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THE BUILDING DESIGN PROCESS: AN INVESTIGATION INTO PRODUCTIVITY

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SYNOPSIS

In this study the role of the architect is investigated in the light of findings in the fields of sociology, psychology and organizational behaviour. The objective is to make recommendations as to how the expanding role of the modern architect can be accompanied by improved performance, especially in his substantive role of building design.

Initially the organizational and procedural context of the building design activity is defined and the meaning and importance of productivity in this activity explained. The centrality of the human creative process as an input in design is then established and it is shown that the organizational environments within which designers work have a direct influence on their capacity and their motivation to engage in the creative process.

The structure of project organizations in the building industry is then investigated and is shown to be quite different from the situation as it is assumed to be by the architectural profession as a whole. It is demonstrated that, due to changes in technology and increased expectations in society, project organizations (which constitute the primary organizational environment for architects) are increasingly characterized by groups in which members simultaneously compete and co-operate in the initial stages of project procurement.

Research on decision-making groups, particularly those in complex interwoven organizations, is reviewed and the nature and importance of the task known as project management explained. A comparison of this task with the work content of the non-design role assumed by architects under the traditional, hierarchic form of project organization reveals that it requires thought and action at much higher levels and an increased ability to manage human interaction.

The response by the architectural profession is then studied. It is shown that, despite previous indications that the competence and integrity of members of the profession may be compromised by enlargement of the role of the architect, little hesitancy has been shown by the profession in accepting, concurrently, both design and project management responsibilities. It is shown, in addition, that the acceptance of this dual responsibility has been accompanied by a deterioriation in the performance of members of the architectural profession. A review of educational and control strategies employed by the professional institutes in an attempt to remedy this situation indicates that these strategies possess severe limitations and disadvantages.

An analysis of the reasons for the deterioration in the performance of architects - using two broad approaches in the study of leadership - indicates that the present deficiencies in both the competence and integrity of members of the architectural profession arise from the simultaneous assumption of content (design) and process (management) roles by the bulk of the profession. An evaluation of attempts made to restructure the profession at three levels,

that of the internal organization of the architectural practice, that of the total professional group and that of the project organization as a whole, indicates that the most promising of these attempts, namely the latter, is constrained by the institutional framework of the architectural profession.

Criteria for a new framework are isolated and the structure of the legal profession, which is sub-divided very much along the lines suggested by leadership research, is analyzed to establish to what degree it meets these criteria. It is concluded that, despite some disadvantages with regard to flexibility, the division of this profession into two interdependent sub-professions meets many of the criteria set up for the architectural profession.

The thesis which emerges from this study is that a division of the architectural profession into two interrelated sub-sections, along the lines of the legal profession, is necessary if the performance of architects is to be enhanced, especially in their fundamental role of building design.

In conclusion, a brief review of the implications of this thesis with respect to its implementation in practice and its effect on education are studied. In addition, directions for further research are indicated.

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CHAPTER 1: INTRODUCTION

1.1 THE ARCHITECT AND PRODUCTIVITY IN BUILDING DESIGN

Architects have designed buildings in cities since earliest times. However, the emergence of the architect as a specialist building designer is, to a large extent, due to the rise of humanism which accompanied the Renaissance. Under the system of patronage which continued through the Renaissance and prevailed until the beginning of the 19th Century the proportion of buildings designed by architects was, however, very small. It was the increase in the size of the cities and the redistribution of wealth accompanying the Industrial Revolution which enlarged the scope and the volume of work available to architects.

The change from patron to client which gave rise to this phenomenon was associated with a change in the conditions under which architects worked. The new client, being usually both unable and unwilling to provide the unstinting encouragement and support which the well-endowed patrons of earlier times gave to their architects, was forced to take into consideration the cost of his architect's services. In addition he was obliged to rely on the skill and integrity of the architect in planning, organizing, co-ordinating and controlling the construction of the building. Unfortunately, the fact that architects had to compete with one another for the opportunity to engage in their art together with the fact that they were in a position in which

they could exercise control over the finances of the client led to many unsavoury practices which prejudiced the aesthetic, functional and business interests of clients. In order to safeguard these interests, and so secure the continued participation of architects in enhancing the quality of the built environment, professional associations were set up. Their prime purpose was to promote and ensure the competence and integrity of their members so as to preserve the status of the architect and hence his capacity to influence the design of this environment.

Society has experienced an ever-increasing rate of change since the 19th Century when the broad patterns of professional conduct were established. These changes have not bypassed the building industry despite the fact that the developments of the Industrial Revolution, which manifested themselves in other industries more than a century ago, have appeared somewhat later. The danger therefore exists that the established patterns of professional conduct, created to ensure that good design be achieved without prejudice to the financial interests of the client, may have become disfunctional and, indeed, may even threaten the capacity of architects to make a contribution to the solution of the environmental problems which characterize not only the highly industrialized countries but also those of the developing world. The objective of this thesis is to investigate this possibility.

1.2 THE NATURE OF BUILDINGS AND THE ROLE OF THE ARCHITECT

The sanctioning by society of the right of the architect to advise and act in building matters is a result of the importance society attaches to the involvement of competent and responsible persons in the procurement of the buildings which, in cities, form a substantial part of people's physical environment.

The largeness and relative permanence of buildings, when compared to most of the other artefacts of society, gives rise to the multiple functions which buildings fulfil. These have been classified as:

1. Providing physical control of the external environment.
2. Providing a functional frame for man's activities.
3. Serving as a means of cultural symbolization.
4. Serving as a convertor of the value of resources.
   (Norberg-Schulz, 1963, pp.109-130; Hillier et al., 1972, p.12)

In addition buildings also have an impact on their environment with regard to each of the above-mentioned factors. Buildings affect:

1. The micro-climate immediately surrounding the building.
2. The patterns of movement in the environment, especially if the new building involves change in the land-use of the site on which it is situated.

3. The character of the neighbourhood in which it is situated and the image of other buildings, especially those in its immediate vicinity.
4. The total store of the material and capital resources of society, its distribution and also the distribution of less tangible work benefits.

Therefore, as Caudill (1971, p.49) suggests:

> 'Almost all architecture, regardless of the matter of "private" ownership, is truly in the public domain.'

The construction of a successful building depends heavily on the successful completion of three other activities which, together with the construction activity, constitute the building procurement process. These activities are briefing, design and design realization. Although building design constitutes the substantive role of the architect, since the beginning of the 19th Century architects have increasingly involved themselves in the processes of briefing and design realization. These three activities are described below in order to clarify how the increasing demands of modern society impact on the role of the architect.

Building Design:

> 'Architectural design is not the visualization of conceptual novelties which will somehow be transformed into buildings but is the detailed conception of buildable environments.'
> (Ove Arup)

In addition to being modifiers of a complex and highly interrelated social and physical environment buildings are themselves complex, being composed of many materials, components and elements either more or less integrated at different levels of scale. Building design involves selecting and deciding on the nature of these materials, components and elements in order to achieve a reconciliation (not a compromise) of the functions and environmental impacts described above. The essence of design is the achievement of a harmony between seemingly incompatible or unrelated ends and means.

Briefing:

Briefing is concerned with defining the design problem. It involves establishing the requirements which need to be reconciled in the design, evaluating the extent to which the design meets these requirements and taking action either to make more explicit the requirements or to arrange for their modification in the light of qualities achieved in the design.

Design Realization:

Design realization is a process which is primarily concerned with the transformation of a design into an actual building. It commences once the design proposal (an invention) is accepted as an intention to be implemented (an innovation) and comprises the conversion of the design into the drawings, schedules and specifications required for the comprehensive planning and

organization of the productive activities involved in constructing the building. It also includes preparation for those activities involved in the future operation, maintenance and perhaps even demolition of the building.

1.3 THE INCREASING DEMANDS OF MODERN SOCIETY

> 'We are still in the middle of the Industrial Revolution; we had better be, for we have many things to put right in it. But it has made our world richer, smaller, and for the first time ours. And I mean that literally: our world, everybody's world.
>
> 'From its earliest beginnings, when it was still dependent on water power, the Industrial Revolution was terribly cruel to those whose lives and livelihood it overturned. Revolutions are - it is their nature, because by definition revolutions move too fast for those whom they strike. Yet it became in time a social revolution and established that social equality, the equality of rights, above all intellectual equality, on which we depend ... We live in the middle of the Industrial Revolution and find it hard to see its implications, but the future will say of it that in the ascent of man it is a step, a stride, as powerful as the Renaissance. The Renaissance established the dignity of man. The Industrial Revolution established the unity of nature.'
> (Bronowski, 1973, p.286)

The progressive physical concentration of people in urban areas in both developing and developed countries is associated with two phenomena:

1. Increased specialization, with which is associated a reduction in the relative number of organizations undertaking similar tasks or providing similar services and a corresponding increase in the size of these organizations.

2. Increased expectations with regard to the quality of life, both at work and away from work, by all sections of society.

The consequences of these two interrelated phenomena are that the expansion in the future demand for buildings will be accompanied by increases in the scale and complexity of projects and by the need to reduce wastage of time, materials and human energy in the procurement, operation and maintenance of these projects.

1.3.1 Greater Complexity:

The expanding demand for accommodation and the frequent need to increase the intensity of land use, coupled with the increasing size and resources of specialized enterprises, results in an enlargement of both the scale and the integrality of building projects. As functions previously separated in individual buildings become contiguous and standards of comfort and convenience escalate, and as the components and equipment required to meet these standards become more numerous and also more complex, the building design problem becomes more difficult.

1.3.2 Decreased Time:

As projects become larger and more complex an increasing amount of finance is invested, for increasing periods of time, in land and partially completed construction work which is not avilable for use and consequently of little, if any, value. Especially in times of high inflation, the need to employ pecuniary resources as productively as possible so as to ensure the maximum benefit to those who invest in buildings - increasingly the 'man in the street' who, via contributions to insurance and pension funds and taxes, provides the funds for buildings - results in pressures which not only compress but also intertwine the processes of project procurement with one another and also with the occupation of the building. The increasing tendency to renovate and refurbish existing buildings results in similar pressures. The consequences are that the time available for design is reduced and that design tends to be carried out concurrently with briefing and design realization.

1.3.3 Reduced Wastage:

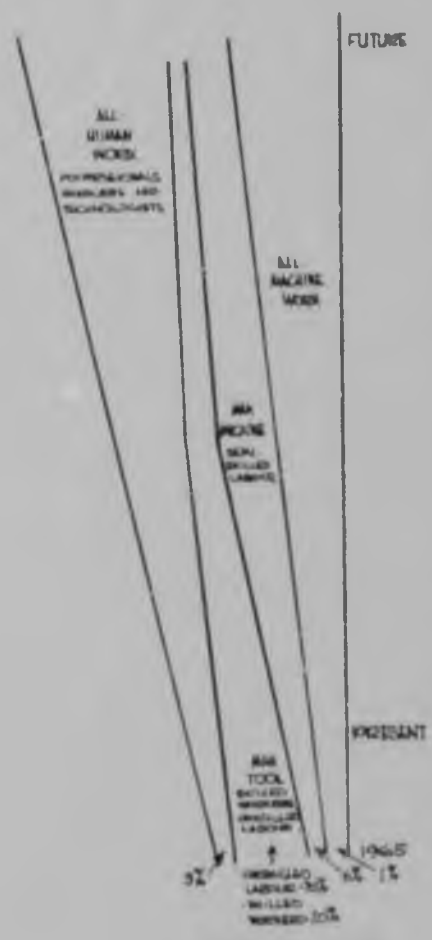
As we near the end of the 20th Century, the need to decrease wastage of resources in the construction, operation and maintenance of buildings becomes more critical. This applies both to .terial and human resources.

As far as material resources are concerned, the need for conservation was already appreciated by some in the first quarter of this century:

> 'The Twentieth Century dawns with the as yet unaccomplished task of conservation of eliminating wastes.'
> (Emerson, 1924, p.9)

These wastes not only result in a decrease in the total store of materials available to society in the future but also in an increase in the pollution of the environment. Clearly, designs which lead to this situation cannot be acceptable.

Just as important as the conservation of material resources is the best utilization of our available manpower. Increasingly the use of human toil for the moving and positioning of the many tons of material required to build even the most modest structure is becoming unacceptable, both from an economic as well as a social point of view. This has led to a move from craft to industrial technology in which machines replace manual labour. Accompanying this change is an increase in the need for operators, technologists, managers and professionals - as shown in the adjacent diagram (Lawrence and Lorsch, 1967, p.237; Evenwel, 1971, p.109). Industrial enterprises, when compared to craft organizations, are therefore faced not only with the purchase of machines but also with the costs of developing the skills required to utilize these machines. The relevance, as far as building design is concerned, is highlighted in the words of the chairman of one of South Africa's largest and most successful construction companies:



CHANGES IN SOURCES OF PRODUCTION WITH MOVE AWAY FROM CRAFT PRODUCTION

> 'Just as we, in the field, are making changes to our construction methods and techniques to accommodate the newly trained semi-skilled black worker, so too, must the people who are responsible for the design and specifications.'
> (Grinaker, 1975, p.5)

Compared to times when materials were bountiful and toil the accepted human condition, the design problem has become more complex as it must now include detail consideration of the material and human resources required at all stages of the building's life cycle.

The greater investments made by production and construction enterprises and their reduced scope in satisfying demands on their own result in increased interdependency with other enterprises, particularly those which supply the finance for building projects. The effect of this is that production and construction enterprises must become increasingly involved in the earlier phases of projects. This is also true of the various individuals and organizations which constitute the client body, for example tenants and loan institutions. Therefore, reduced wastage also entails increased action in the briefing and design-realization processes.

It can be concluded that the pressures outlined above give rise to a situation which demands increased skill in design and increased skill in managing the briefing and design-realization stages of the project procurement process.

1.4 THE PERFORMANCE OF THE ARCHITECT:

Unfortunately, members of the architectural profession appear unable to adequately cope with this dual challenge.

Criticism of buildings designed by architects has been widespread. It is said that:

> 'Modern buldings are arid and remote from life. They're blank, featureless, without character.'
> (Pancho Guedes, 1975, p.22)

This criticism has emanated not only from architects at the forefront of artistic endeavour but also from academics, clients, architects in practice and from the public at large. It is a worldwide phenomenon: in Britain, for example, dissatisfaction has reached such a peak that appeals have been made on television for the removal of the architectural profession from the realm of public authority housing (Hellman, 1976, p.157). In addition to the criticisms levelled at the designed buildings, researchers have time and again remarked on the 'applicability gap' between research and practice:

> 'It is curious that at a time when research on the environments we inhabit enjoys widespread acceptance and funding, the gap continues to widen between what we ought to build and what actually gets built.'
> (Hack, 1976, p.13)

There appears to be a similar gap between technological possibilities and the application of technology in achieving and expressing the aims of our age

EVADES EXACT INTERPRETATION."

"THE REPORT AND CASE OF THIS WORK OF ART REFLECTS THE SIMPLICITY AND
MEETSMINT OF MA EARLIER VERSION. THE SYMBOLISM REMAINS PERSONAL AND



(Harper, 1972, pp.35-36; Webb, 1975. p.31).

It is therefore not surprising that design is increasingly being seen as a luxury without direct contact with, or purpose in, society. Paradoxically, it is only through the activity of design that the reconciliation of ends and means required to achieve the potentialities created in the 19th Century can be accomplished.

As the need for speed and participation increase in a progressively inter-dependent world, the criticism of the managerial practices of architects - particularly in briefing and design realization - have also increased. Unfortunately, it is not only the profession itself which has been critical of its members; criticism emanates both from the construction sector of the industry and from clients (as is attested by the increasing frequency of litigation and the steeply rising premiums for professional liability insurance).

If the picture painted above appears unnecessarily harsh, this is not done to damn the profession but to illustrate that it is necessary for it to find a better way of promoting competence and integrity among its members, particularly with respect to the substantive role of the architect, namely building design.

1.5 PREVENTING POOR PERFORMANCE

Much attention has already been given to improving the performance of architects particularly by the professional institutions. Emphasis has been placed on education, especially in the field of management associated with the briefing and design-realization processes. The intention has been both to improve the capability of the architect in the managerial tasks which have now grown far beyond their original scope and, more particularly, to enable him to increase his efficiency in these tasks and so free himself for the creative pursuits which ultimately result in better buildings.

Probably the most comprehensive of these educational endeavours has been the work done by the Royal Institute of British Architects (RIBA) in the preparation of its 'Handbook of Architectural Practice and Management' and in the associated management seminars conducted in Britain and then subsequently in South Africa. This work is fairly representative of other efforts in both Britain and the United States of America in that it concentrates on management techniques, especially those concerned with the mechanics of information flow. Unfortunately this focus does not constitute fundamental enough an approach to the application of management thought to the problems of the architectural profession so that, in the words of Harper (1972, p.37) '...within the historic burdens of the Industry, management theories have rarely offered more than a panacea.' This does not mean that the considerable body of knowledge about techniques is not valid but that,

before it can be successfully applied, the position of the architect in the social system of the building industry and in society at large must be reviewed in terms of the objectives of the profession.

1.6 PREVIOUS RESEARCH

> 'The sociological part of the Tavistock Report seems pregnant with promise for future research. It points to the possibility of revised definitions of functions in building, and a recasting of roles, professional and executive.'
> (Hanson, 1974, p.164)

Traditionally, in the architectural profession, coverage of topics such as patronage, legislation and professional organization has been neglected (Banham, 1969, p.13; Eaton 1969, p.viii; Herbert, 1975). It seems to have been Walters (1960, pp.117-120) who first drew the attention of the profession to the necessity of studying the changes in the social environment (specifically the building industry) in order to select a course of development 'in which the virtues of individuality and devotion to architecture can survive'. The first steps of such a study, although not directed at the architectural profession alone, were undertaken by the Tavistock Institute of Human Relations in Britain in the early and mid-1960's. The research, focusing on communications in the building industry and specifically communications across the 'design-construction gap' isolated by Emmerson (1962), established that the major hindrance to information flow lay in the traditional relationships between the major parties involved in

building (Higgin and Jessop, 1965; Tavistock, 1966). Concurrent research, which attempted to find ways and means of easing information flow and so making design more responsive particularly to its technological context, resulted in the stimulation of new contractual forms including the 'negotiated contract' and the 'package deal' (Banwell, 1964; Bowley, 1966).

Subsequent research in the Tavistock tradition has focused on the idea of a co-ordinating function exercised over the design and construction activities, an idea mentioned in the first Tavistock report (Higgin and Jessop, 1965, p.70). The work done in this connection, including that undertaken by Miners (1971) in South Africa and by Morris (1974 a and b) in Britain, has however not studied the implications for the architect. Nor has any other substantial work been done on establishing the implications of organizational changes in the building industry for the architectural profession. Indeed, as Broadbent suggests, few architects took the Tavistock findings seriously. Even the RIBA, in their substantially revised 'Handbook of Architectural Practice and Management' (1973, p.345), apparently consider the research of such little value that they manage to misinterpret the findings. They write:

> 'The Tavistock Institute reports, Communications in the Building Industry (1965) and Interdependence and Uncertainty (1966), stressed the need for long term research into the organization of communications techniques in the building industry.'

