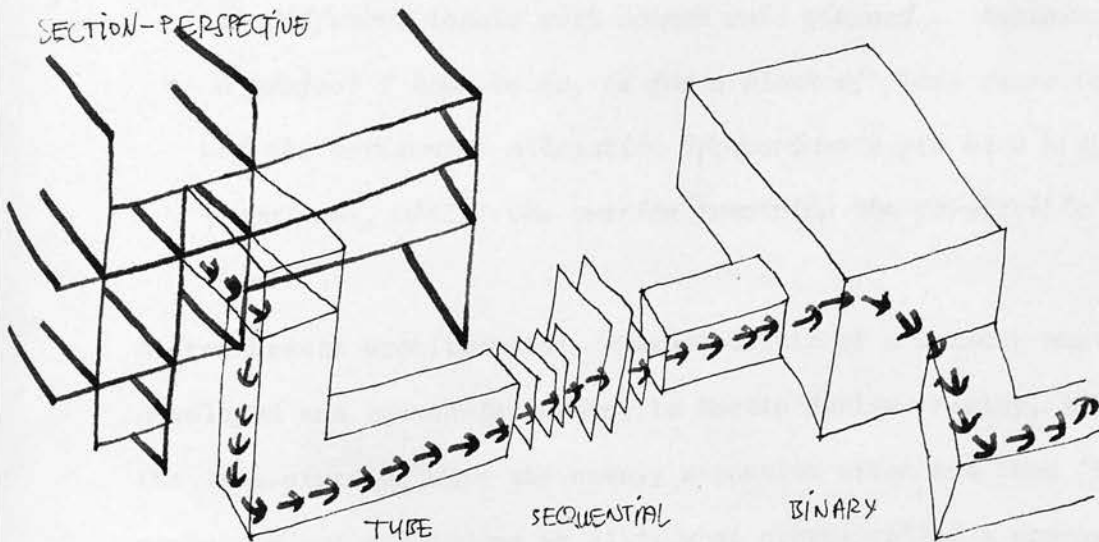


FIG. 1.

The structure-and-model, a truly 3-dimensional design tool (its possibilities having been shown in both experimental - see Mitropoulos, 1971 - and application design - see project illustrated in Chapter 1), is requiring development.

Work is done within the structure from all 6 directions, and without any reference to the 'ground', resulting in 3-dimensional design.

*As opposed to the familiar watered-down version of actually 2-dimensionally design piled up one on top of the other and connected with a lift (the result of, among other things, gravity, the building-land-profit connection, social order, and an architectural education tackling increasingly complex situations under the impression that, complex equals simple multiplied by a factor, and of course the invention of lifts themselves!).*

*An actual example, that brings me joy, is a friend (and her family) living at 128, and 132 Charilaou Trikoupi, Athens, which is a 3rd floor apartment with three steps up somewhere in it - actually, two apartments of adjacent blocks of flats at different levels with common wall pierced. Another, still a project I hope to do, is for a block of flats where instead of the horizontal allocation of apartments you have a split-level one, whilst the outside remaining the permissible Form-1 box.*

A 'toothpaste architecture', characteristic of a network mentality, developed and spread (according to Martin Pawley (Pawley, 1970)), in the late sixties, when the uneasy situation often was that 'the answer maybe, is not a building at all', what others called a non-architecture, or, not buildings but large areas simply covered. Where, I would add, a street would pass through a building (Fig. 2) (haven't you experienced

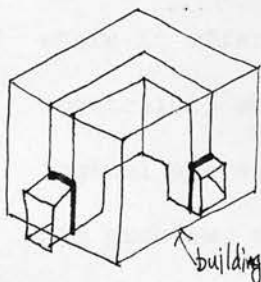


Fig. 2.

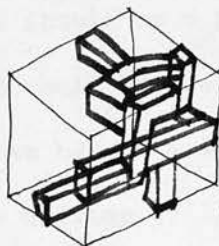


Fig. 3.