Research into the organization of projects, and not 'the organization of communication techniques' was the essence of the Tavistock reports.

By the mid-1970's little progress had been made in improving the performance of architects despite the fact that the profession as a whole was becoming more concerned with the matter and the fact that social science research, both structural (organizational) and behavioural (psychological), had made great strides since Walters first formulated the problem in 1960 and since the fundamental studies of the Tavistock Institute.

1.7 OBJECTIVE AND METHODOLOGY

This study sets out to investigate the implications of the research mentioned above on the problem outlined in the first section of this chapter, namely that the established patterns of professional conduct may have become disfunctional in terms of the substantive function of the architect, building design. A multi-faceted exploration of this problem constitutes the following thirteen chapters, the content of each of which is outlined below.

Chapter 2 is concerned with looking at design in its larger context. The chapter commences with a review of the broad organizational and procedural context within which the building design activity must take place. With this as a background, expectations with regard both to the output from and the input to the design activity are studied in order to establish the meaning and importance of productivity in design.

The following three chapters focus more closely on the design activity itself and on the performance of those who undertake this activity.

Chapter 3 is concerned with the identification of the prime resource required in the building design activity. An analysis of the nature of building design problems - using the most comprehensive of the three systems of criteria discussed in this chapter - isolates the human creative process as the fundamental resource required.

In Chapter 4 the creative process, as described in three different analyses, is investigated in order to provide a comprehensive and authentic view of the nature of the process. The activities which constitute the stages of this process are discussed with respect to both the information-processing and emotional areas identified as being important and interrelated aspects of creativity. It is shown that the environment within which the creative process takes place has a considerable influence on the process and must therefore be taken into account in any attempt to enhance the capacity and willingness of designers to engage in the process.

The objective in Chapter 5 is to establish how the environment can be made more conducive to designers. A review of both the intellectual and the motivational requirements of designers highlights the importance of communication in this regard. A model of the communication process is used to identify two broad areas of impediment: physical factors and the nature of human relationships. Previous research has isolated the importance of the latter which is shown to be intimately bound up with the structures

of organizations in the building industry and the roles people fill in these organizations.

Chapters 6, 7 and 8 are concerned with the organization of project organizations in the building industry.

The intention in Chapter 6 is to define the roles and relationships of the various parties involved in project organizations in the building industry. A systems approach is used to analyse the situation as it is assumed to exist in the industry at present. The actual situation, as revealed in a number of systematic studies undertaken to explore the procedures actually used in procuring buildings, is then analysed using the same approach. It is shown that the stages, which in the assumed situation are sequential, overlap and give rise to both an increase in the number of resource controllers to which the architect is responsible during design and in an enlargement of the role of the architect as he is required to fulfil his previously sequential roles concurrently.

Chapter 7 is concerned with establishing the reasons for the overlap of project stages, particularly with regard to the impact of changes in building technology. Various means of classifying technology are discussed as a background to identifying changes in technology in the building industry. A comparison of the characteristics of craft and industrial technology shows that tradition is unable to provide the increased control required in the latter situation and that such control can best be provided by an overlap of the stages of the project procurement process.

The content of Chapter 8 comprises an overview of the organizational strategies through which overlap may be achieved. Four strategies - varying from almost wholly competitive to wholly co-operative - are reviewed in terms of their application in the building industry with respect to the relationship between building sponsor and construction enterprises. Conditions under which each strategy is practical are analysed and the attitude of the architectural profession towards each is outlined. It is concluded that the middle-range co-operative strategies are the most functional despite the fact that they are not favoured by the architectural profession. The increasing interdependence between components of the client sector of the building industry is then analysed and also shown to require the use of co-operation rather than competition. It is concluded that the architectural profession must accept the inevitability of the complex forms of project organization, characterized by decision-making in groups, which result from the multiple use of one or other of the co-operative strategies.

The emphasis in Chapter 9 is on the group making decisions at the upper levels of the project organization. The chapter commences with a review of the relationship between decision-making and socio-emotional processes in groups. It is shown that, in order to maintain or improve the quality of group decisions and performance, the level of commitment of the group to the task in hand and the level of cohesiveness of the group need to be controlled. The task of project management in the building industry is defined and is shown to include controlling the commitment and cohesiveness

of project groups by regulating the membership, size and continuity of such groups and co-ordinating the internal processes within the group. A comparison of project management with the work content of the non-design role assumed by the architect under the sequential form of project organization (discussed in Chapter 5) reveals that the task of project management is much more dynamic, requires thought and action at much higher levels and an ability on the part of those undertaking the task to manage people.

The larger scale of the professional institution is the prime focus of the following two chapters.

The attitude of the architectural profession towards accepting the increased responsibilities implicit in the move towards more co-operative forms of project organization is the subject of Chapter 10. The development of the code of conduct of the architectural profession is traced against the background of the function of professions in society. It is shown how, despite early signs of a conflict in the dual role assumed by architects, little action has been taken to reduce this conflict despite the many changes which have taken place since the formation of the profession. An analysis of the size and organization of architectural practices in South Africa reveals that design and project management roles are concurrently assumed by the majority of the profession, thus reinforcing the stance taken by the profession as a whole and sanctioned by the rest of the industry and society at large.

In Chapter 11 the behaviour of architects in their dual role is studied. The effects of this behaviour on the organizational health of project organizations in the building industry is evaluated and it is concluded that the performance of architects generally leaves much to be desired. The attempts by professional institutions to remedy this situation are assessed and are shown to incorporate severe limitations which need to be removed before success can be achieved.

In Chapter 12, which is concerned with the factors influencing leadership performance, the individual again constitutes the prime focus. Using two broad approaches in the study of leadership - the situational approach and the functions approach - the possibility of any one individual concurrently and successfully assuming both building design and project management responsibilities is assessed and found to be extremely remote. An analysis of the causes of ineffectiveness in managerial and design tasks is undertaken and it is shown that the activities required for successful performance in the one task imposes constraints which severely limit performance in the other.

The emphasis in the last two chapters reverts to the larger social structures within which the design activity takes place.

In Chapter 13, the penultimate chapter, an evaluation is undertaken of various attempts made to restructure the organizational systems within which architects work. This is done at three scales: that of the internal

organization of the architectural practice, that of the total professional group and that of the project organization as a whole. It is shown that the most promising of these attempts, namely the latter, is constrained by the attitudes which arise from the code of conduct of the architectural profession. The code of conduct is analysed to establish its relevance in the newer forms of project organization which characterize the building industry today. It is concluded that the code is outdated and that a new professional structure is required. Criteria for such a structure are isolated and the structure of the legal profession is analysed to establish to what degree it meets these criteria. It is concluded that the division of the profession into two interdependent sub-professions is a logical step in architecture.

The thesis of the author is presented in the concluding chapter. It advocates a new professional structure in the building industry and is based on the arguments put forward in the preceding thirteen chapters and on an evaluation of previous attempts to introduce a sub-division into the architectural profession. The implications of this thesis are studied with respect to its implementation in practice and its effect on education. In addition, directions for further research are indicated.

CHAPTER 2: THE CONTEXT OF BUILDING DESIGN

Design does not occur in a vacuum but in the context of the policies, plans and procedures of individuals, groups and enterprises, their expectations for the future and their commitment to investments made in the past. Consequently, any discussion of the design activity cannot successfully proceed without a background of the organizational, procedural and expectational context of design. The objective of this chapter is to provide such a background.

.1 THE ORGANIZATIONAL CONTEXT

Firstly, all those setting objectives and constraints for ign - whether directly or indirectly - will be isolated.

.1.1 Elements of the Building Industry:

In a modern urban environment there are a host of such elements which have arisen due to the process known as the fragmentation of the building industry.

1. There is the clientele of the building industry. This comprises users, investors and entrepreneurs. Users are those who occupy the completed building as well as those who collectively constitute what is known as the 'public', whose physical environment is largely determined by the buildings around them. Investors supply the finance which makes the construction of buildings possible and entrepreneurs undertake the risks and responsibilities entailed in sponsoring the construction of the building.

2. There are the members of the industry itself which includes not only general contractors but specialist sub-contractors, manufacturers, suppliers and the operatives of the various crafts and skills.

3. There are the professionals: architects, quantity surveyors, and engineers in the structural and services fields. They may assume responsibility for designing the building or sub-systems or components thereof or may merely be concerned with advising on a particular facet which needs to be taken into consideration in the design. Any one of these professionals may also serve as the agent of the entrepreneur or building sponsor, as he will be referred to in this thesis.

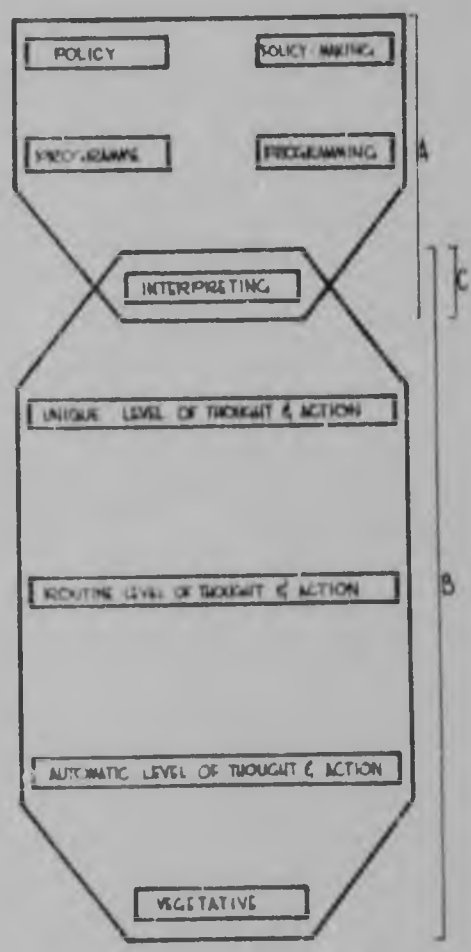
4. Lastly, somewhat in the background, are the governmental bodies who safeguard the long-term interests of society. These include the town planning, building survey, city health and fire prevention branches of municipalities and also bodies at provincial and central government level.

Providing the context for building design, therefore, are a diverse array of individuals, groups and enterprises which, for the most part, are organizationally independent with little continuous interchange across what Miller and Rice (1967, p.130) term 'task-oriented sentient boundaries'.

2.1.2 Levels of Decision and Action:

In order to appreciate more fully the position of the building design activity in its context, it is necessary to identify and isolate the broad areas of thought and action which constitute the tasks of each of those individuals, groups or enterprises which establish the context for building design.

The total spectrum of thought and action involved in any undertaking has been conceptualized as consisting of two overlapping areas or spheres (Paterson, 1966, p.41; Woodward, 1970, p.45). This is illustrated in the adjacent diagram. The planning and programming of a task is accomplished in the 'conceptual area' while the execution is carried out in the 'operational area'. The overlap between these two areas gives rise to a third, termed the 'procedural area', in which plan and execution of a task are integrated. These three areas will now be described in more detail.



The Conceptual Area:

In this area value judgements are made about the future domain of an enterprise. Policies and programmes are formulated to orientate the activities of an enterprise towards these domains. Patricios (1975, p.69) emphasizes that policy-making and programming are not restricted to particular enterprises or types of enterprises:

> 'In society planning, in its broadest context, is an activity common to virtually all of its institutions and organisations and is always associated with goals, whether political, economic or social.'

The formulation of policy attempts to give direction for action in the light of the environment of the enterprise and, as Drucker (1971, p.237) points out, stands under conditions of 'incurable uncertainty', often giving rise to conflict. Programming, appropriately termed 'problem seeking' by Karp (1969, p.41), specifies the limits within which further work should be constrained.

Policy and programming decisions usually have an effect on all the activities or functions of an enterprise and commonly also on the decisions ard activities of

other enterprises in the same environment and consequently form a very important part of the context of design.

The Operational Area:

There are a number of functions in this area. Whereas one may be concerned with the production of an artefact, another may deal with purchasing, a third with selling, a fourth with security and so on. Fayol (1949, pp.3-6) and Paterson (1966, pp.14-15) are amongst the many writers on management who have classified these functions into various groups. Very broadly, however, a distinction can be drawn between what Miller and Rice (1967, pp.5-6) term 'operating activities' and 'maintenance activities'. Operating activities are those which contribute directly to the import-conversion-export process which defines the domain or dominant competitive issue of the enterprise. These can range from the making of bricks to the letting of apartments. Maintenance activities provide support for the operating activities by procuring and replenishing resources, both human and material.

The tools used in the import-conversion-export processes of the various functions, together with the arrangements made for the co-ordination of input, throughput and output, constitute the technology of such functions. Technology is not merely a set of tools, but a system of interrelated and intercommunicating devices and activities operating at a particular point in time (Drucker, 1972, p.56). It can foster or prevent the optimum utilization of material resources and, as has been indicated in Chapter 1, can influence the nature of the work performed by individuals and therefore their job satisfaction.

The operational area of any enterprise has a very direct bearing on the quality of life of a population. Particularly the 'operating activities' of enterprises therefore constitute an important part of the context for design. This is especially so in developing countries like South Africa where both the job environment and the job content of a large section of the population need to be upgraded and where scarce material resources need to be preserved.

The Procedural Area:

This area is concerned with interpretation and co-ordination, and provides for reconciliation of the various 'operating activities' with the 'maintenance activities' as well as reconciliation of the operational area as a whole with the conceptual area. Reconciliation involves specifying how the resources deployed in a technology can best be directed to achieving the objectives expressed in policy.

Problem-solving rather than problem-seeking is involved and decisions in this area are concerned with the nature of what will be done. Two interrelated functions can be distinguished.

1. The design function: which results in the translation of policy into a prescription for the physical arrangement of materials, components and elements comprising an object which is to be produced.

2. The organizing function: which results in the overall arrangement of human and material resources required to finance, design, produce and use the required objects.

Design can therefore be seen to be associated with the function of organization

in the zone of overlap between the conceptual and operational areas of any enterprise.

2.1.3 The Project Organization:

A characteristic of the process whereby buildings are procured is that the independent enterprises described earlier come together temporarily and so form what can be termed a 'project organization'. Miners (1971, p.18), referring to the temporary nature of what he terms the 'micro organization for specific building projects' writes:

> '...individuals and firms come together intimately for the duration of the project, and then disperse to form different groupings around other projects.'

This remains true despite the tendency, in the time since Miners wrote, for some of the parties to coalesce into more stable groupings. It is thus the project organization, rather than each of isolated independent enterprises, that constitutes the real context for building design. Consequently, the discussion this far must be set into the environment of the project organization.

In the project organization, by agreeing to reciprocate with one another in some way, a diverse number of independent enterprises become organizationally interdependent. Each enterprise will possess certain technologies for its operating as well as its maintenance activities. The greater or lesser utilization of such technologies will act as a requirement to be satisfied in any interchange with other enterprises. Also, as each enterprise has a separate policy-making

and programming centre, the purpose of which is to attend to its own future viability rather than that of the project, decisions at the conceptual level similarly constitute requirements to be satisfied in an interchange.

It is commonly held by members of the architectural profession that policy is set only by the building sponsor and that technology is merely a collection of tools and equipment possessed by production and construction enterprises. These concepts, as will be illustrated in Chapter 7, derive from a partial view of the nature of craft production and from a bias introduced by the very close ties architects have had with their clients in the design of custom work. At this stage, it can therefore be accepted that both the policies and the technologies of all parties participating in a building project must be seen as constituting the context for building design.

The functions involved in the procedural area tend to encompass matters beyond the sectional ambit of each of the individual enterprises. This situation arises primarily through the physical connection between the parts, components, sub-systems and elements of the building. As Kohn (1971, p.143) states

> 'It seems that the only all-connecting link in the whole macrosystem of the building process ... is the space and shape arrangement and the allocation of final building products, their agglomerations and parts.'

As it is the building sponsor who is in ultimate control of the entry into and the exit from the project organization, it is he who assumes overall responsibility for the design as well as the organization functions and consequently he who determines the procedural context for building design.

.2 THE PROJECT LIFE-CYCLE AS A CONTEXT

To amplify the picture of the context of the design function it is necessary also to relate design to the processes with which it is associated in the overall procedure by which society procures, uses and eventually demolishes its buildings. Although a generally accepted framework of processes exists and is entrenched in the fee structure of the architectural profession, it does not reflect very accurately the true nature of the processes it attempts to describe. Various attempts have therefore been made to define these processes more precisely - by the R.I.B.A. (1964), Reiner (1970) and Morris (1974a and b) in Great Britain, and by Louw (1974) in South Africa. The frameworks of processes defined by each of these is illustrated in the following transparency as is also the framework entrenched in the fee structure of the profession (termed usual terminology in the diagram). It is important to note that the frameworks do not necessarily represent the sequence of processes for any project. Variation in the sequence of processes may be substantial and is discussed further in Chapter 6.

The motivation for the creation of these new frameworks has varied from the desire 'to provide a model procedure for methodical working of the design team' (R.I.B.A., 1973, p.345) to the need for establishing a framework for the use of computers in the building industry. Morris (1974b, p.2) however, aimed at sketching a framework whereby projects may be described and categorized so as to be able to analyse the nature of the relationship between the design and construction processes. The purpose of the analysis which follows is similar to that of Morris but uses as reference the broader context of all the processes to which design is related.

USUAL TERMINOLOGY	PURPOSES OF WORK AND DECISIONS TO BE REACHED	R I B A (1964)	REINES (1970)	MORRIS (1974)	LOUW (1974)
BRIEFING	TO DECIDE ON THE GENERAL OUTLINE OF THE REQUIREMENTS AND PLAN FUTURE ACTION	INCEPTION	BRIEF	PLANNING (ORGANIZATIONAL AND PROGRAMMING FACTORS)	BRIEF
	TO DETERMINE THE FORM IN WHICH THE PROJECT IS TO PROCEED ENSURING THAT IT IS FEASIBLE, FUNCTIONALLY, TECHNICALLY AND FINANCIALLY.	FEASIBILITY			
SKETCH PLANS	TO DETERMINE GENERAL APPROACH TO LAYOUT, DESIGN AND CONSTRUCTION.	OUTLINE PROPOSALS	DESIGN	SKETCH DESIGN	INITIAL DESIGN
	TO DECIDE ON PROPOSALS, INCLUDING PLANNING APPEARANCE, CONSTRUCTION METHOD OUTLINE SPEC. AND COST.	SCHEME DESIGN			
WORKING DRAWINGS	TO DECIDE ON EVERY MATTER RELATED TO DESIGN, SPEC. CONSTRUCTION AND COST.	DETAIL DESIGN		DETAIL DESIGN	DETAIL DESIGN
	TO CONVERT THE DESIGN INTO INSTRUCTIONS	PRODUCTION INFORMATION	DESIGN REALIZATION	WORKING DRAWINGS	
	TO CREATE A MEANS OF COST CONTROL	BILLS OF QUANTITIES		BILLING	BILLS OF QUANTITIES
	TO INVITE, PREPARE AND SELECT TENDERS	TENDER ACTION		ESTIMATING	?
SITE OPERATIONS	TO PROGRAMME THE WORK IN ACCORDANCE WITH CONTRACT CONDITIONS; BRIEF SITE INSPECTORATE, AND MAKE ARRANGEMENTS TO COMMENCE WORK ON SITE.	PROJECT PLANNING		PLANNING AND PROGRAMMING	
	TO FOLLOW PLANS THROUGH TO PRACTICAL COMPLETION OF THE BUILDING	OPERATIONS ON SITE	PRODUCTION	CONSTRUCTION ON SITE	CONSTRUCTION
	TO HAND OVER THE BUILDING FOR OCCUPATION, REMEDY ANY DEFECTS, SETTLE THE FINAL ACCOUNT, AND COMPLETE ALL WORK. +	COMPLETION			
					OCCUPATION

+ THE LAST 'FEEDBACK' STAGE OF THE R I B A MODEL IS OMITTED AS A DISTINCT PROCESS AS IT IS ASSUMED THAT FEEDBACK IS IMPLICIT IN EACH INDIVIDUAL PROCESS.