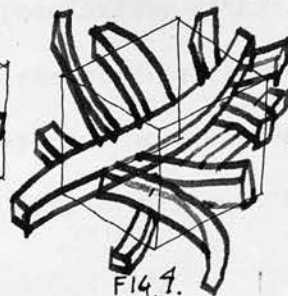


Fig. 4.

cutting through museums, Woolworth's etc?), and a whole city could be conceived as a building (Fig. 3),

where, a building itself would be 'isolating' part of urban networks (Fig. 4).

Hodological space could become the gathering place, replacing the 'older image of medieval linked plazas',

*As Robert Vickery (Vickery, 1974) discussing directions of emerging life-styles and architectural form, would put it. He continues by giving as example the I.D.S. Center in Minneapolis, where 'the "street" (in its pedestrian sense) moves through the building, widens, and becomes a gathering place'. This is in fact the natural conceptual progression from A2/A1 (street/square and on its own enough for structuring the environment), to*

*Binary (corridor/hall,*

*Figure 5, also see*

*Chapter 5).*

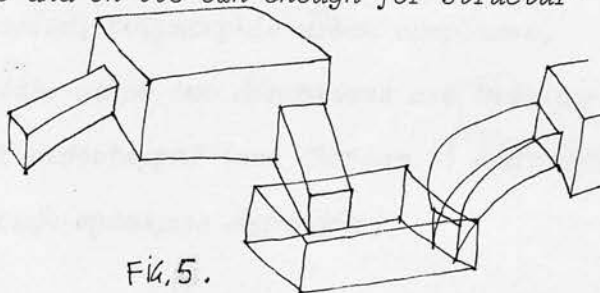


Fig. 5.

and could 'stimulate and facilitate exploration of the environment

*Another of Stephen Carr's criteria for environmental form (mentioned above) where 'what is apparently required is the right level of novelty and complexity to stimulate curiosity plus sufficient openness and connectedness to allow easy access to new settings and experiences.*

It is the space of possible movement of the various preferred routes, that by making you feel secure that you can go, allows you to stay. Movement through space (versus the other activities) is by its nature a requirement relatively predictable at the early stages of design, where it offers itself as a possibility rather than a restriction, or constraint, and could be the structuring element, showing the Hodological space can become a way for the urban designer to 'pre-structure' his problem, as Hillier (Hillier, Musgrove, O'Sullivan, 1972) might have put it.

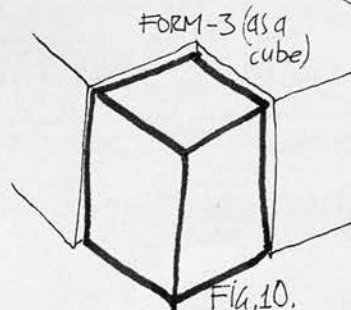
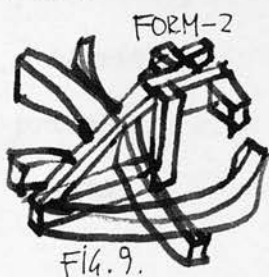
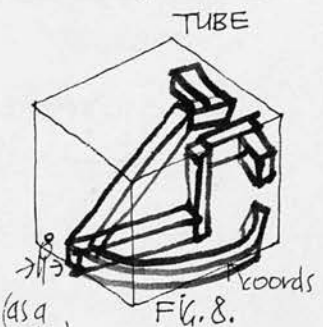
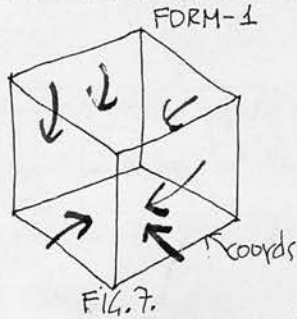
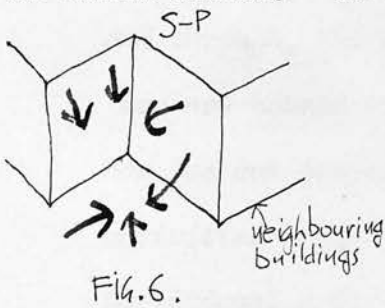