EXISTING MODELS OF THE PROJECT PROCUREMENT PROCESS

USUAL TERMINOLOGY	PURPOSE OF WORK AND DECISIONS TO BE REACHED	R I B A (1964)	RETNER (1970)	ROBBINS (1974)	LOUW (1974)
BRIEFING	TO DECIDE ON THE GENERAL OUTLINE OF THE REQUIREMENTS AND PLAN FUTURE ACTION.	INCEPTION	BRIEF	PLANNING (ORGANIZATIONAL AND PROGRAMME FACTORS)	BRIEF
	TO DETERMINE THE EXTENT TO WHICH THE PROJECT IS TO PROCEED BY ENSURING THAT IT IS FEASIBLE, FUNCTIONALLY, TECHNICALLY AND FINANCIALLY.	FEASIBILITY			
SKETCH PLANS	TO OBTAIN AN OVERALL APPROACH TO LAYOUT, DESIGN AND CONSTRUCTION.	OUTLINE PROPOSALS	DESIGN	SKETCH DESIGN	INITIAL DESIGN
	TO DECIDE ON PROPOSALS, INCLUDING PLANNING APPEARANCE, CONSTRUCTION METHOD, OUTLINE SPEC. AND COST.	SCHEME DESIGN			
WORKING DRAWINGS	TO DECIDE ON EVERY MATTER RELATED TO DESIGN, SPEC. CONSTRUCTION AND COST.	DETAIL DESIGN		DETAIL DESIGN	DETAIL DESIGN
	TO CONVERT THE DESIGN INTO INSTRUCTIONS	PRODUCTION INFORMATION	DESIGN REALIZATION	WORKING DRAWINGS	
	TO CREATE A MEANS OF COST CONTROL.	BILLS OF QUANTITIES		BILLING	BILLS OF QUANTITIES
	TO INVITE, PREPARE AND SELECT TENDERS	TENDER ACTION		ESTIMATING	?
SITE OPERATIONS	TO PROGRAMME THE WORK IN ACCORDANCE WITH CONTRACT CONDITIONS; BRIEF SITE INSPECTIONS; AND MAKE ARRANGEMENT TO COMMENCE WORK ON SITE.	PROJECT PLANNING		PLANNING AND PROGRAMMING	
	TO FOLLOW PLANS THROUGH TO PRACTICAL COMPLETION OF THE BUILDING.	OPERATIONS ON SITE	PRODUCTION	CONSTRUCTION ON SITE	CONSTRUCTION
	TO HAND OVER THE BUILDING FOR OCCUPATION, REMEDY ANY DEFECTS, SETTLE THE FINAL ACCOUNT, AND COMPLETE ALL WORK.	COMPLETION			
	+				OCCUPATION

+ THE LAST 'FEEDBACK' STAGE OF THE R I B A. MODEL IS OMITTED AS A DISTINCT PROCESS AS IT IS ASSUMED THAT FEEDBACK IS IMPLICIT IN EACH INDIVIDUAL PROCESS.

EXISTING MODELS OF THE PROJECT PROCUREMENT PROCESS

2.2.1 A Comparison of Models:

The advantages and disadvantages of each of these frameworks or models will now be discussed with respect to the concepts outlined in the first section of this chapter.

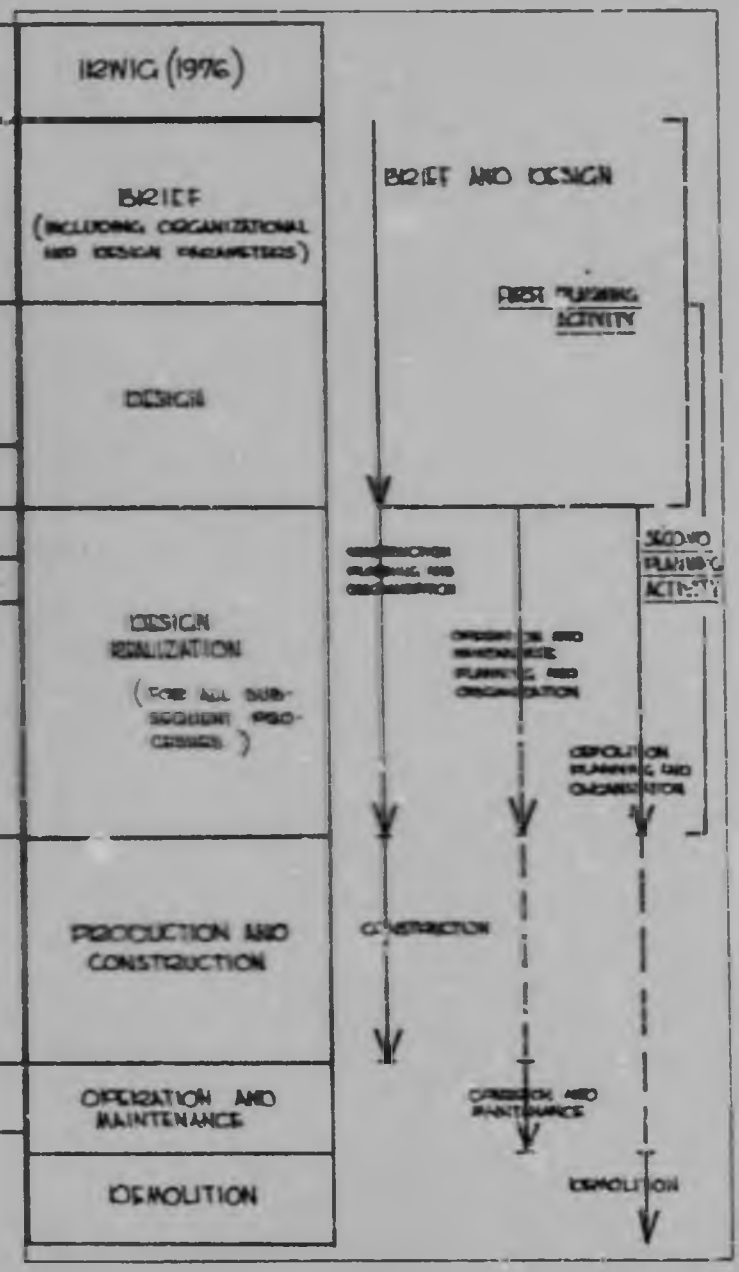
1. Comparing the generally accepted framework with the R.I.B.A. format indicates that the usual terminology underplays the link between the design of the total building and the design of components and elements of the building. In addition it is imprecise as it includes under the title of 'working drawings' a number of processes which involve no drawing at all. Similarly the term 'site operations' does not give sufficient recognition to the importance of planning these operations (which very often do not take place on site) and tends to underplay the link in function between planning and tender action.

2. Louw's model tends to ignore most of the processes intervening between detail design and construction on-site. It does, however, include 'occupation' which is a process on which design has an important bearing.

3. Reiner's model overcomes the disadvantages mentioned above but, unfortunately, does not include the processes which follow production. Production, in his terminology, includes both off-site manufacture and on-site construction.

4. All the models considered this far assume the brief to emanate solely from the building sponsor. Morris (1974a, p.80) alone alludes to a 'planning and programming' function in production and construction enterprises. ...es, however, not differentiate this activity clearly from the organiza- ... activities concerned with the detailed implementation of design

R.I.B.A (1964)	REINER (1970)	MORRIS (1974)	LOUW (1974)	NEWIG (1976)
INCEPTION	BRIEF	PLANNING (ORGANIZATIONAL AND PROGRAMME FACTORS)	BRIEF	BRIEF (INCLUDING ORGANIZATIONAL AND DESIGN PARAMETERS)
FEASIBILITY				
OUTLINE PROPOSALS	DESIGN	SKETCH DESIGN	INITIAL DESIGN	DESIGN
SCHEME DESIGN				
DETAIL DESIGN		DETAIL DESIGN	DETAIL DESIGN	
PRODUCTION INFO.	DESIGN REALIZATION	WORKING DRAWINGS		DESIGN REALIZATION (FOR ALL SUBSEQUENT PROCESSES)
BILLS OF QUANTITIES		BILLING	BILLS OF QUANTITIES	
TENDER ACTION		ESTIMATING		
PROJECT PLANNING		PLANNING AND PROGRAMMING		
OPERATIONS ON SITE	PRODUCTION	CONSTRUCTION ON SITE	CONSTRUCTION	PRODUCTION AND CONSTRUCTION
COMPLETION				
			OCCUPATION	OPERATION AND MAINTENANCE
				DEMOLITION



THE PROJECT PROCUREMENT PROCESS : A NEW MODEL

decisions. This inaccuracy probably stems from Morris's lack of clear identification of briefing, which he includes in design. Unfortunately the model also does not include any post-construction processes.

The limitations of the models discussed above have necessitated the construction of a new model, illustrated on the left, adjacent to the others to allow for comparison. The primary contribution of this model is that it incorporates the idea that there are two distinct 'systems of activity' in the process (Tavistock, 1966, p.18; Miller and Rice, 1967, p.136). The first activity corresponds with the 'conceptual area' discussed earlier and includes briefing and design, with the so-called planning activities of the second activity constituting implementation. The second activity corresponds with the 'operational area', with design and design realization constituting the planning activities and actual physical work on materials the implementation.

1.2.2 Description of Processes:

Each of the processes which constitute the overall procedure is now described in some detail to provide a defined terminology for the discussion which follows in later chapters.

Brief g:

Briefing is concerned with the specification of requirements and goals in what has been referred to as a 'problem statement' (Karp, 1969, p.41). The brief may take any form - from the scribble on the back of an envelope to the most elaborate and voluminous of documents. It may deal only with matters of policy or it may stipulate requirements with regard to the detailed form of components and

composition of materials to be incorporated into the building. Detailed process and timing requirements may also be included in the brief. Whereas certain requirements may be very rigid, others may be quite adjustable.

Design:

Design, as defined in Chapter 1, embraces the total conception of a building form in all its detail.

Design Realization:

This term was first coined by Reiner (1970) who used it to denote the function intervening between the design and production and described in the quote below.

> 'When a man dothe begyn to buylde his hose or mansyon place, he must provyde (sayth Jhesus Christe) that before that he begynne to buylde, for all thynges necessarye, for the performacion of it, leste that whan he hath made his foundaction, and can not fynysshe his worke that he hath begen, every man wyll deryde him sayenge. This man dyd begyn to bylde, but he can not fynyssh or make an ende of pysses, many lathes and many tyles or sklates or straws, besyde stones or brycke, besyde workemanshyp and the implementes....'
>
> From: The boke for to lerne a man to be wyse in buyldyng of his howse for the helth of body and to hold quyetnes for the helth of his soule, and body London (1549?) (Kaye, 1960, p.32).

Whereas the conception of a building form in all its detail constitutes the process of design, it is another process, design realization, in which the design is translated into a marshalled arrangement which will allow co-ordinated and safe production, operation and maintenance, or even demolition processes to be

carried out. Design realization therefore involves the translation of the design into instructions for action and for control. Used in this wider context, design realization incorporates the organization of all resources necessary for the performance of any of the tasks which come after design. These resources are men, money, machines and detailed and clear instructions (known as 'production information' and 'bills of quantitities' in the construction context). Although generally the intensity of 'design realization' for production is greater than that required for the operation, maintenance and demolition of buildings, the importance of the early preparation of the information for these other processes has been emphasized (Akam, 1972; Summerley, 1974, pp. 98 and 100).

Production:

This function involves both off-site manufacture and on-site construction and assembly operations. It comprises the co-ordination and control of operations as well as the actual operative activities themselves.

Operation and Maintenance:

This function comprises the activities of those who occupy the building, those who clean and maintain the building, and those who co-ordinate and control the operation of mechanical and electrical systems and the upkeep of the building.

Demolition:

The planned destruction or disassembly of all or a portion of a building is included as well as the detailed co-ordination and control of such activities.

To summarize, the process of design can be seen as intervening between the briefs of those concerned with the production, use, operation, maintenance, demolition and financing of a building project and the 'design realization' activities necessary to implement the intentions of the design. In addition, it is influenced by the organizational arrangements which constrain the actions of all those concerned.

EXPECTATIONS OF OUTPUT AND INPUT AS A CONTEXT

It is not only organizational and procedural elements which define the context of design but also expectations with regard to the output of and input to design.

1.1 Defining the Output of Design:

Defining the output of design is a problem. Rubenstein (1957, p.96) suggests that it is useful to differentiate between 'direct' and 'indirect' outputs of activities which occur at the upper levels of organizations. In design, direct outputs are concerned with the novelty, clarity and quality of information produced while indirect outputs relate to the achievement of economic results brought about by other activities of the organization on the basis of the direct

output. Drucker (1971, pp.349-350), highlighting the importance of the indirect output in what he terms 'knowledge work' states:

> 'For this task we need definitions - not to speak of measurements - that are quite different from those that we have learned to apply to manual work. The most useless and wasteful effort is that of an engineering team that with great speed, precision and elegance turns out drawings for the wrong product!'

The output of the design process cannot be divorced from its effect on the construction, occupation, operation and maintenance or demolition of the building. The only meaningful way therefore, of defining the output of the activity in which the nature of the building is determined and strategic resource allocation decisions made, is with reference to the implications of the design on the policies, plans, procedures and technologies of those undertaking these activities. Despite the importance of the indirect output, the direct output should not be neglected in any evaluation of the design process. The information produced, even if not used to construct a building, may nevertheless often create a source of valuable knowledge for future designs. Ultimately, therefore, the output of design will and must be related to its effect on the processes which constitute its context.

3.2 Evaluating the Output of Design:

The assertion that buildings should satisfy completely, and at once, the aesthetic as well as the practical needs of man has often been repeated (Cook, 1967, p.10; Broadbent, 1973a, p.387; Papanek, 1974, p.19; Martienssen quoted

in Herbert, 1975, p.26). The idea that certain qualities should exist with respect to the quantity and quality of the accommodation provided and its durability has had currency since Roman times when Vitruvius stated that all buildings should exhibit 'Durability, Convenience and Beauty'. This dictum, eventually enshrined in the English language in the words of Sir Henry Wotton (1624) as 'Well building hath three Conditions. Commoditie, Firmenes, and Delight' is comprehensive enough in an age where the fairly primitive material and labour resources required were readily accessible - as for instance, in ancient Greece where public building programmes were consciously set up to reduce unemployment amongst the unskilled masses and where buildings were simple, with few moving parts, and relatively permanent. However, in an increasingly populous world requiring increasingly complex buildings which have to be operated and maintained, in addition to being constructed and occupied, the need to conserve resources and reduce pollution as well as the necessity of creating more gainful and meaningful work for an ever-increasing proportion of the working population demands that Wotton's dictum be enlarged.

This was already appreciated by the early leaders of the modern movement in architecture. For instance Sullivan, in his'Kindergarten Chats (revised 1918)' (1947, p.35) wrote:

> 'The subjective value of a building is far the higher, by far the more permanent; but money value is inseparable from the affairs of life, to ignore it would be moonshine.'

More recently others have in fact extended Wotton's definition by including:

1. Cost factors (Arup, 1970, p.2; Caudill, 1971, p.131).
2. Time and cost factors (Broadbent, 1973, p.vii).

3. 'Minimum mechanical energy and human drudgery in making and maintenance' (Goodman quoted in Hanson, 1974, p.168).

Improvement in the output of the design process therefore implies not only that user objectives in terms of commodity, firmness and delight are achieved, but that the processes of production, operation, maintenance and demolition (where necessary) do not require the use of more exertion or more materials or other resources than is necessary to achieve these objectives.

3.3 Productivity in the Design Process:

The concept of productivity is perhaps one of the most misunderstood and misapplied concepts in use today. Bakewell, in his book entitled 'How to Find Out: Management and Productivity' (1970, p.2), illustrates the diversity of definitions which prompted Salter (1966, p.2) to remark of productivity:

> '...to some it measures the personal efficiency of labour; to others it is the output derived from a composite bundle of resources; to the more philosophic, it is almost synonymous with welfare.'

Despite the large number of interpretations, the concept of bringing about greater results (output) with lessened effort (input) is a common theme in all. As society's expectations increase, so the reconciliation of ends and means discussed above not only becomes more difficult but must also be achieved with minimum wastage of resources used in the design process itself. In other words productivity in building design becomes important.

4 CONCLUSION

As the expectations of a modern society demand greater benefit with less exertion, so productivity in design becomes an important goal. Any attempt to achieve this goal must take into account both the resources used and the organizational and procedural context of the design activity. The content of subsequent chapters focuses first on the nature of the resources required and then on the organizational and procedural arrangements necessary to stimulate best use of these resources.

CHAPTER 3: THE NATURE OF THE BUILDING DESIGN PROBLEM

Design can be classified as a problem-solving process along with a host of other pursuits such as finding the answers to crossword puzzles or manipulating mathematical equations. The nature of the problem-solving process, however, differs with the nature of the problem. Consequently, before the resources and conditions required for productivity in the building design process can be isolated, the nature of the problem to be solved must first be appreciated.

A TAXONOMY OF PROBLEMS

Research done during the 1960's revealed that problems can be grouped together according to a number of criteria. The criteria put forward by Archer (1966), Reitman (1965) and Thompson (1967) are discussed below.

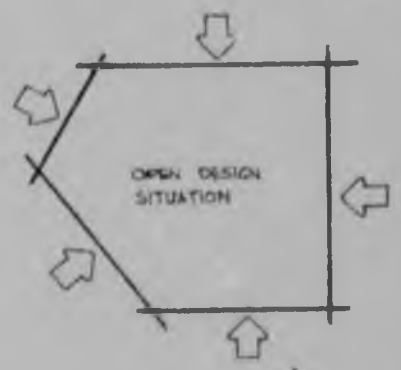
1 The Archer Classification:

Archer (1966, pp.7-8) classifies problems according to the range of solutions which are possible. He visualizes the solution to any problem as falling within an area bounded by constraints as shown in the diagram on the right.