*Hillier, and his co-writers, after pointing out how research should influence designers at the pre-structuring stage go on to examine the outcomes of research in terms of main types of elements which characterise the designer's field, and how (referring mainly on the experimental prototype solution types) research itself, assuming a research-design link, benefits 'by becoming part of the dynamic process from which it can continuously learn and develop its conception'. This points to one of the three directions of future Space Networks work: applying the conceptual notation to design for 3-dimensional pedestrianisation, polymorphic urban complexes, 'school-networks', etc. (the other two directions are Developmental Psychology, that I sidestepped (see Chapter 3) and videotaping movement through space, see Appendix ).*

The Space Networks Notation is not a fact-fed rationalised design methodology synthesizer. Its design is experimental, not in the Hypothesis/Experiment/Conclusion/Prediction/Control way, but rather is what has been otherwise called 'speculative design'. It is a way of communicating subjective information. It is not meant to replace Plan/Section/Elevation but a representation of the structuring experience of movement through space. Its articulation is the result of better understanding of the process so as to become useful to the designer in structuring the environment in a way related to man's experience of it. It combines a Presentational mode of communication (Tube), with a Discursive one (Sequential, Binary) - the terms borrowed from Langer (Langer, 1951) as referred to in Thiel, 1973. It is not to provide 'visual effects for a refined eye',

Margaret Roberts (Roberts, 1972) commenting on Gordon Cullen's notation (see Chapter 5) puts forward two implications 'that it will assist in developing a more refined eye for visual effects' (and also, 'that people's reaction to landscape is both uniform and predictable).

nor record the environment, or concern itself at its larger scale or static state, but to guide the designer in organising space in patterns, which facilitate orientation by being directed at the pedestrian's experiencing of space: the way the pedestrian's cognitive/perceptual system does, by linking the brain to behaviour, by anticipation/feedback, in Notation: Tube/(Sequential, Binary), or otherwise T/(S,B). The notation already introduced (see Chapter 1) and articulated (see Chapter 5) must be understood as a concept within its socio-psychospatial framework (see Chapters 2, 3 and 4, respectively). Where Section-Perspective means an holistic approach, that an urban building doesn't stand alone, but is part of the continuum of human and physical space networks, which means that it may show that such a building at such a site should (examples: sites chosen for multipurpose building design, Brussels, and the Edinburgh University one for Video work - see Chapter 1), or should not be. As an illustration, taking a corner site, we first



consider the notation element Section-Perspective (S-P): the human and physical space networks available in the environment neighbouring the site, which provide possible connections (Fig. 6). Then, allowing dimensionally for legislation, climate (etc.) assume the building to be an empty cube-envelope, Form-1,

*What Geoffrey Broadbent (Broadbent, 1973, in his Social Needs chapter) calls the 'permissible building envelope'. There are other interesting similarities too, like his 'plotting activities into the environmental matrix', a 3-dimensional plot of the site, to my movement-through-space activities model within the wooden and balsa-wood structure (see Photos). But, on the other hand, his designing is not for movement, the 'permissible building envelope isn't riddled by any available already there dynamic networks ('networks-found'), and his 3-dimensional location of critical activities is for priorities like 'board meetings'. He speaks of an hierarchy, and that 'once the primary activities have been located, it should be possible to plot the secondary ones around them', the latter, 'as far as possible, according to the routes' (mention of movement here) 'which people take from one to the other in, around and through, the building'. 'So the activities' he goes on, 'are now housed in rooms or other appropriate spaces'. That now 'we can decide just how much, or how little, the various activities should be separated from each other by physical partitions, walls and so on, and how far they should be open - bearing in mind the stated requirements for visual and aural privacy. From this point of view too, circulation will be counted as activity and must be allocated space accordingly,*