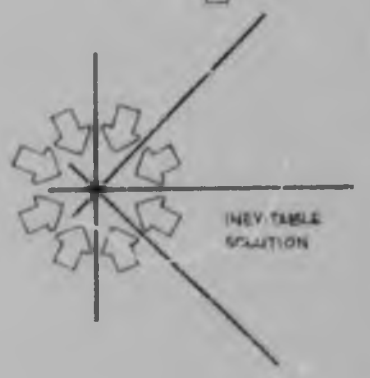
PROBLEM SOLUTIONS AND CONSTRAINTS

These constraints define the limits to acceptability of a solution and arise from the attributes of any object or process introduced into the problem either as a need or as a resource. Although it is correct to view the problem-solving resource itself as a constraint on possible solutions, as Hillier and his colleagues (1972, p.9) have done, the performance of the problem-solver is a dependent variable which must be excluded from any discussion on the nature of the problem itself.



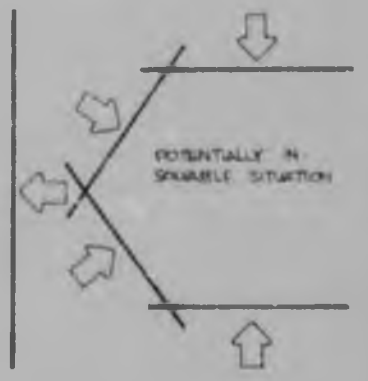
The way in which the constraints interact determine the type of problem faced:

1. Sometimes the constraints will be spread out allowing for a broad field of manoeuvre, constituting what Archer calls an 'open design situation'.

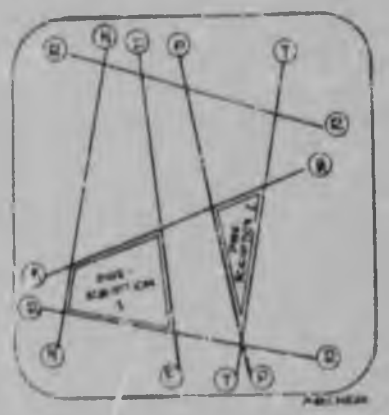


2. In other cases the field of manoeuvre may be so small that the solution is virtually conditioned by the interaction of the constraints. As in the solution of an equation, the solution is 'inevitable'.

3. There is also the potentially insoluble problem where one required condition completely denies the fulfilment of the other requirements unless a technical breakthrough is achieved.



4. There are also those problems, which Archer regards as typical of design, that constitute a broken up field of freedom in which two or more fundamentally different prescriptions are indicated.


BROKEN UP DESIGN SITUATION

2 The Reitman Classification·

Reitman (1965, p.152) differentiates between problem types on the basis of the routine implicit in the process of transformation of the problem into a solution. He visualizes this process of transformation comprising one or other of the following techniques:

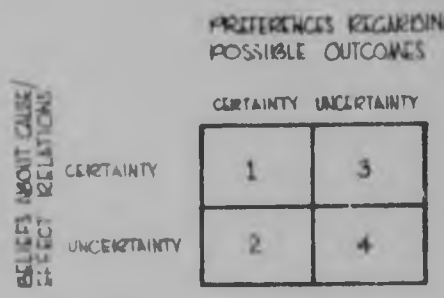
1. A routine search through well-organized information banks.
2. More complex activities using known methods for the construction of new relationships between existing concepts.
3. Creative thought which involves discovering connections between objects or ideas previously never, or at least infrequently, considered to have any connection, and so inventing entirely new solutions.

Whereas problems subject to solution by the first technique are termed 'well-defined' those which involve a substantial degree of ingenuity are called 'ill-defined'. Reitman's classification corresponds fairly closely with that proposed by March and Simon (1958, p.137) who visualize problem solving taking place under conditions of 'certainty', 'risk' or 'uncertainty'.

The Thompson Classification:

In the work of Thompson (1967, pp.134-135) the two approaches - one focusing on solutions and the other on the process of transformation - become integrated. Thompson suggests that decision issues always involve two major dimensions which are related as shown on the adjacent diagram:

1. Standards of desirability regarding possible outcomes.
2. Beliefs about cause/effect relations.



1 CALLS FOR 'COMPUTATIONAL STRATEGY' (ELECTRONIC COMPUTER USEFUL)

2 'JUDGEMENTAL STRATEGY'

3 'COMPROMISE STRATEGY'

4 'INSPIRATIONAL STRATEGY'

DIMENSIONS OF DECISION ISSUES

Depending upon the balance of 'certainty' to 'uncertainty' with respect to both dimensions, Thompson categorizes problems according to which one of four techniques is required for the solution of the problem: 'computation', 'judgement', 'compromise' or 'inspiration'. As Thompson's system of classification is the broadest of the three described, and in fact incorporates the other two, it will be used in the attempt to define the nature of design problems which constitutes the topic of the following discussion.

DESIRABILITY OF OUTCOMES

There are many points of view from which the solution to a design problem can be evaluated. In an urbanized society building sponsors, component manufacturers, contractors, users and others tend to judge design solutions from their own specialized positions so that, rarely, can any solution count on universal acceptance, especially when it involves some degree of change. Not only is there a diversity of opinions but, as outcomes are evaluated by people,

requirements rise and fall with aspirations. In this regard Woolley (1970, pp. 17-18) illustrates how, in the planning of surgical departments for hospitals, uncertainty with regard to the desirability of outcomes pertains as much to apparently quantifiable factors, such as cost, as to aesthetic, comfort and safety qualities which tend to be less quantifiable.

As, in practice, it is hardly ever possible to create a solution to a building design problem which will be regarded as optimum by all concerned, and as the values which will attach to any solution are always somewhat uncertain, building design problems must be placed to the left of Thompson's graph - thus indicating the need for 'compromise' or 'inspirational' techniques for their solution.

3. INTERDEPENDENCE BETWEEN CAUSE AND EFFECT

It is the relationship between the various sub-problems into which an overall problem is factorized which determines the amount of certainty or uncertainty along this dimension.

As the human mind is limited in its capacity to focus on more than a small number of facts or ideas at any one time, all complex problems inevitably become divided into sub-problems which can be handled more or less separately (March and Simon, 1958, p.151; Reitman, 1965, p.156). Problems differ, however, in the manner in which solutions to particular sub-problems are related to the definition and the solutions of other sub-problems formulated in order to solve the overall problem. The two extremes outlined below

have been described by March and Simon (1958, pp.178-191).

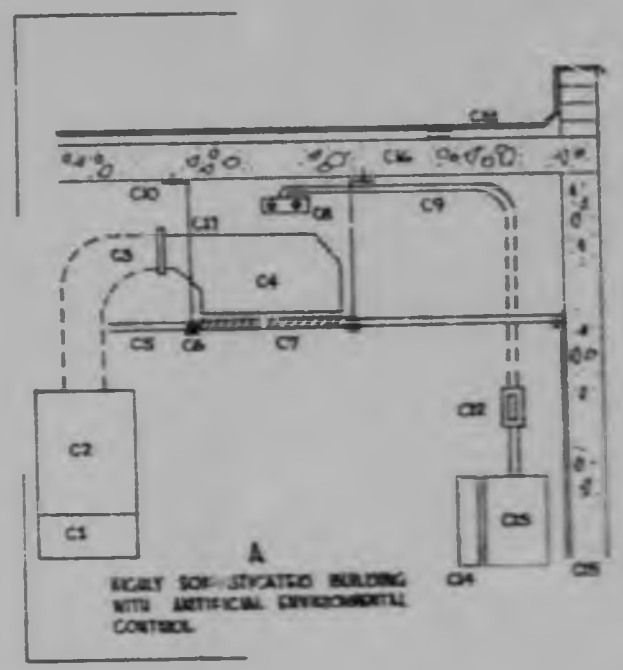
3.1 Problems Amenable to Procedural Programmes:

Some problems are of such a nature that they allow the use of techniques, termed 'procedural programmes' by March and Simon, whereby a completely rational approach results in the sequential solution of ever-decreasing sub-problems which, when solved, automatically give rise to a satisfactory overall solution. The basic characteristic of such problems is the comprehensive nature of the knowledge which exists about the interdependency between the various sub-problems created. March and Simon suggest in this regard, that these problems are characterized by two interrelated conditions:

1. Each of the sub-problems, at any stage of the process, is relatively independent of the others.
2. At each stage of the process a judgement as to the feasibility of the solution to the sub-problem is possible.

3.2 Problems Amenable to Substantive Programmes:

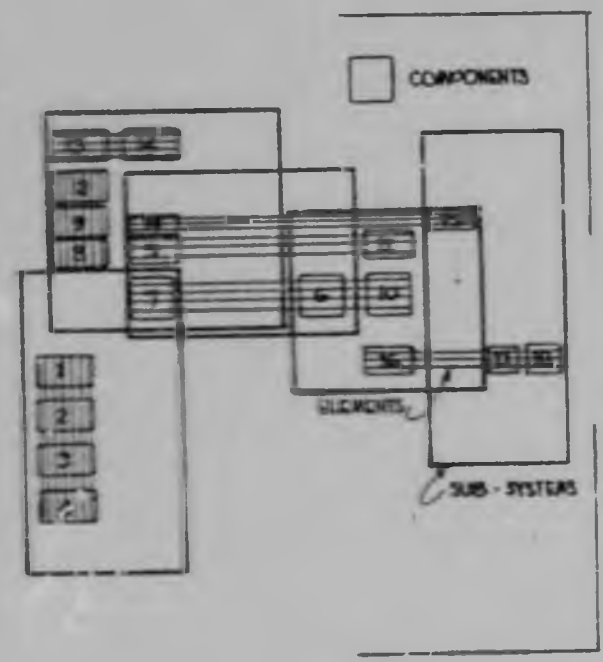
At the other end of the scale there are problems to which an acceptable solution can be found only by allowing the definition and solution of sub-problems to be modified with regard to the definition and solution of adjacent sub-problems. The only guide for the obtaining of an overall solution is the structure of the overall problem at a particular point in time, called a 'substantive programme' by March and Simon. There is concensus that these problems, in

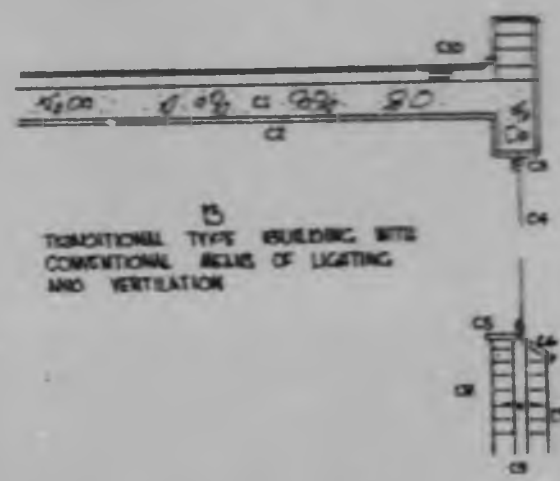


A

HIGHLY SOPHISTICATED BUILDING WITH ARTIFICIAL ENVIRONMENTAL CONTROL

		W.P.	ST.	SPA.	L	V
C1	A.C. PLANT					X
C2	A.C. PLANT					X
C3	DUCTING					X
C4	DUCTING					X
C5	COOLING - SUMP			X	X	
C6	COOLING		X	X		
C7	COOLING			X	X	X
C8	ELECTRICAL				X	
C9	ELECTRICAL				X	
C10	COOLING		X			
C11	COOLING		X			
C12	ELECTRICAL				X	
C23	TRANSFORMER				X	
C24	TRANSFORMER				X	
C25	WALL	X	X			
C26	ROOF		X			
C27	ROOF	X				
C28	ROOF	X				
C29	WALL			X	X	



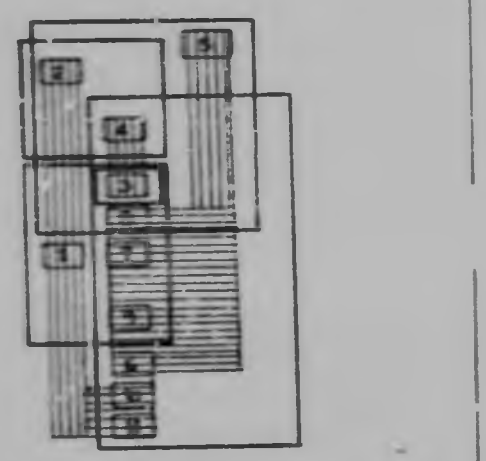


B

TRANSITIONAL TYPE BUILDING WITH CONVENTIONAL MEANS OF LIGHTING AND VENTILATION

		W.P.	ST.	SPA.	L	V
C1	ROOF		X			
C2	ROOF			X	X	
C3	WINDOW	X	X	X		X
C4	WINDOW	X		X	X	
C5	CEIL			X		
C6	CILL	X				
C7	WALL	X	X			
C8	WALL	X	X	X		
C9	WALL	X	X			
C10	ROOF	X				
C11	ROOF	X				

W.P. - WATERPROOFING
ST. - STRUCTURAL
SPA. - SPATIAL
L - LIGHTING
V - VENTILATION



SPATIAL INTERRELATION BETWEEN COMPONENTS, ELEMENTS AND SUBSYSTEMS OF BUILDINGS

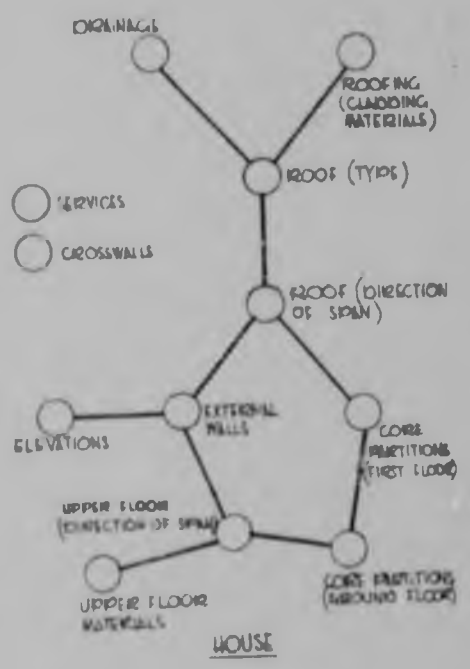
contrast to those described earlier, are characterized by the following conditions:

1. The interdependence between sub-problems is reciprocal.
2. The feasibility of a solution to a sub-problem is difficult or impossible to ascertain without reference to the solution of other sub-problems. (Asimow, 1962, p.6; Norberg-Schulz, 1963, p.78; Luckman, 1966, p.5)

3. Building Design Problems:

Buildings can generally be regarded as 'wholes' (Herbert, 1975, p.2). The essence of a 'whole' is that while it is formed of its parts, it in turn influences the parts and affects their relations and functions. The complex spatial interrelation between the components, elements and sub-systems of two relatively standard structures is illustrated on the transparency.

This complex spatial relationship gives rise to a high degree of inter-dependence between sub-problems in building design. The extent of this phenomenon has been demonstrated in one of the few attempts to investigate first-hand the process of design in practice. This research, undertaken by Luckman as part of the Tavistock study into the building industry, incorporated two case studies - one of a house to be built on a repetitive basis, the other of window cleaning facilities to a high tower office block (Tavistock, 1966, p.17). The diagrams on the right illustrate the interdependence between the sub-problems identified in these two studies.



Given the extent of the interdependence, it is not surprising that the Tavistock researchers found that design decisions very often set in train a chain of consequences which caused initial design decisions to be changed.

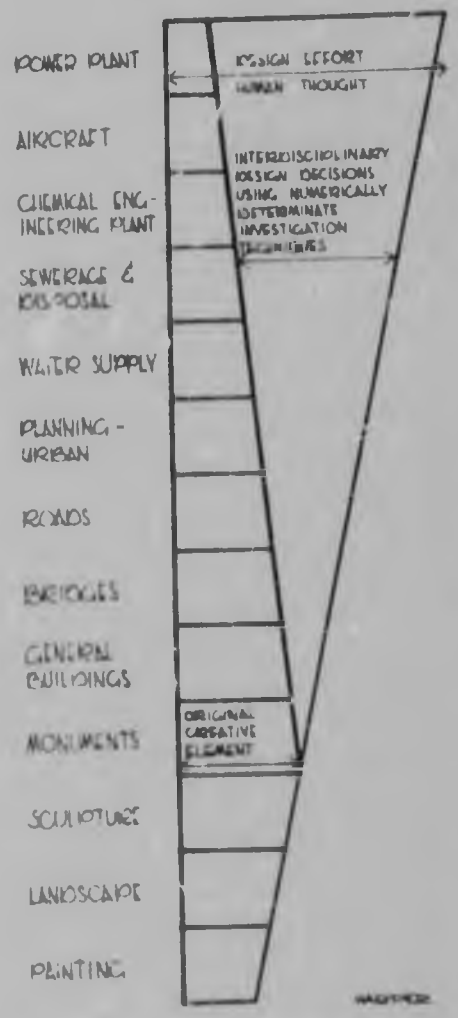
It has been demonstrated that on the cause/effect axis of Thompson's graph building design problems tend towards the 'uncertain' dimension. Consequently they call for 'judgemental' or 'inspirational' strategies for their solution.

THE NEED FOR HUMAN MINDS

It has been shown that along both of Thompson's dimensions building design problems tend towards uncertainty. As indicated in the adjacent diagram* this in no way implies that the solution to all sub-problems are non-quantifiable and that each and every sub-problem is highly interdependent. What is indicated is that human judgement, adaptability and, above all, imagination are required to create the solution to the bulk of the complex building design problems with which an urbanized society is faced. This has been emphasized by Mallows (1965, p.28):

> 'Only this built-in computer of the mind and the heart can solve all the simultaneous equations necessary to produce, for human problems, fully human solutions on which action can be taken.'

Unfortunately, or perhaps fortunately, this 'built-in computer' does not operate in a mechanical fashion but by means of what has become known as the 'creative process', a complex human process involving thought and emotion.



PROPORTION OF CREATIVE ELEMENT IN DESIGN OF VARIOUS ARTEFACTS

* This diagram was used by Professor Harper of the Department of Building at UMIST in a lecture given to final-year B.Sc. (Building) students of the University of the Witwatersrand during their overseas tour which the author organized and led.

CHAPTER 4: THE NATURE OF THE CREATIVE PROCESS

In the previous chapter the need to utilize the judgement, flexibility and particularly the imagination of human minds to solve building design problems was demonstrated. During the 1960's much work was done in creating techniques which would foster the imagination and sharpen the judgement of individuals and groups concerned with the solution of ill-defined problems, especially design. Techniques such as 'Brainstorming' and 'Synectics' were evolved which, by the control of information flow, separated out the components of the 'creative process'. However, since the mid-sixties, this 'information processing' approach has increasingly been criticized, even by its former protagonists, on the grounds that it interferes with the emotional tone and therefore the performance of creative individuals (Mallows, 1965, p.60; Broadbent 1973b, pp. 4-5). It has become clear therefore that, whether means of increasing productivity involve arrangements at the institutional level or techniques at the drawing board, they must be based on a full understanding of the creative process from both an information-processing and a socio-emotional point of view.

Three methods have been used to research the creative process:

1. Analysis of the evolution of a work from rough notes or sketches;
2. Observation of the activities of an individual by a second party;
3. Introspection by the individual himself (Broadbent, 1973a, pp.21-22).

Three descriptions of the creative process, each obtained by one of the methods referred to above, form the basis of the analysis which constitutes the content

of this chapter. The descriptions are the following:

1. An analysis of the relationship between Beethoven's rough sketches and his concertos undertaken by Denis Matthews (1971), an eminent British concert pianist.
2. The observation of a professional composer composing a fugue - undertaken by Reitman (1965, pp.166-180).
3. The well-known but often-neglected description by Frank Lloyd Wright (1943, pp.153-160) of his experience in designing Unity Temple.

Each method, and therefore each description has its limitations; broadly as the scope for understanding the total nature of the process increases, (from 1 to 3), so too does subjectivity and interference with the process itself. However, taken together, these descriptions do provide a fairly authentic and comprehensive view of the nature of human creative activity.

1 CREATION: A PROCESS

The first and perhaps most important aspect revealed in the literature is that creation involves a process. It is not merely a flash of sudden inspiration, despite the apparent spontaneity of final results. All three descriptions clearly illustrate that this creative process proceeds in stages, and at virtually no stage is concerned with the whole problem in all its complexity. Thus the idea discussed in Chapter 3, that complex problems have to be divided into sub-problems, is supported. These sub-problems can be formulated at any of a number of levels from the overall layout of a building to the design of a balustrade. There seems, however, to be no difference in

difficulty between design at one level and at another. According to Wright:

> 'And, always, some minor concordance takes more time, taxes concentration more than all besides. Any minor element may become a major problem to vex the architect.'

The stages into which the process is divided do not occur in any fixed order; there is considerable repetition of stages as solutions to some sub-problems are made to influence other sub-problems. According to Luckman (1966, p.4):

> 'The designer does not consciously take every step laboriously but like a good chess player, can see several moves ahead and back, taking short cuts, and is often checking feasibility of an idea at one level with ideas for other levels.'

This is well illustrated in Wright's description of both the choice of roof for Unity Temple and the choice to house the secular activities of the church in a separate building. In regard to the former Wright recounts:

> 'What roof? ... The concrete slab - of course. Nothing else if the building was to be a thoroughbred, meaning built in character out of one material.
>
> 'It would be nobly simple. The wooden forms or molds in which concrete buildings must at that time be cast were always the chief item of expense, so to repeat the use of a single form as often as possible was necessary. Therefore a building, all four sides alike, looked like the thing. This, reduced to simplest terms meant a building square in plan. That would make their temple a cube - a noble form in masonry.

'The slab, too, belonged to the cube by nature. "Credo simplicitatem." That form is most imaginative and happy that is most radiant with the aura or overtone of super-form. Integrity.'

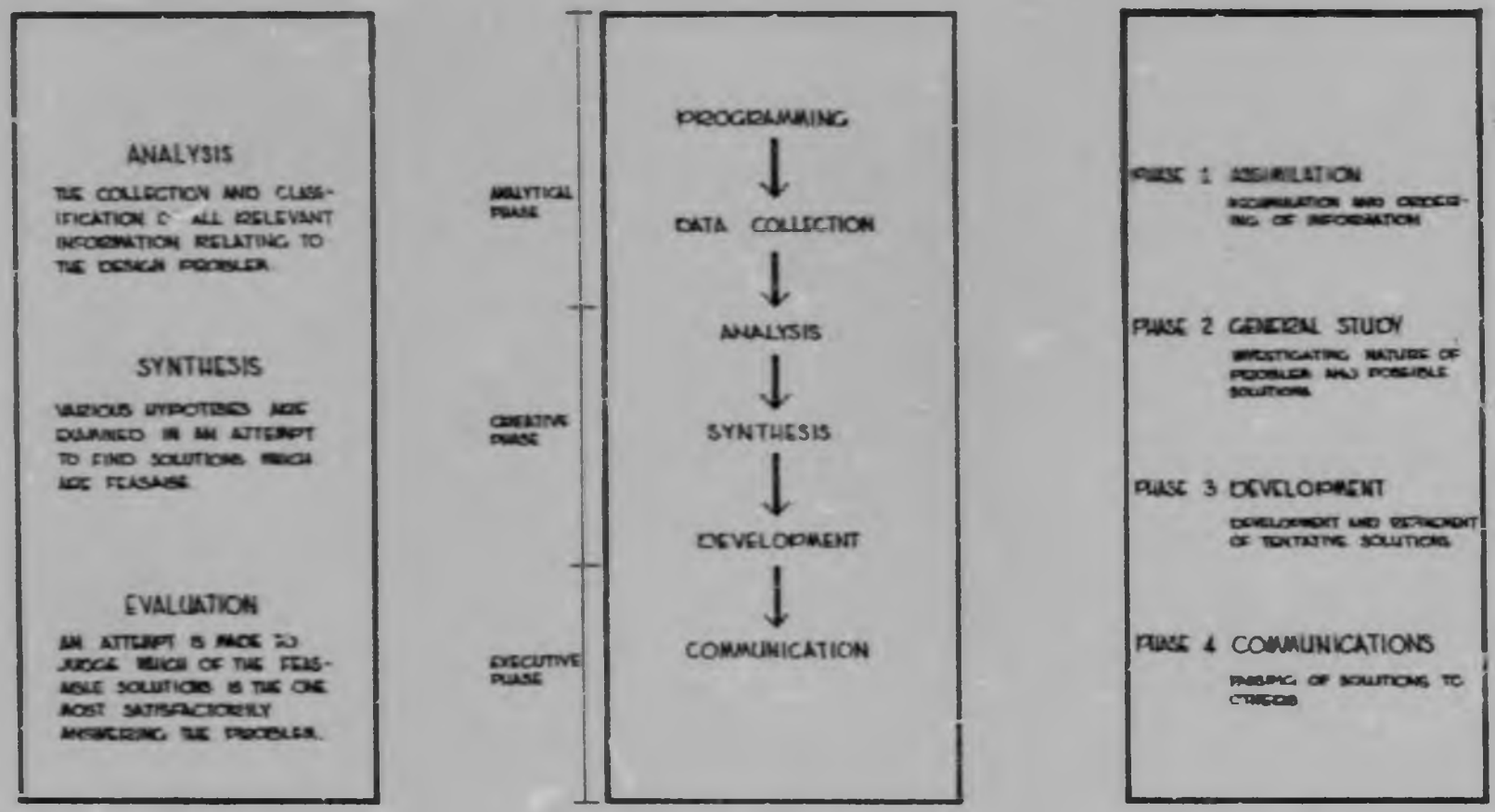
This process of trial and error also occurs in music as is indicated by Reitman and illustrated repeatedly in Beethoven's sketches. It is intimately bound up with the nature of the design problem, and has been referred to by many other writers on the subject (March and Simon, 1958, p.178; Woolley, 1970, p.7; Hillier et al., 1972, p.10; Broadbent, 1973a, p.430; Colman, 1974, p.19).

ACTIVITIES IN THE CREATIVE PROCESS

The stages of the creative process are achieved by means of smaller scale activities. A rigorous analysis of the neuro-physiological decision system in the human body has resulted in the isolation and identification of four such activities:

'Information: the reception and categorization of stimuli.
Conclusion: the assessment of the problem, if any, and appreciation of possible courses of action.
Decision: the selection of a course of action and decision to act on it.
Execution: the analysis of the possible methods of carrying out the selected course, and the decision to act in the chosen method.'

(Paterson, 1966, p.19)



LUCKMAN MODEL — ARCHER MODEL — R.I.B.A. MODEL

THE PROCESS OF DESIGN

These activities are almost identical to the latter four of the five phases proposed by Drucker in what appears to be one of the most comprehensive models of the decision-making process yet created (Mallows, 1965). The phases in this model, initially published in the mid-1950's, are the following:

> 'defining the problem;
> analysing the problem;
> developing alternative solutions;
> deciding upon the best solution;
> converting the decision into effective action.'
> (Drucker, 1968, p.421)

Subsequent models, by Luckman (1966, p.1), Archer (19[illegible], p.7) and the RIBA (1973, p.3[illegible]9) reproduced on the transparency, have not improved on Drucker's interpretation in spite of the fact that they have focused specifically on the design activity: Luckman omits the first and last of Drucker's stages; Archer omits the fourth stage, and the RIBA model underplays the importance of both evaluation and the creation of solutions and also omits the first stage.

The omission of the first phase of Drucker's model by Paterson is, however, essentially due to a difference in scale which exists between the two models. Whereas Drucker includes both problem-seeking and problem-solving in his process, Paterson's activities exist at a smaller scale and apply both to problem-seeking and problem-solving processes. They are therefore somewhat closer to the primary human activities which must form the basis of any study of the creative process. An analysis of these activities with respect to the creative process follows.

2.1 Information Activities:

These activities involve the reception and categorization of stimuli. Although none of the three descriptions which form the background to this discussion focus assertively on information activities, they are nevertheless implicit in the act of playing the piano mentioned in Reitman's description and the questions posed by Wright about the building as he recalls it evolving in his mind.

The source of information may be either internal or external to the individual (March and Simon, 1958, p.10):

Internal Sources of Information:

Internally, the memory of the individual serves as a storehouse of solutions to problems encountered in the past and also a repertory of more or less 'raw' information which may be regarded as components of problem solutions. March and Simon suggest that the content of the memory may be considered as being divided into two parts at any one time:

1. A part which exerts little or no influence on behaviour at the particular time and where changes take place relatively slowly, through the process of learning about the effects of decisions taken in the past.
2. A part, termed 'the evoked set', which is much smaller than the first and which exerts a significant influence on the behaviour of the individual and can change very rapidly.

External Sources of Information:

Externally, there exist aspects of the environment which, through relevance or emphasis, becomes highlighted as stimuli. These stimuli have a strong connection with the evoked set of the memory. In this regard March and Simon state:

> 'The stimuli which are present at a given time are major determiners of what set will be evoked or maintained; conversely, the set at any given time will be a major determiner of what parts of the environment will be effective as stimuli.'

March and Simon (1966, pp.179-180) point out that those who solve ill-defined problems tend to gather information in the least expensive way. As is evidenced in Wright's description, the actual physical search for information is avoided, if at all possible, being replaced with what Burger (1974, p 114) terms 'personal communication'. This involves a dialogue between the mind of the individual and the information at hand about the problem. Such a dialogue not only familiarizes the mind of the individual with the problem but also automatically achieves a broadening and deepening of the memory store from which 'evoked sets' are drawn (Norberg-Schulz, 1963, p.201; Miner, 1975, p.179). In building design, this memory store encompasses many fields including the feelings and activities of human beings, the nature of construction materials and processes, and the characteristics of physical phenomena such as heat, light and sound. Its enlargement with experience not only allows for greater mental scope and flexibility, but also aids in directing effort to those areas in which it is required by avoiding what is commonly known as 're-invention of the wheel'.

2.2 The Conclusion Activity:

> 'Physical concepts are free creations of the human mind...'
>
> (Einstein, quoted in Mallows, 1965, p.19)
>
> '... he has made a composition ... pure invention ... pure creation of the mind ...'
>
> (Le Corbusier, 1931, p.218)

This activity represents the culmination of the information component and involves the bringing forward of ideas about the nature of problems or solutions to problems. In the field of building design it has been variously termed:

'the immediate form phase of design'	- van der Ryn (1966, p.38);
'form generation'	- Broadbent (1973a, p.25);
'concretizing'	- Norberg-Schulz (1963, p.71);
'invention'	- Guedes (1976).

It is concerned with the creation of ideas about the three-dimensional form of buildings, the spaces within and around buildings, and the physical disposition of the resources used to construct buildings.

In the creative process solutions are obtained neither by searching the memory for precedent nor by using existing formulas or routines, but through the construction of new solutions out of more or less 'raw' material. In the field of science, Mallows (1965, p.19) refers to Faraday, Darwin, Davy, Poincare, Planck and Einstein all of whom emphasized the importance of intuition and

imagination in the bringing forward of ideas. In architecture, many have pointed out that new ideas do not arise as an automatic combination of the components isolated during the 'information activities' (Norberg-Schulz, 1963, p.201; Hillier et al., 1972, p.10; Guedes, 1975, p.21). This is well illustrated in the comment of Paul Rudolph who, when discussing his Temple Street Parking Garage in New Haven, U.S.A., says:

> "I could tell you that the design of the balustrades has to do with the nature of materials ... I could go on and on and give an explanation of why each element is as it is, but one could never, finally arrive at the real truth, because that is on deeply subconscious multilevels, many of which I am not aware of myself.'
> (Cook and Klotz, 1973, pp.118-119)

The conclusion activity, when it involves the creation of new ideas, therefore involves a largely subconscious combining and re-arrangement of stimuli and the 'evoked set' of the memory.

2.3 The Decision Activity:

Ideas brought forward in the conclusion activity are, by no means, always suitable for implementation; more often than not they serve merely to provide a stepping stone for further ideas. The decision to accept or reject a proposed idea for implementation is the end result of a process of evaluation which intervenes between the generation of the idea and further action either on the same sub-problem or on another.

All three descriptions referred to earlier show evaluation to be an integral part of the creative process whereby intuitively imagined compositions and intellectually apprehended data are continually compared in order to direct the individual to a satisfactory problem solution. It is perhaps Beethoven's sketch books which illustrate this most dramatically. They show how the proposed finale for the 9th Symphony was rejected, the idea being modified and then used for a quartet. Similarly, an idea for a quartet was rejected and, after modification, became the allegretto of the 7th Symphony.
Not only does the decision activity draw upon an understanding of the factors against which solutions must be evaluated; it also forms part of the on-going process of creating knowledge about failures and successes in design, the science of design, as Norberg-Schulz (1963, p.55) and Hillier et al. (1972, p.4) have elected to call it.

2.4 The Execution Activity:

This activity involves choice of, and decision on, the best method of execution of the decision. It can take any number of forms (such as playing a musical instrument or sketching) which accomplish the transposition of an accepted idea into a form in which it can be readily appreciated both by the individual undertaking the process and by others. All three descriptions illustrate the importance of this component. Wright, for instance, writes of thirty-four sketch studies required to help in establishing concordance between Unity Temple and Unity House; 'to test bearings - and prove ground already assumed by putting all together in definite scale on paper'.

As described above, the execution activity represents the culmination or a process. However, it can also involve the carrying out of a new task at another level of scale. For instance, Wright's decision to let the 'sense of the great room shape the whole edifice' of Unity Temple was executed by undertaking another series of information, conclusion, decision and execution activities which focused on the shape and subsequently the material of which Unity Temple was to be built.

Before proceeding to the emotional aspects, it is important to observe that the time taken to describe the four activities which constitute the creative process is misleading. Activities are often instantaneous and, as has been pointed out above, related in complex ways at different levels. It is also necessary to emphasize that, although the activities may result in a proposal for action by others, this does not necessarily imply that the proposal will be accepted by them. Finally, it is apparent that the creative process relies not only on the vigour of youth in bringing forward new ideas but also on the experience of age in supplying information and evaluating and executing proposals.

4.3 EMOTIONAL ASPECTS

It has been demonstrated that, from an information-processing point of view, the creative process can be imagined as a linked continuum of activities through which new solutions to sub-problems are found and integrated with one another

and with existing solutions to provide a new solution for the problem as a whole. The creative process is, however, not merely experienced intellectually - as a series of abstract components at different levels intertwined in complex ways - but is accompanied by emotional involvement on the part of those undertaking the process. The importance of such involvement has been highlighted by Mallows (1965, p.44) with regard to the process of building design which, he writes, 'is very largely, if not primarily an emotional process'. The words used by Wright - namely doubt, hesitation, eagerness, faith and fear - to describe his experience of the emotions which accompany the intellectual process reinforce Mallows's statement. These emotions arise from a general tenseness and excitement in anticipation of results and from the demands made by each of the activities on the individual.

At times, progress in the creative process requires that self-restraint and strict control of invention are needed to the extent that, on occasions, effort must even be totally halted to allow for what Wallas (1926) termed 'incubation'. For instance Wright interrupts his work on Unity Temple to listen to music:

> 'Then go ask your Mother - to play something - Bach preferred, or Beethoven if she prefers.'

At other times, the imagination must be left free to flow and external stimuli suppressed to allow for the intense concentration required in reconciling the many aspects which need to be considered. Even the eminent Wright remarks:

> 'Holding all this diversity together in a preconceived direction is really no light matter but is the condition of creation.'

The intellectual and emotional aspects of the process are inextricably interrelated in a way which cannot be divorced from the personality of the individual undertaking the process or the environment in which he finds himself. Suggestions as to ways in which the performance of individuals can be improved must, therefore, take into consideration the individual as a whole and his relationship to the physical and social environment in which he works.

CHAPTER 5: THE IMPORTANCE OF COMMUNICATION

It has been indicated in the previous chapter that the creative process is, to a considerable degree, affected by and interlinked with the environment in which it takes place. The environment affects not only the intellectual scope and flexibility of the designer but also his emotions and consequently his motivation towards finding a true reconciliation of ends and means. In this chapter requirements for environmental conditions which promote the ability and willingness of designers to engage in the creative process will be established.

1 THE CREATIVE PROCESS AND THE BRIEF

The positive effect of the environment on both the intellectual and the motivational aspects of the creative process is related to the availability and nature of the brief, that is the statement of the problem to be solved.

1.1 Intellectual Aspects:

The need for the designer to be in touch with the problem situation has already been referred to. Clearly the less pertinent and reliable the information available about the situation is, the weaker his appreciation of the real nature of the problem to be solved will tend to be. Also the more difficult it is to retrieve such information, the more time he will have to spend on this activity. Consequently less time will be available for creating, choosing and communicating solutions to the problem. Conversely, the clearer and more accessible the information, the more time available for the creative process itself.

It has been indicated in Chapter 3 that the solution to a building design problem which fully satisfies requirements in one area, often fails to be optimal in another. As values in different areas of a brief are compatible only within certain limits, beyond which one tends to conflict with another, it is only on rare occasions that the requirements of all the resource controllers involved in a project are able to be fully reconciled. In the more common situation, rigid insistence by any one party on full satisfaction of its own requirements will compromise the interests of other parties or, at the very least, result in an inordinate amount of time being spent in attempts to reach a reconciliation. This gives rise to the need for requirements to be structured, as far as possible, as flexible performance-based objectives rather than narrow prescriptive constraints (Norberg-Schulz, 1963, pp.13-14; Broadbent, 1973b, p.5).