*within, or between rooms'.*

*Conceptually, there is agreement on the need to start with the possibilities rather than constraints, and in pre-locating what either of us takes to be as critical activities. The difference shows the artificial split between architecture (Broadbent, and Ambient space) and Town Planning (Kevin Lynch in his Designing The Paths chapter: 'The Paths, the network of habitual or potential lines of movement through the urban complex, are the most potent means by which the whole can be ordered', Lynch, 1960 - at a scale however dictated by the car). For the Space Networks scale, based on the pedestrian, this split doesn't exist.*

with the connections dangling inside it (Fig. 7). Man (out of scale here - Fig. 8) stands at one 'entrance' with his own Hodological space projected ahead of him, then (Notation: Tube (T)) starts moving along that space of his, anticipating and expecting, finally structuring through his movement. Form-2 (Fig. 9) is all these paths traced, as well as the connections made with the available networks of Form-1 (of Fig. 7). Finally, Form-3 is the built part of Form-2, which may either be just that, a 'toothpaste architecture', or a simple cube (that provides controlled environmental conditions - Fig. 10), or just any other intermediate form, due to other considerations, from aesthetics to economics.

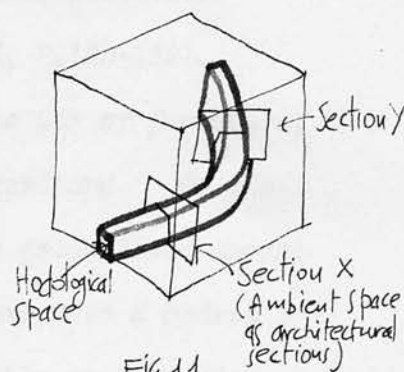
To Broadbent's (see above) 'primary, then secondary activities according to the routes', we have here Hodological (the preferred routes, Notation: T), with Ambient space as you move along (Notation: S,B) which is also a way for the designer to check/change on those preferred routes.

*For a single simple house of course, the sequence of frames (or just a few perspectives) is enough. But as the system gets more complex and dynamic it is not more perspectives you need, but the help of the other elements, the holistic ones of the notations: S-P, B, and T.*

Because, for man, both when he is moving 'through' space, but also when he engages himself in the plethora of other activities 'in' space, there is a distinction (and a synthesis) of Focal and Ambient vision (see Trevarthen, 1973 as referred to in Chapter 3). Which is

where Ambient space comes in (Fig. 11) with its supporting role for both Hodological (the projective-exploratory activity of movement through space) and Personal space (the concentration-requiring activities at the variable, non-bubble personal space). In total, the activities for/by/in/through

the spaces-you-come-with (see Chapter 4). So, after Hodological space and its notation (S-P, T, S, B), Ambient space brings us to the concept of Together/Separate (Mitropoulos, 1969 P.330 and Chapter 1), a concept elaborated on from my first designs as an undergraduate and culminating in my finals' multipurpose building project.



*Project executed 1970-71, Royal Academy, Brussels, final year Architecture. More information on that project is available upon request - also see Chapter 1.*

Together/Separate is towards the designer's structuring of Ambient space.

*Ambient space, outside its brick-and-mortar level, is also subject to Lighting Arrangements, like in the Martyniuk et al study on lighting overhead/peripheral/combination of*

both. They showed, using Evaluative (friendly/hostile), Perceptual Clarity and Spaciousness data, that the 'behaviour setting produces environmental cues or signals' (Martyzniuk, Flynn, Spencer and Hendrick, 1973). Same of course with partitioning systems, where a panel (due to varying degrees of transparency) 'acts as a teaser that half conceals both light and space and temptingly motivates a tour of the entire area', or (due to the 2-in. spaces between the 2-ft. wide panels) 'one catches only glimpses of bright colours, and a variety of textures. This concealment stimulates anticipation' (Progressive Arch. July 1961, P.125-129). Environmental cues are also achieved by the use of furniture, as symbols, for circulation, or to mark territory. Or the example against the More-space (versus the Articulated space) school of thought: turning those huge rooms into a bedsit by using wardrobe, chest of drawers and table as a barrier between the bed-desk-window side, and the other 'corridor'-to-the-door side.