From the information-processing point of view then, the more accessible, clearer and more flexible the brief, the greater is the scope for the designer to engage in the creative process.

1.2 Motivational Aspects:

In a study of 200 accountants and engineers in the Pittsburg area of the USA, Herzberg and his associates (1959) found that it was primarily a feeling of growth in job competence which provided motivation for these people. What prompted them to apply their abilities to a particular problem was the promise of increased responsibility, achievement, advancement and recognition implicit in the work itself, that is factors related to job content. What made them feel bad about their jobs, on the other hand, were factors related to the job environment such

as poor working conditions, inadequate salary, insufficient job security and so on. It was found that although these so-called 'hygiene' factors contributed to an individual's dissatisfaction with his job, if certain minimum levels were not attained, they were unable to elicit any positive long-term motivation. Although the motivation of people is somewhat more complex than the findings outlined above suggest, studies of scientists in research organizations tend to confirm that productivity and creativity of knowledge-workers are strongly related to challenge, job accomplishment and responsibility (Pelz and Andrews, 1962, pp.43-47).

Responsibility implies the freedom to find out and decide for oneself. By providing immunity from the need to conform with the dictates of authority or tradition, it facilitates the modification or rejection of previously accepted ideas often necessary for the creation of something new. Not surprisingly, therefore, it is a condition which is sought after by those whose work demands the creation of new ideas and particularly those who choose architecture as a career (Raudsepp, 1963, p.33; Goslin, 1967, p.100; Perrow, 1970, p.19; Drucker, 1973, p.351; Miner, 1975, pp.179-180).

As knowledge-workers, and designers in particular, are motivated by the problem to be solved rather than by a need to obey or a desire to conform, they require authentic information, adaptable to the problem at hand, from a motivational as well as from an information-processing point of view.

When information is inaccessible, vague or over-constraining in many important areas of the brief even the most competent and enthusiastic of designers will

avoid the creative process and resort to other techniques.

> 'These may range from the flip of a coin, to quite elaborate techniques for randomization to the use of formulas..., or to precedent.'
> (Thompson, 196-, p.119)

This substitution not only misuses the ability of the designer but also eliminates potential solutions which may have been able to reconcile requirements. In addition, in briefs wherein requirements in one area are set very rigidly and information about requirements in other areas is vague, it is likely that attempts to satisfy the former will result in compromise of the latter. This situation often necessitates 'redesign' at some time in the future when the compromised requirements become patent. In this regard Louw (1974, p.88) points out:

> 'Work redone is never as well done as work done the first time; enthusiasm has gone, and with it coherence and quality.'

It is, therefore, not only the opportunity for designers to engage in the creative process which can be achieved through the availability of clear, flexible briefs but also their willingness and enthusiasm to engage in this process.

THE NEED FOR COMMUNICATION

The transmission of a clear, flexible brief involves the process of communication, the importance of which has been stressed repeatedly (Luckman, 1966, p.4; Karp, 1969, p.43; Olivier, 1970, p.72; Woolley, 1970, p.3; Barclay, 1970, p.6). Both in South Africa and Britain the performance of the professions has been related to failures in this process.

In South Africa, a consistent feature of the evidence presented to the Commission of Enquiry into Remuneration for Professional Services in the Building Industry was the general acceptance of the importance of communication to the costs, productivity and effectiveness of the professions (McKenzie, 1971, p.14).

In Britain, an analysis of over 500 buildings on which the advice of the Building Research Advisory Service of the Building Research Establishment (BRE) was sought - during the period 1970-1974 - established that the major cause of defects due to design (58% of the total) was the failure of designers to make use of available information (Freeman, 1975, p.308). The collapse of high-alumina-cement beams over school swimming baths in England and the notorious fire at Summerland provide further examples in this regard (Atkinson, 1974, p.29). In the first case, manufacturer's literature was inadequate and, in the second, the architects had failed to ascertain the fire performance of the products which they had specified.

THE COMMUNICATION PROCESS

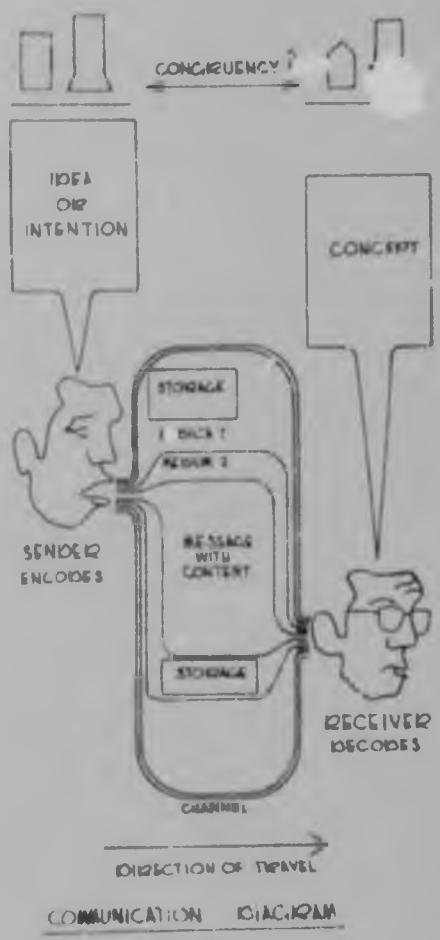
Communication is a process which involves the transmitting and receiving of messages by people. This process is represented in the model - an amended version of that created by Feldberg (1972, p.30) - illustrated on the right. The model assumes a simple two-person communication which involves:

A sender and a receiver;

A message or signal which has a certain content which is structured in a particular way;

A channel along which the message is passed and which has direction;

A medium which is used for the transmission of the message.



COMMUNICATION DIAGRAM

The sender is the individual who formulates and passes on the message at a given moment and the receiver is the individual at whom the message is directed.

Whereas the content of the message comprises the elements of information, advice or instruction conveyed, the structure of the message is concerned with the interrelationship between the elements and the presentation of the content.

A wide variety of means can be used to accomplish presentation: the spoken word, the written work, pictorial or three-dimensional representations or even physical gestures. These techniques can be broadly classified according to whether or not they automatically provide a record (Higgin and Jessop, 1965, p.15) Whereas 'formal communications' include items such as bills of quantities which are relatively permanent, 'informal communications' comprise scribbles on the back of an envelope or a sketch on the back of a menu.

The channel defines the organizational context of the message and is determined by the relationship between the sender and the receiver at any particular moment and by the direction in which the message is travelling.

The channel is manifested by whatever medium is chosen for transmission of the message. An increasing number of media are becoming available for this function, and for the storage of messages, as electronic facilities are added to the electrical and mechanical means already available. The medium chosen for a message is related to its physical and temporal context, and influences heavily the techniques and skills which can be used for the structuring and styling of messages.

In the model the sender initiates the communication by transmitting a message to a receiver. When the sender initiates his message he does so with some idea or

intention in mind. He selects a medium and chooses the structure which he feels will best be able to transmit the content of his idea or intention to the receiver. On transmission the receiver decodes the message, thus converting it into a concept in his own mind. The objective of communication is to ensure that the idea or intention of the sender and the concept of the receiver are congruent. The degree of congruency achieved is affected by two factors:

1. The extent to which physical factors in the environment or in the medium or the structure of the message interfere with transmission and decoding.
2. The nature of the human relationship which exists between the sender and the receiver.

IMPROVING COMMUNICATION

Many of the efforts aimed at improving communication between those concerned with building design have been directed at improving techniques and developing media for obtaining, presenting and storing information. These efforts have focused on reducing the amount of 'physical noise' in the communication system and have resulted in the creation of information-structuring systems such as CI/Sfb and representational techniques such as the 'constructive diagrams' proposed by Woolley (1970). However, the adoption of a common language and the use of sophisticated techniques will, alone, not cure some of the major restraints on the flow of information in the building industry. In fact, the review undertaken by the Tavistock Institute into communications in the building industry in Great Britain very decidedly led to the conclusion that the main factor lying behind communications difficulties in the industry was the nature of the relationships between the communicators rather than matters of a more physical

nature (Higgin and Jessop, 1965, p.35).

The nature of human relationships depends upon the differences between the people involved (Feldberg, 1972, pp.29-30; Paterson, 1966, pp.73-76). Paterson suggests that there are four main categories of difference, namely differences in:

Position (function);
Knowledge;
Mores;
Personality.

He points out that although these categories are 'intimately intertwined' it is the difference in position and knowledge between people which establish the inherent characteristics of the relationship set up. These characteristics then become modified by the way in which people pass on and receive messages, that is their behaviour (which is influenced not only by their function and their knowledge but also by their mores and their personalities).

The differences in position and knowledge determine the legitimate channels which exist between any two people at a particular time. The nature of these channels is intimately bound up with the structures of organizations and the roles people fill in these organizations and so influences the expectations and reactions of senders and receivers with regard to the messages passing between them. Schein (1965, p.114), for instance, suggests:

> 'Thus, one can think of the design of organizations as being a problem of building in the right number and right kinds of information channels or systems according to the needs of that organization.'

A priority in providing a conducive environment for designers is, therefore, to ensure that channels which will provide designers with a clear and flexible brief exist within the project organization.

CHAPTER 6: THE NATURE OF THE PROJECT ORGANIZATION

Organization has been defined as:

> 'the patterning of activities through which the primary task of the enterprise is performed.'
> (Miller and Rice, 1967, p.33).

Organization involves the allocation and acceptance of roles by individuals or enterprises and the consequent establishment of relationships between these individuals or enterprises. The idea that professional affairs in architecture should be viewed in the light of the overall organization of the building industry, used in its widest sense, has already been put forward (Walters, 1960). However, as has been pointed out in Chapter 2, it is not the building industry as a whole but the project organization which forms the primary environment for the architect. The purpose of this chapter is to investigate the nature of the project organization, in order to:

1. Define the roles and responsibilities of the various parties as they are assumed to exist in the industry at present.
2. Illustrate how the extant situation varies from the assumed.

1 ORGANIZATIONAL RESEARCH IN THE BUILDING INDUSTRY

An historical analysis of the relationships in project organizations in the British building industry was possibly first attempted by Jenkins (1961) in

a Master of Arts dissertation submitted to the University of Durham in 1953. Jenkins focused on the relations between those enterprises or individuals that constitute what he termed the 'building trilogy' - architect, employer and builder. Subsequently Walters (1960, pp.118-119) attempted to describe the development of project organizations in the same country with respect to the roles adopted by the various parties. Assuming what he termed a 'normal building team' - consisting of a client, separate architect, engineer and quantity surveying firms, a main contractor and separate firms of sub-contractors and suppliers - he traced the gradual process called 'the fragmentation of the building industry' as it might have occurred. This was followed by the Tavistock research in which the 'intrinsic nature of the relationships' between the various processes constituting the building procurement process was the focus (Higgin and Jessop, 1965; Tavistock, 1966). This research also included a review of the development of project organizations in the building industry in Britain from the Middle Ages onwards.

Unfortunately, none of these works succeeded in defining clearly the nature of the roles and relationships with which they were concerned:

> Walters, rather vaguely, differentiates between what he terms 'professional conduct' and 'design control'.
>
> Tavistock researchers, Higgins and Jessop (1965, pp.40 and 43) refer, equally abstrusely, to 'contractual relationships', 'control functions' and 'service functions'.
>
> Miners (1971, p.85) and Turin (1967, p.90) have also made brave but unsuccessful attempts to define explicitly the roles and relationships between different participants at different stages of a building project.

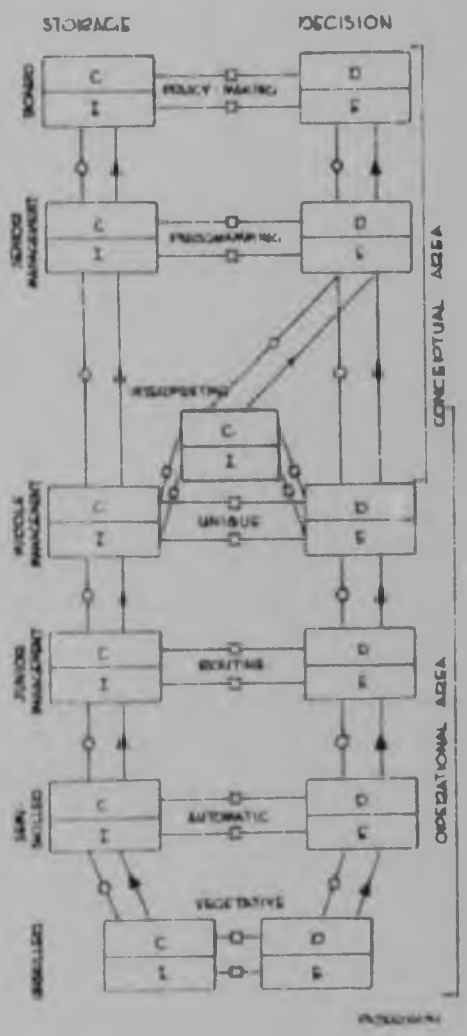
It is not surprising, therefore, that many architects exhibit a lack of clear understanding in this area (McKenzie, 1971, pp.10 and 23) and that it is possible today to repeat the words of Ray Affleck (1968, p.261), the prominent Canadian architect, who, in his address to the RIBA, some nine years ago, said:

> 'We are at the present time more in need of a model for process and participation, than of still more architectural scale models...'

Such a model is provided by the 'Systems School' of management thought, which, although it has never been fully subjected to the rigorous scrutiny of scientific method, provides at least a rigorous approach to the definition of roles and responsibilities in organizations. It is this approach which is used in the following analysis of roles and relationships in project organizations in the building industry.

ORGANIZATIONAL ROLES

The activities constituting the design process have already been analysed. A similar analysis of the work involved in all the complementary functions required to move from initiation to completion of a project would reveal that it can similarly be divided into the four components: information, conclusion, decision and execution. These four components exist at a number of levels in any organization and form a 'decision complex' as is illustrated in the diagram developed by Paterson (1966) presented on the right. As discussed in Chapter 2, the lower levels constitute the 'operational area' and the upper levels the 'conceptual area' with the area of overlap comprising the 'procedural area'.



DECISION COMPLEX

Paterson's diagram (which reflects only part of two of the functions in the operational area and assumes a unitary administrative structure) ought to be three-dimensional, in order to represent fully the complex of potential roles and relationships which exist when a number of enterprises come together in a project organization. This is because, at the operational or executive level, each enterprise possesses its own 'maintenance' and 'operating' activities while the 'administrative' level encompasses the 'conceptual areas' of all the enterprises participating in the project organization. Elaboration of the diagram does not, however, materially assist in the discussion which follows and is therefore avoided in the interests of clarity.

Any individual or enterprise participating in the project organization can undertake work which comprises one or more of the components at one or more levels. This does not imply that each participant undertakes only part of a mental process; it merely indicates, once again, that within the components which comprise the decision-complex of the project as a whole there are smaller scale activities which reflect individual patterns of thought and action.

The components of the project decision system undertaken by any individual or enterprise constitute the role of the individual or enterprise in the project. (Miller and Rice, 1967, p.40; Paterson, 1966, p.67). In their lives people act in many roles: as husbands, fathers, citizens and parishioners. Intermittently they step into their work role, reverting to other roles at predetermined times, or as the situation demands. The switch from these other

roles to work roles may be thought of in negative or in positive terms. In negative terms, individual behaviour patterns are viewed as being limited by the constraints, in the form of policies and programmes, which apply to the work role. In positive terms, as illustrated in Chapter 5, the work role can be viewed as presenting an opportunity to the individual to satisfy his own needs and objectives. The objectives of the work role are, however, rarely identical to the individuals objectives but are accepted by him in some degree between close identification and minimum toleration. Roles must therefore be considered as somewhat separate from the actors who, at a particular time and in a particular place, fill the role and who, through their interpretation of the role (role behaviour), give it a unique approach.

ROLES IN BUILDING PROJECTS

The roles of the various parties who participate in project organizations in the building industry have developed over time in response to social, economic and technical pressures. The present position, as generally assumed by individuals concerned with building, is codified in what has been variously termed 'the system' and the 'one-off approach' (Bowley, 1966, p.350; Tavistock, 1966 p.45; Turin, 1967, p.90; Miners, 1971, p.67; McKenzie, 1971, pp.5-7; Walker, 1975, p.13). This has been described as follows:

> 'In this ideal situation, the design is completed and has been approved by the client, and a full bill of quantities is prepared, before tenders are invited. The selected contractors have accepted comprehensive and precise blueprints and specifications to which they must work, and the

> fitting together of the various activities by different contractors has been arranged. And nothing goes wrong.'
> (Miller and Rice, 1967, p.137)

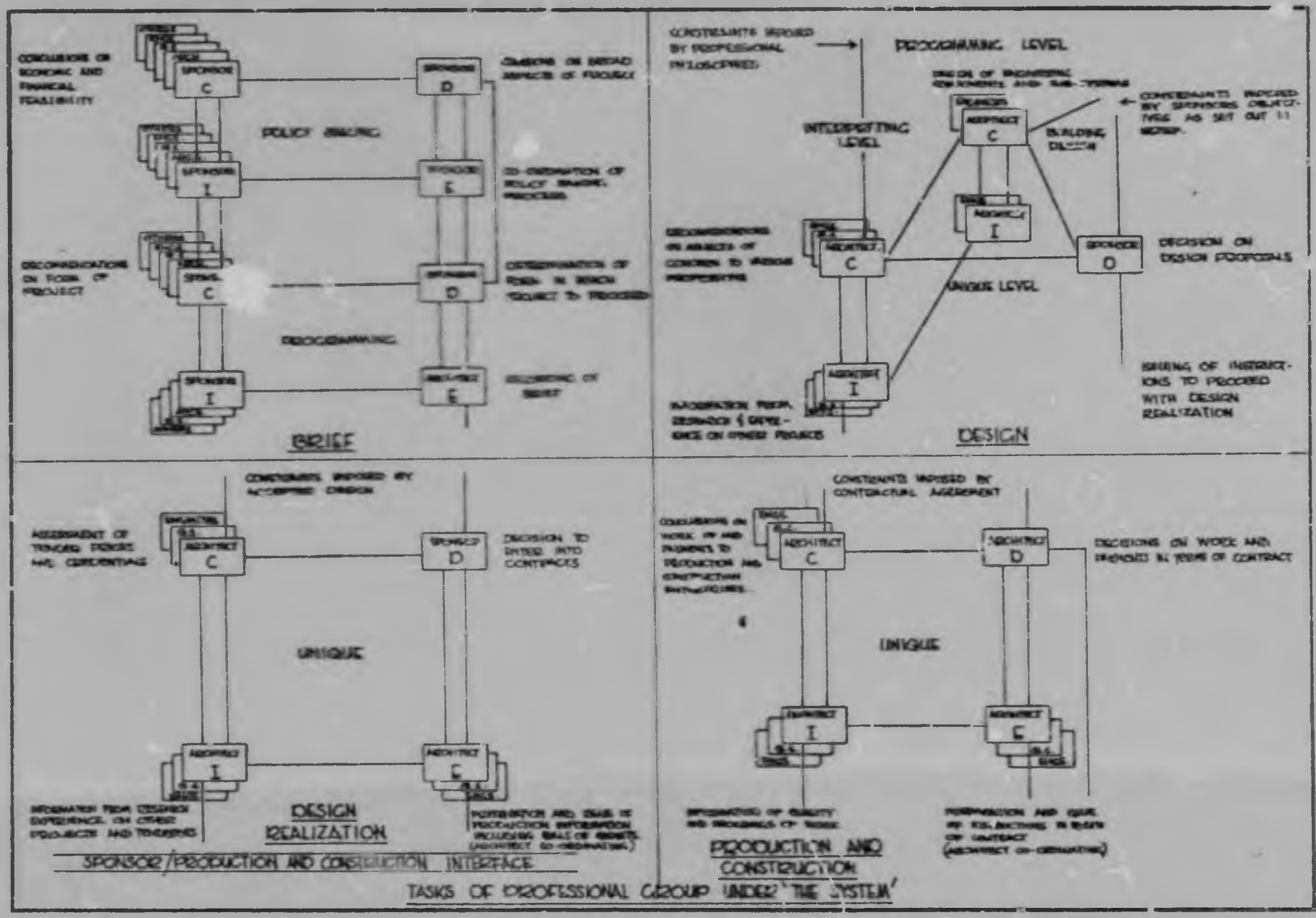
The roles of those concerned with a typical complex building project are described below and illustrated in the diagram on the following transparency - in the context of each of the four processes isolated in Chapter 2. Decision levels have been established by reference to the two examples prepared by Paterson (1966, pp.27-79) and reproduced in Appendix 1.