Or simply depends on the 'who is there'. As the Marseilles detective snapped back at the Parisian mobster Lino Ventura (in Melville's *Le Deuxieme Souffle*), who when unexpectedly tracked down and dragged into the police station, is bewildered but still cool-cheeky to enquire if that was a 'mad-house'.

It is a concept for conditions of conflict.

'Conditions of conflict almost always capture the attention of the pathway observer' says Foster (Foster, 1974), adding how 'instances of conflict plague individuals in an urban




*path system'. Professor Welsh in discussion with Abse (Abse, 1966) balances the argument by noting how 'our usual approach is largely negative' and that 'it is certainly possible to educate people to be more aware of different perceptions, as of course they are exploited, as a positive pleasure, in other cultures'.*

Very close to Alexander's idea of patterns (his language, after all concerns itself with Ambient space behaviour.

*Edmund White (White, 1970) refers to Alexander's patterns (see Chapter 5) as 'uses of a building, or more precisely patterns that solve a conflict'. 'This reconciliation of two opposing tendencies, has been expressed by a symbol'. Similarly with Jane Jacobs (Jacobs, 1969): 'A good city street neighbourhood achieves a marvel of balance between its peoples' determination to have essential privacy and their simultaneous wishes for differing degrees of contact. This balance is largely made up of small, sensitively managed details, practised and accepted so casually that they are normally taken for granted'.*

*See also Hall's (Hall, 1966, P.126-127) 'Chart Showing Interplay of the Distant and Immediate Receptors in Proxemic Perception', with one side: Kinesthesia, Thermal Receptors, Olfaction, Vision, Oral/Aural. And on the other side the Informal Distance Classification: Intimate, Personal, Social-Consultive, Public.)*

Together/Separate is based on the articulation of space with its neighbouring spaces where, the possibilities exist: to hear but not to see (Tog. acoustically/Sep. visually), to see but not to hear, to see and to

hear but not able to touch (because of distance), to see and to hear but not able to touch (because of movement, ex: escalator right through a space) etc. This is not only for the detailed elements of the building to be treated separately, but also for the interpersonal relations A  B, and for the individual's Personal space (not always necessarily a minimum space), the interactional notion of aloneness A  B  . But what is more, and in continuation of the Hodological structuring, it is for orientation purposes: where different parts of the building are experienced together at the same time. McLuhan (see his Understanding Media) would probably recognise, in this, modern man,

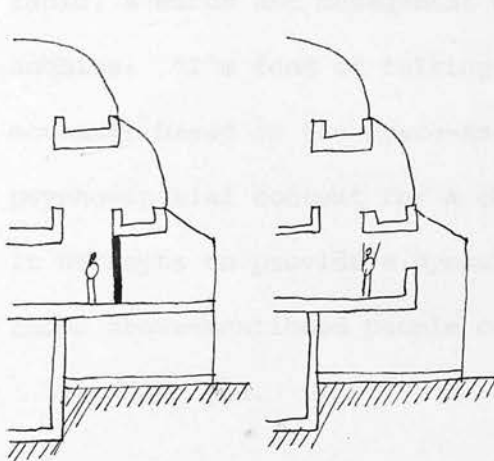
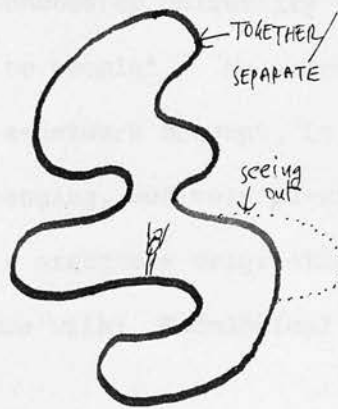


Fig. 12



retribalised into a pluralism of many things coexisting... As an example, see (Fig. 12) (could be section Y of Fig. 11 for instance), taking part of a pedestrian

concourse from Progressive Architecture 9/72, P.113, and improvising to extend the Together/Separate conflict.

Three London artists work in a Southwark warehouse at 13 Bankside. One of them (Jarman?, Ginsborg?, or Logan?) 'has neatly solved the cold problem by simply setting (in it) a small greenhouse within which he sleeps as snug as a geranium' (Nigel Gosling reporting in The Observer Review, 28th November 1971). Mecca disc-jockey to national TV personality Jimmy Saville lives alone, mostly in a caravan, camping for the night on parking meters. Martin Pawley (Pawley, 1974) as reviewed by Cooper in The Sunday Times, starts with the consumer society, for which to work, we, have



to be constantly buying its products, which direct us to his arguments that '(i) we're increasingly wanting to buy the products, and (ii) that the most technologically-advanced of them - and the most desired - promote what he calls 'social atomisation' (see Chapter 1). 'The tension has lessened' Neil Shine, editor of the Detroit Free Press, the city's only morning paper is reported (Observer Magazine 31/3/74) to have recently said. 'Strangers', he went on, 'are talking to each other in the street - and that's something I haven't seen for a very long time'. "Lesley", on the 18th of last month interviewed by the B.B.C. afternoon radio, a maths and management Manchester University student, said of her hobbies: "I'm fond of talking to people". My proposal of design-for-movement based on the space-as-a-network concept, is placed in a socio-psycho-spatial context for a changing, actively participating, society. It attempts to provide a dynamic structure originating from the spaces those above-mentioned people come with: Hodological and Personal.

Thank you.

APPENDIX

My sincere thanks to Miss Spektovov in particular, and the University's Audio-Visual Services in general - otherwise not available for research.

MOVING THROUGH NETWORK-SPACE, ON VIDEOTAPE

This is a short account of the videotape recording (and then, the observation of it) of my Hodological space through a network environment. It relates strongly to Chapter 3. The concluding remarks may seem somehow 'obvious', but it is interesting to note that both Peripheral awareness (even when using wider lens) and Anticipation (except when oral instruction outside the simulation would be given. Example: "We are going to take a walk to look for a Restaurant") have been missing, from the two simulations I have seen: The Glasgow Mackintosh School of Architecture one (Anderson, 1970), and the other of Berkeley, California shown at the Lund Conference (where the subject himself, like a driver, can make choices-decisions of movement - equipment similar to the one at the Lund Institute of Technology, Section of Architecture (see Acking, 1973)). Rose (Rose, 1968) after comparing Film, Video and Computer Graphics simulations (the last wins for him), and although having 'a cone of vision approximately 50 degrees; points out that 'the peripheral field appears to be critical to the effectiveness of the simulation'. But, like Anderson above, he looks to better technology for the answer. Same with Bonsteel (Bonsteel and Sasanoff, 1967): 'The most pressing need is to develop a field of view more nearly approximating man's normal field of vision. This limitation, necessitated by available lenses and monitors, was accepted for this developmental study but proved a major drawback in obtaining experience as movement through an environment'.