Briefing:

The sponsor is responsible for making all decisions on policy and programme matters with regard to the project. In addition he is expected to provide any co-ordination required during the briefing process. Advice and information about broad aspects of the project are received from many sources, among which are the architect, quantity surveyor and various engineers. Whereas the quantity surveyor and engineers are responsible only for advic on financial and technical feasibility respectively, the architect, in addition to supplying information and advice about the form in which the project could proceed, is charged with setting down the sponsor's brief.

Design:

Building design is the prime role of the architect. In this function he is assisted by structural, electrical, air-conditioning and other engineers who


BRIEF
DESIGN
DESIGN REALIZATION
PRODUCTION AND CONSTRUCTION
SPONSOR/PRODUCTION AND CONSTRUCTION INTERFACE
TASKS OF PROFESSIONAL GROUP UNDER 'THE SYSTEM'

design those components and sub-systems of the building which require more specialized technical knowledge. Even where such components are designed or selected by the architect himself, engineers often provide the architect with advice based on technical research and their own specialized experience. The quantity surveyor acts in a similar role, providing advice on cost matters. Design takes place within the constraints set out in the brief and its result, a recommendation on the detailed form of a building, is then evaluated by the building sponsor who decides either to go ahead with the implementation of the recommendation or not. If the former, he has the right to issue an instruction to proceed with design realization.

Design Realization:

Within constraints imposed by the approved design and subject to the co-ordination of the architect, each of the professions undertakes the preparation of production information (including the bills of quantities prepared by the quantity surveyor) on behalf of the building sponsor. It is the responsibility of the architect to arrange for the distribution of this information to production and construction enterprises interested in submitting a bid on the project. It is also his responsibility to administer the bid-opening procedure. On the basis of the bids received from tenderers and research and experience in the past, each of the professions provides the sponsor with an assessment of the tenders. The building sponsor then decides with whom to enter into a contract for the production and construction of the building.

Production and Construction:

On the basis of information about the quantity and quality of work undertaken by the contractor and sub-contractors, the architect, quantity surveyor and engineer reach conclusions in their respective areas of concern. On the basis of their advice and within the constraints imposed by the contractual agreement entered into between the contractor and sub-contractors, and the building sponsor, the architect decides on the issue of payments and instructions and co-ordinates the issue of instructions by any of the other consultants.

How these roles have evolved from the Middle Ages up to the Second World War and the pressures which have given rise to, or at least accompanied this evolution, are illustrated in Appendix 2. Although some of the more recent developments outlined have run counter to 'the system', the overall trend during the period was a consolidation of the sequential nature of the stages of the project procurement process.

.4 ORGANIZATIONAL RELATIONSHIPS

> 'Since no man has a natural authority over his fellow, and force creates no right, we must conclude that conventions form the basis of all legitimate authority among men.'
> (Rousseau: The Social Contract)

Relationships between individuals or enterprises or parts of enterprises arise because of the need for communication. Relationships are dependent on the components of the 'decision complex' which constitute the tasks of the

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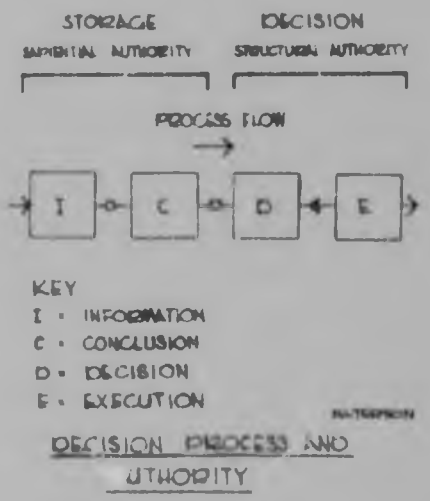
communicating parties at any one time. The relationships between these components only become converted into relations between individuals or enterprises at the points where the total decision complex is divided into roles, the relationships between the components themselves always being fixed. An analysis of these relationships has been undertaken by many researchers including Paterson (1966), Lawrence and Lorsch (1967), Newman and Rowbottom (1968) and Drucker (1968). However, perhaps the most rigorous and systematic model is again that of Paterson which is described and discussed below.

4.1 Bases of Organizational Relationships:

Underlying the relations between the components of the decision process are the two bases of authority mentioned in Chapter 5, namely knowledge and position. Both Paterson (1966, pp.81 and 85) and Lawrence and Lorsch (1967, pp. 172-173) refer to the importance of differentiating between authority or influence based on knowledge (sapiential authority) and that based on position (structural authority).

Sapiential Authority:

As indicated in the adjacent diagram sapiential authority, which is defined as 'the entitlement to be heard by reason of knowledge or expertness', attached to the Information and Conclusion units of the decision complex (Paterson, 1966, p.114). It is vested in the person and not the position and involves responsibility only for the expertness with which information is judged and by which any conclusions are reached. It does not involve responsibility for results stemming from any action taken on the conclusion reached.



DECISION PROCESS AND AUTHORITY

Structural Authority

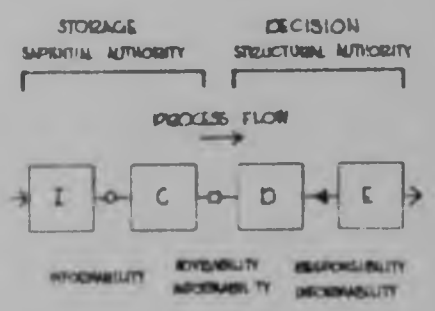
Structural authority, on the other hand, is defined as:

> 'the entitlement to command (stemming from a legal or other contract) vested in a position in [an] enterprise, and so in the person occupying that position in ordering and co-ordinating functions pertaining to other positions, and to expect obedience in the ordering and co-ordinating.'
> (Paterson, 1966, p.81)

It attaches to the Decision and Execution components of the decision process and involves responsibility for the results of decisions and actions.

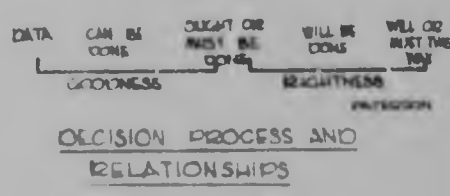
1.4.2 Relationships at the Same Level:

Paterson (1966, pp.150-151) identifies three types of relationship which exist between the components of the decision process at any one level: informability, advisability and responsibility.



Informability:

Informability is the relation which exists between the information and the conclusion units. It comprises the kind of knowledge which can be passed on as 'this can be done' and describes the right of the information unit to pass on items of knowledge in the hope that they will influence the work of the conclusion unit



DECISION PROCESS AND RELATIONSHIPS

Advisability:

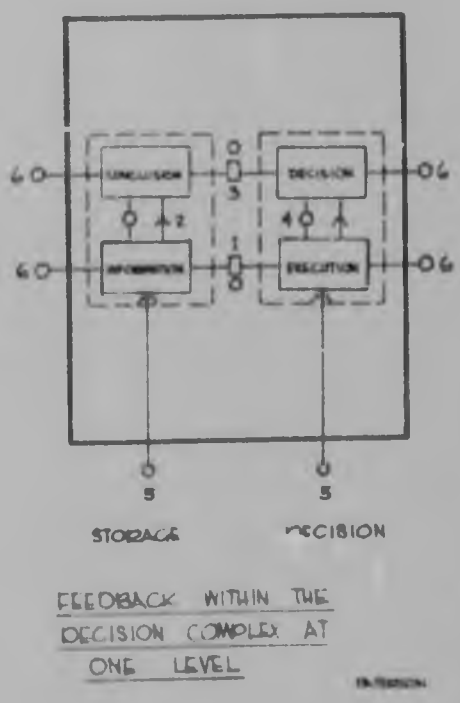
Advisability is the relation which exists between the conclusion and decision units. It involves the r ght to give information related to the adequate fulfilment of the receiver's function - because of the sender's expertness or knowledge on matters pertaining to that function. Advice is given in the form of 'this ought or must be done' and although it implies a warning of the probably consequences of action, it excludes any connotation of direct sanctions by the sender or his superior.

Responsibility:

Responsibility is the relation which exists between the decision and execution units. This relationship sometimes called 'accountability' involves an obligation, by the execution unit, to answer for the result of work undertaken in response to a command by the decision unit. The decision unit is vested with the right to apply sanctions if its instructions on what 'will be done' are not complied with.

As both advice and commands entail the passing on of information which can be expressed as 'this can be done', the relations of advisability and responsibility both include the relation of informability. Advisability and responsibility are however mutually exclusive.

The process flow is, however, not only one way. Using the adjacent diagram Paterson (1966, pp.151-153) illustrates how there is a form of feedback within the decision complex quite apart from the feed-into the system from above,



FEEDBACK WITHIN THE DECISION COMPLEX AT ONE LEVEL

laterally, and from below. His analysis, contained in Appendix 3, indicates that at any one level the following relations exist:

A reciprocal relationship (advisability and informability):

1. Between conclusion and decision
2. Between execution and information

A relationship of control (responsibility and informability):

1. By conclusion over information
2. By decision over execution

A relationship of informability only:

1. By information to conclusion
2. By execution to decision

.4.3 Relationships Between Levels:

There exist also the relations between the components of the decision complex at one level and at the level above. Ignoring the relationship of informability (which does not change) and the relationship of advisability (which tends only to lose its impact when it involves communication from lower to an upper level), there are two additional possible relationships between levels: direct responsibility and accountability.

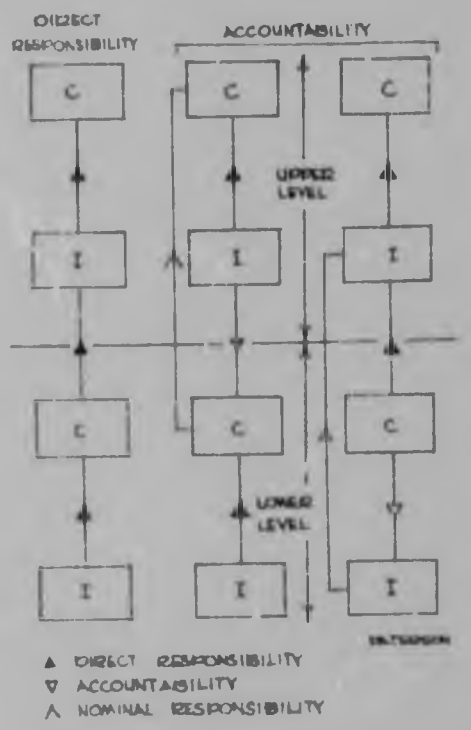
Direct Responsibility:

As shown in the diagram over the page this relationship - involving direct control - may exist between the decision unit at the lower level and the execution unit at the upper level or between the conclusion unit at the

lower level and the information unit at the upper level. The relationship is identical to that existing between the execution and decision units or the information and conclusion units within the same level, as outlined in the previous section.

Accountability:

Under conditions of complexity and risk, where co-ordination becomes important, a 'bypass' relationship may exist as illustrated in the adjacent diagram. In this diagram the open arrow heads (∧) represent nominal control by the upper unit over the lower while the triangular arrows (∇) represent the concurrent relationship of accountability which exists between the intermediate unit (which is in actual control) and the lower unit. Accountability involves the right to command and expect obedience but not the right to enforce obedience by the use of power (Paterson, 1966, p.100). It comprises orders in the form of 'you must do such-and-such or so-and-so will punish you' and therefore still entails the connotation of direct sanctions, but at one remove from their source.



RELATIONSHIPS BETWEEN LEVELS

Where roles are defined so that the unit in actual control is responsible to only one nominally controlling unit, the unit in actual control is commonly referred to as the agent of the unit in nominal control (Higgin, 1964, p.139; Oxford Pocket Dictionary). Where, however, the unit in actual control is responsible to more than one nominally controlling unit - as is the case with the architect during the production phase of a building project when he assumes what in building circles is referred to as a 'quasi-judicial' role -

then the role becomes enlarged to encompass control of the interaction between the nominally controlling units.

RELATIONSHIPS IN BUILDING PROJECTS UNDER THE SYSTEM

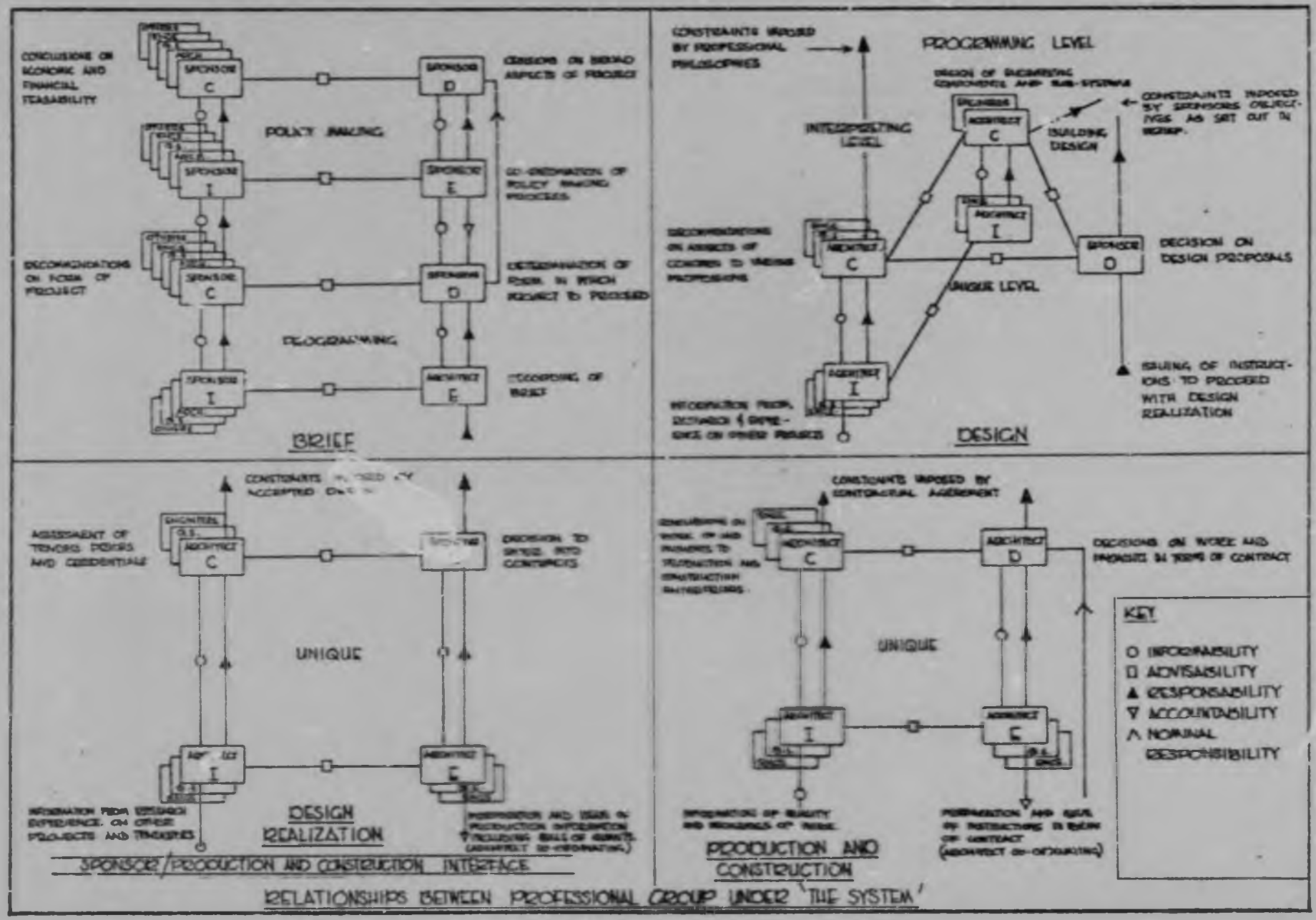
It is now possible to clarify the relationships between the major parties participating in building projects. The relationships between the assumed roles of the parties, represented in the diagram on the transparency over the page, is discussed below - in the context of each of the four stages constituting the project procurement process.

Briefing

A relationship of advisability exists between the various consultants and the building sponsor. Although any one of the consultants may be the prime adviser, as sponsor objectives and financial matters are of paramount importance at policy and programming levels, it is advisers in these matters who tend to have the greatest impact on the sponsor's decisions. Because the architect acts as agent of the sponsor in recording the brief, the relationship of the architect to the building sponsor is one of responsibility.

Design:

The sole relationship between the architect and the building sponsor at this stage is one of advisability. A relationship of advisability also exists between the consultants and the architect and between the consultants and the sponsor. The latter relationship is, however, not as strong as the former.



RELATIONSHIPS BETWEEN PROFESSIONAL GROUP UNDER 'THE SYSTEM'

Design Realization:

The relationship of the architect to the building sponsor is again one of responsibility. The relationship between the sponsor and all the consultants providing an assessment of tender prices and tenderers' credentials is again one of advisability.