WHY VIDEOTAPE, AND, WHY NOT

Video is real time. Relatively inexpensive and easy-to-use, it is a 5 lbs hand-held camera (in this case with a 4/1, 15-60 mm, 7°-28° lens) attached to a 17 lbs shoulderpack taperecorder, recording simultaneously vision and sound, anywhere with normal lighting that you can physically carry it. You can playback what you've just recorded immediately after recording it, or have live feedback, or erase it and use it again - characteristics providing a greater flexibility than that of the film medium, whilst the video medium picture remaining a realistic simulation, detailed enough, yet not too finished an image (as with film) so as to make eventual model-making, for passage-simulation purposes, very demanding. Example: In the case when, starting with existing neighbourhood physical networks you continue tape on proposed model, using a modelscope. It is of course well suited for movement-through-space design communication (to the designer himself, to others of the design team, or potential users). One step further from the static architectural perspective, which is not what-we-see, but the illusionistic device invented by Brunelleschi and codified by Alberti that assumes you are one-eyed and not moving. Or even the J. van Eyck's 'Giovanni Arnolfini and His Wife' with its three vanishing points. Sequences add up to a continuity, a discursive mode as with dancing, or writing, or speaking. Visual and dynamic, 3-dimensional representation of space, where one is actively involved in searching and structuring, in real time: without cuts for accelerated action (jump cutting: omitting the obvious), decelerated action (the opposite to accelerated, through repetitious cuts), continuous action (common cinematic rhythm, the pace set by subject movement), simultaneous action (crosscut: being in two places at same time), or previous

action (flashback: remembrance of previous actions), all film editing techniques.

The type/extent of my involvement in Video and Questionnaires work (outside indicative attempts in various directions for further research) has not been the one originally intended (see Chapter 1) for two reasons: One, the realisation of the very limited human (subjects and co-researchers) and material (necessary equipment), availability (to me, here, now) for cognitive mapping and videotaping. Two, a change of approach in this Space Networks research after attending-participating in the Newcastle 'Space' and Lund 'Architectural Psychology' conferences, when I decided to make my contribution in the much needed direction of general experimental-design principles. After having established a unified socio-psycho-spatial context for the movement-through-space notation. What was attempted was videotaping as a parallel effort to mainly establishing the socio-psycho-spatial context of Space Networks concept towards Design.

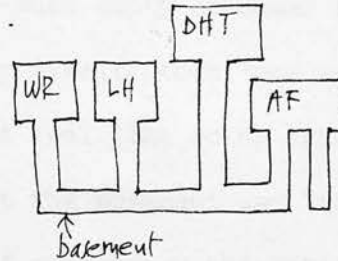
#### ONE HOUR'S TAPE OF SEQUENTIAL MOVEMENT-THROUGH-SPACE

Videotaping was: Firstly to record my Hodological space to and from any of the three University Buildings (David Hume Tower (DHT), Adam Ferguson (AF), William Robertson (WR)) and the group of 3 Lecture Halls (LH), all communicating through the DHT basement area (see Chapter 1). Not looking into any space in particular, but the dynamic relationship of one with the one next to it: an articulated continuity. Then, secondly, to observe this sequential perceptual feedback, which was not for describing the environment, but towards better understanding of the T/(S,B) process, the cognitive/perceptual relationship model. Where 'S' is for sequential (See Chapters 3 and 5), and where Hodological

Space (See Chapter 4) is characterised by its distinguished path varying according to the situation and involving 'direction towards' and 'direction away from', as opposed to the Euclidean space distinguished path being the shortest connection between two points (Lewin, 1938). Lewin originally introduced Hodological space as a geometry to represent "directions" in psychology. 'Direction' he says 'is a property not only of certain dynamic constructs aiming to explain behaviour, but also of behaviour itself. Many, if not all, psychological activities show directedness - especially every action toward a goal or away from a region'. Lynch's Image-of-the-City, path-structuring concept (like mine - see Chapter 5) fits with this Hodological approach, as Derk de Jonge (de Jonge, 1967-68) is quick to point out: 'The life space of man and animals is different from geometric space in that it is not homogeneous since there are distinct differences in meaning between various directions and areas (e.g. up-down; near-far)'. 'Lewin', he goes on, 'has developed a number of concepts with regard to the structure of the life space such as Goal, Preferred Route, and Barrier. In any specific case the goals chosen and the routes that are preferred on the way to these goals depend on a number of factors including the value orientation and attitudes of the subject. A preferred route may either be the quickest, the shortest, the cheapest, or the least unpleasant way to the goal to be reached'. Which, is identical to my borrowed use of the term Hodological Space. But, unlike with Lynch's outer scale, the hour-long tape made consists of walking pace runs through the architectural interior behavioural spaces, ignoring the buildings-forms as such, experiencing a non-building, a network, a toothpaste architecture.

The area itself has been described in one of the questionnaires, by a member of the servitor staff as: 'The basement of DHT is primarily a joining up corridor to adjoining buildings, and Lecture Halls of David Hume Tower. It has a reasonably large cafeteria, an SRC shop, and a Cloakroom which serves for three buildings'. Schematically, I would, as a section, put it:

There is also one other run (the last 13 minutes) of a path that had been tested (not from the tape) for description differences of outside/inside: Thirteen (13) second-year



architectural students gave directions (from memory) on how to reach a difficult-to-locate room (but 'habitual' to them - where they often have lectures-meetings) starting quite some distance away from entrance of building (over a large section of the centre of Edinburgh). Eight (8) described the outside in schematic map-drawing, but switching into verbal sequence once inside. Four (4) used verbal instructions all along. One (1) (admittedly biased by my own tutoring of him) did sequential perspectives the whole way. This illustrates Stephen Carr's (Carr, 1967, referred to in Chapter 6) statement: 'In general, sequential structuring is most appropriate for habitual trips, simplified schematic structuring may be most appropriate over large sections of the city to facilitate fitting together sequences'.

#### ANTICIPATION, AND PERIPHERAL VISION APPRECIATED

Viewing the sequential (the perceptual S of the T/(S,B) model) real-time videotape of my Hodological space, a plethora of observations and hypotheses-forming apart, my main interest was involved and sus-

tained in the appreciated importance of Anticipation (see Chapter 3) and Peripheral Vision (see Chapter 4).

Going over this recorded passage through the network of interior passageways linking the multipurpose multilevel area with hand-held camera (outside early trials with tripod, or on a trolley) fixed straight ahead at eye-level, and where some of the runs were done when people were there, and others chosen when empty of human activity, there was the expressed feeling (shared by myself) that "one seems to be going round and round", that "you don't feel like going from A to B but spinning around and about", or, that the movement was "completely without any obvious sense". This lack of expectancy and anticipation towards a goal was coupled with a limited cone of vision, even when zooming at articulation choice points - where restricted peripheral vision was felt most: "You seem up against a continuous wall". Or when a corridor or hall was crowded with people (especially when they were moving): "You don't seem to realise movement through space", and "You have a controlled path really. No choice". Don't forget all the same, the real-time videotape characteristic tedium and boredom in these sequences on the one hand, and that these trips were in fact exploratory (not habitual) where orientation is crucial.

However, both restricted Ambient vision and Anticipation outside the limits of momentary vision were unexpectedly (and happily) compensated by turning on the sound - the ear, like the eye being itself a distant receptor. Peripheral awareness was reinforced (along the whole tape) by: Footsteps of technician (holding the camera) and myself (klik, clak, clak). Or, by my instructions to him/her ("The next door here. All right. I'll pull this door. To the right again. Steps.

One. Two. Three. Four. OK. Right"). Or, forewarning of obstacles ("A slight bump here on the pavement. OK"). Or, caused by sporadic small talk, either with technician, or bystander ("Hello, love. How are you doing. Did you have a nice holiday. Bye"). What's more, anticipation was sometimes created too. The first time when unexpected function (conference coffee break) was being held along our path, ahead: four turnings, two minutes, and one floor away (the incident is 16 mins from start of tape).

In both cases, this sound and vision cooperation (Together: acoustically/Separate: visually - see Chapter 6), assisting and stimulating movement-through-space (ahead of the moving body, but still behind the projecting further-out brain - see Chapter 3), was quite impressive.

Note: The original 1 inch I.V.C. 180 tape 'Space Networks, June 1973 - December 1973, with Table of Contents, remains for one year with the Audio-Visual Services. A one half inch copy, together with questionnaires, plans of area, etc. with myself for future research.



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