Production and Construction:

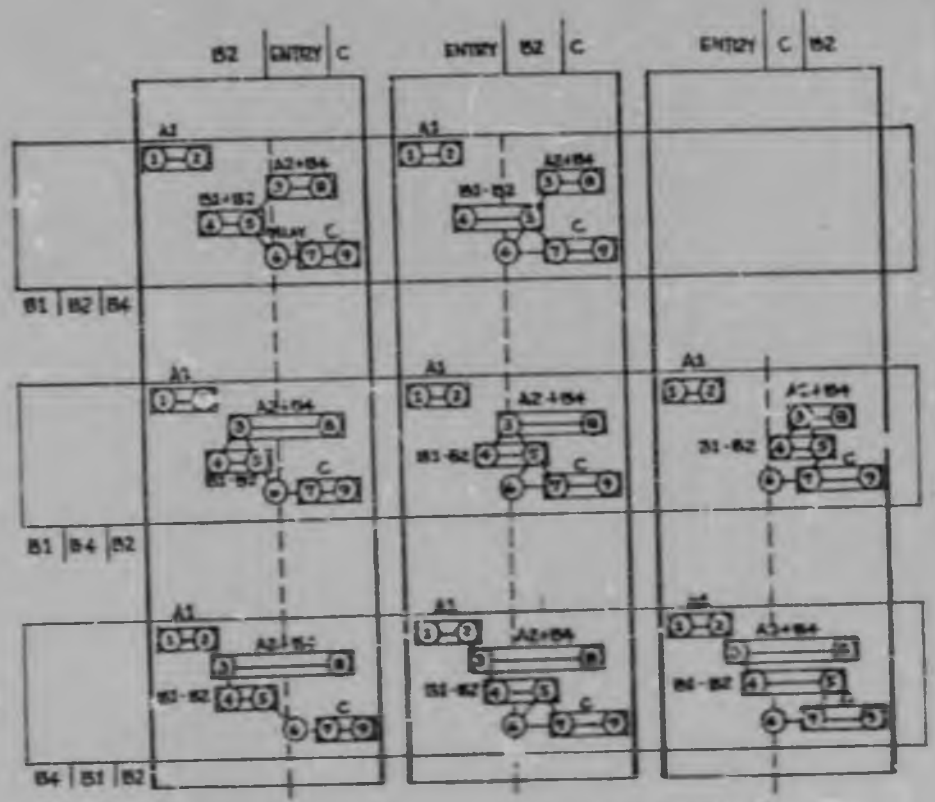
Responsibility is the relationship of the architect (in his 'quasi-judicial' role) to all those parties who have agreed to co-operate in terms of the contractual agreement which constitutes the culmination of the design-realization stage. The other major relationship at this stage of the project is one of advisability, which exists between the various consultants and the architect.

The crucial point of all this, as far as the architect is concerned, is that at no one time does he act both as agent and as prime adviser to the building sponsor or any other resource controller.

6.5 OVERLAP OF PROJECT PROCUREMENT PROCESSES

Research by the Tavistock Institute (1966, p.43) has indicated that 'the system' described above, with its characteristic of 'sequantial finality' with regard to the stages of the project procurement process and the consequent sequential intervention of the participants, is not only outdated but not very directly manifested in actual projects. This has been confirmed

OVERLAP OF PROJECT PROCUREMENT PROCESSES

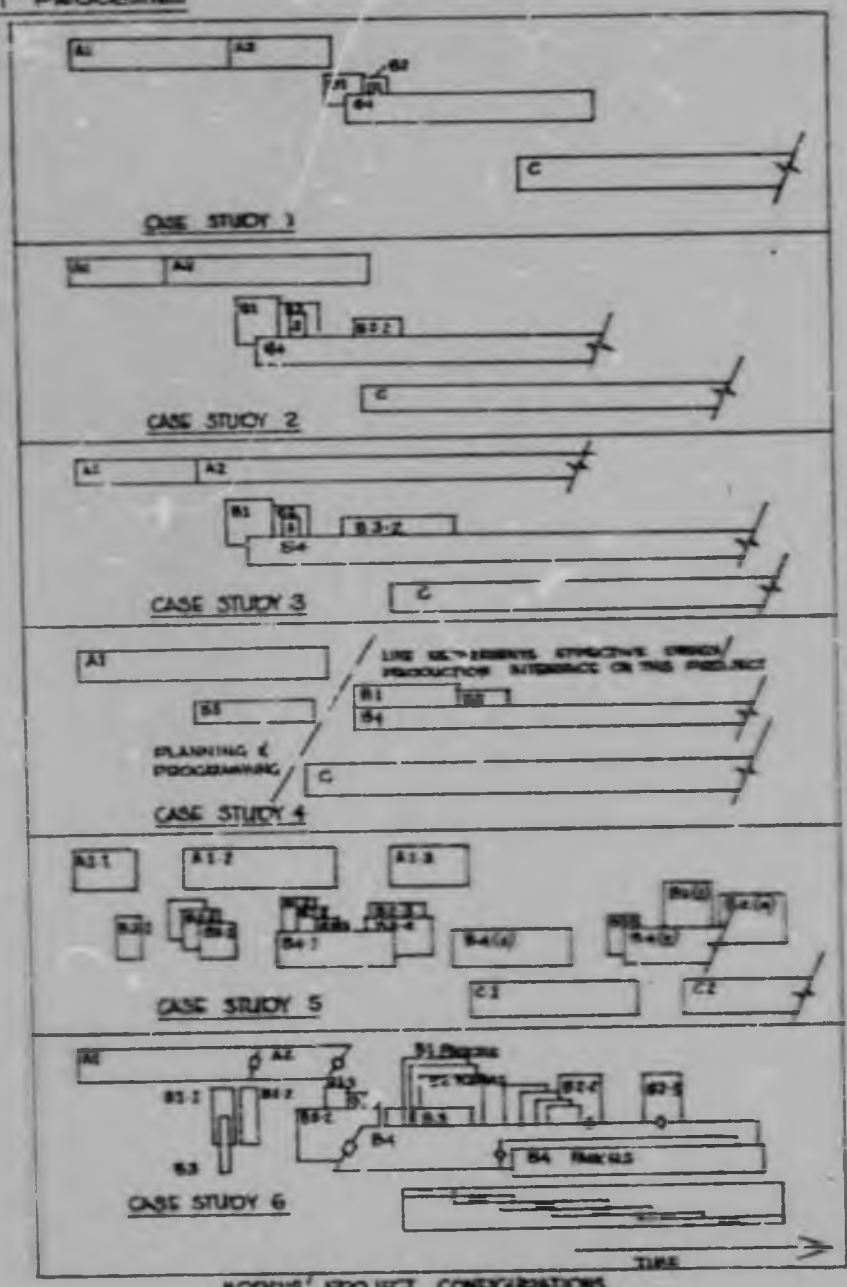


KEY

1 INSTRUCT DESIGNER TO PROCEED
2 SUBMIT DESIGN DRAWINGS TO CLIENT
3 INSTRUCT TO PROCEED WITH WORKING DRAWINGS
4 INSTRUCT TO START CONSTRUCTION
5 SUBMIT CONTRACT (PRICE)
6 CONFIRM APPOINTMENT OF CONTRACTOR
7 HAND OVER SITE
8 COMPLETE WORKING DRAWINGS
9 PRACTICAL COMPLETION

A1 OUTLINE DESIGN
A2 DETAIL DESIGN
B1 BILLING
B2 ESTIMATING
B3 CONSTRUCTION PLANNING
B4 WORKING DRAWINGS
C CONSTRUCTION OR SITE

TURIN'S PROJECT CONFIGURATION



ROBBINS' PROJECT CONFIGURATIONS

in two independent research projects undertaken to systematically explore what Newman and Rowbottom (1968, p.8) call the 'extant' organization, that is the actual rather than the assumed configuration of building projects.

1. Turin (196 in a research project at University College, London, undertook 50 detailed case studies in order to investigate the 'sequences of interventions of participants.' He developed 9 different configurations to represent his findings. These are illustrated on the transparency opposite, in an amended format so as to relate to the stages of the building procurement process defined in Chapter 2. Unfortunately, however, this is only partially accomplished as the original study omits specific reference to the briefing stage and to the 'project planning' component of the design realization stage and also, confusingly, associates detail design with working drawings.

2. Morris (1974b) studied 6 projects with reference to the overlap of the stages from the initial brief to completion. The adjacent diagrams also illustrate Morris's findings which still demonstrate some, but not as many, of the disadvantages exhibited in the Turin configurations.

What all but one of these models illustrate is that the processes, which in 'the system' are regarded as distinct and sequential, are now overlapped to a lesser or greater extent. This situation is fairly highly developed in France, where competitions for the building of new towns outside Paris have resulted in radically different organization forms to those exemplified by 'the system' (Barclay, 1972, p.6) and also in the United States of America, where

'fast-track' has become a catchword to describe the parallel execution of project phases. Although 'the system' is still regarded by many in South Africa as an ideal, new formal tendering procedures are increasingly being used (McKenzie, 1971, p.3). These procedures result in the process of briefing, design and design realization being carried out more or less concurrently with the building programme, as is exemplified in projects such as the Rand Afrikaans University, a R50 million university complex planned from scratch and built in 5 years (S.A. Builder, October 1975, p.14). However, even where such procedures are not used, project configurations, in the private sector at least, rarely conform to that advocated in 'the system'. Projects are often rushed through to the tender stage with inadequate information and documentation, thus commonly giving rise to the need for redesign during construction.

The overlap of the stages of the project procurement process and the early intervention of additional resource controllers (such as production and construction enterprises) introduce additional communication channels, and therefore potential relations, into the project organization. These relationships allow the previously excluded resource controllers to exercise greater control over the decisions made in the conceptual area of the project organization. At the same time it enlarges the role of the architect as he is required, simultaneously, to act as prime design adviser to the resource controllers and to fulfil his so-called 'quasi-judicial' role.

RECAPITULATION AND A FORWARD LOOK:

Before the influence of the situation described in the conclusion of the previous chapter is explored, a summary of discussion up to this point will be presented. In addition, the content of the following two chapters - in which the need for the overlap of project stages is established and the organizational strategies used to achieve overlap are identified - will be outlined. The central argument will be resumed in Chapter 9.

Summary:

The thesis commenced with an outline of the function of architects in society and a review of the broad nature of the problem now facing the architectural profession. Against this background the objective of this study was formulated and a methodology selected.

Following this, it was shown that building design is not an isolated activity but is intimately related to the organizational and procedural context within which it takes place. An analysis of the expectations of society with regard to both the output from and the input to the design activity was undertaken and the meaning and importance of productivity in this activity was explained.

Subsequent discussion focused on defining the nature of the input in the design activity. An analysis of the character of building design problems revealed that the prime resource required for the solution of such problems is the human creative process.

Further, an investigation of the way in which creative people work showed that the four activities into which the creative process may be resolved do not follow each other in any fixed order but occur randomly according to the relationship between the individual undertaking the process and the environment within which he works.

The effect of the environment on the intellectual and motivational requirements of designers was then discussed and the importance of the process of communication was highlighted. The nature of this process was analysed and two broad areas of impediment identified, namely physical factors and human relationships. A study of these revealed that the latter area constitutes the major obstacle to information flow in the building industry and therefore also imposes a severe restraint on the capacity and motivation of designers in the industry.

An analysis of the factors which influence human relationships showed that differences in the position and knowledge of communicating parties are an essential starting point for any discussion. Consequently, as these two factors are intimately bound up with the structure of organizations and the roles people fill in these organizations, it was concluded that roles (and relationships) in project organizations in the building industry should be investigated. This investigation was carried out with respect to both the structure of project organizations as they are assumed to exist in the ideal case and as they actually exist. It was demonstrated that the actual situation, when compared to the assumed, involves an overlap between project stages which results in both an increase in the number of resource controllers to which the

architect is responsible during design, and an enlargement of the role of the architect.

Chapters 7 and 8:

In Chapter 7 the impact of changes in building technology on the source of the brief for designers is investigated. It is shown that the reason for the overlap of project stages lies in the need for resource controllers to exercise increased control over their inputs and outputs in industrial technology as compared to craft technology.

In Chapter 8 organizational strategies which can be used to achieve overlap are reviewed and their viability in the building industry, in both production and client sectors, is evaluated. It is concluded that, in general, the more co-operative forms of strategy hold greater promise for reconciliation in the industry and that, therefore, project organizations constructed using these strategies do not constitute an arbitrary or ill-conceived environment for architects. They do, however, constitute a different environment to that assumed in the industry generally, and the impact of this difference is the subject discussed in subsequent chapters of this thesis.

CHAPTER 7: TECHNOLOGY AND CONTROL

This chapter is concerned with the reasons behind the need for greater control by the enterprises that commit resources to the construction of a building. This includes not only enterprises undertaking construction on site or fabrication in factories, but also the various enterprises which have an interest in the use of the completed building. The degree of control required is dependent on the difference between the actual environment of the enterprise and the environment required for the efficient functioning of especially its dominant operating activity. The nature of the environment required is, to a large degree, determined by the technology selected for the execution of the activity (Thompson, 1967, pp.144-146). As it is one of the primary functions of the administrative unit to modify the existing environment in order to bring it closer to that required by the technology, the necessity for greater control by this unit - implicit in the overlap of the stages of the project procurement process - is closely related to the nature of the technology employed by the enterprise.

1 CLASSIFICATION OF TECHNOLOGY

The definition of technology suggested in Chapter 2 incorporates reference both to the tools used as well as to the system of co-ordination employed in the application of the tools to a process. Many attempts have been made since the early 1950's to differentiate between one technology and another.

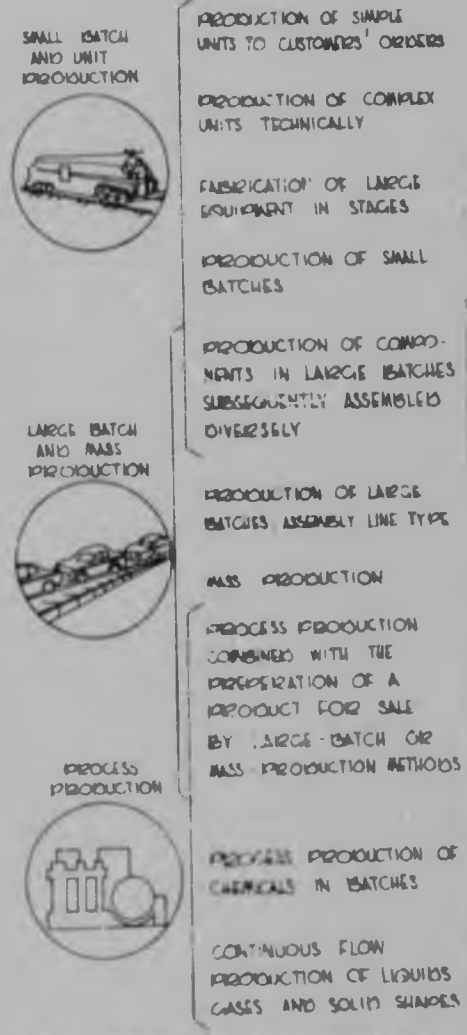
1 The Woodward Classification:

The first of these was that of Woodward (1958) who evolved the scale shown on the right so as to be able to group different manufacturing firms in different industries into categories which transcended differences between industries. The variable underlying Woodward's scale is what she terms 'technical complexity' which is concerned with the extent to which a production process is controllable and its results predictable.

Implicit in the scale is the nature of the production task (that is the quality and, more specifically, quantity of goods required to satisfy a particular market) and the degree of mechanization of the production process (Woodward, 1970, p.4). Mechanization is, in turn, related to capital investment (Olivier, 1970, p.23; Reiner, 1971, p.52, V.1). In this regard, Reiner, Deputy-Director of the Environment and Housing Division of the Economic Commission for Europe, states:

> 'Since mechanized processes call for investments in machines, and also some kind of shelter, the degree of industrialization, in the purely technological sense, may be measured by the capital intensity, i.e. the capital invested per person employed.'

As the progressive training of personnel in enterprises similarly requires capital investment and also renders the production process more controllable and its results more predictable, the extent of investment in training also provides a measure of 'technical complexity', and therefore of technology, along this scale.



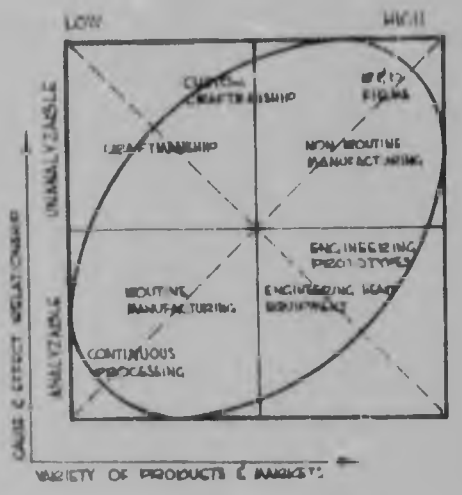
THE WOODWARD CLASSIFICATION

2 The Perrow Classification:

Perrow (1970, pp.75-85) conceptualizes the technology of any enterprise with respect to two criteria:

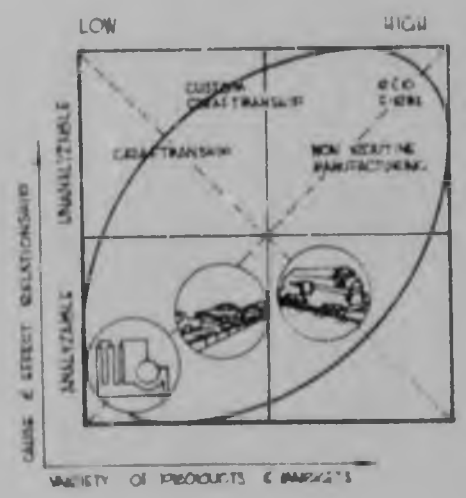
1. The extent to which the relationship between cause and effect is analysable.
2. The variety of problems encountered.

By using these two factors as axes of a graph, Perrow illustrates in the diagram reproduced on the upper right, how various technologies can be classified.



THE PERROW CLASSIFICATION

A comparison of Perrow's graph and Woodward's scale reveals that the latter formulation igonores those technologies in which unanalysable search procedures are the norm. The area of overlap between the two concepts, as illustrated in the lower diagram, demonstrates this conclusion.



A COMPARISON OF THE PERROW AND WOODWARD CLASSIFICATIONS

3 The Thompson Classification:

The third and final system to be discussed is that formulated by Thompson (1967, pp.15-18). This classification system, meant to be applicable to the technology of any enterprise, whatever its task, is based on the source of the information used to accomplish control. Three forms of technology are isolated:

1. Intensive Technology:

This Technology is that of the artist and is used in 'one-off' situations. It comprises a very wide variety of techniques, the selection, combination

and order of application of which are determined by feedback from the operation itself. Success depends on the sensitivity of the individual employing the technology to the situation or object as it develops and the extent of his control over the resources and techniques required to accomplish the operation.

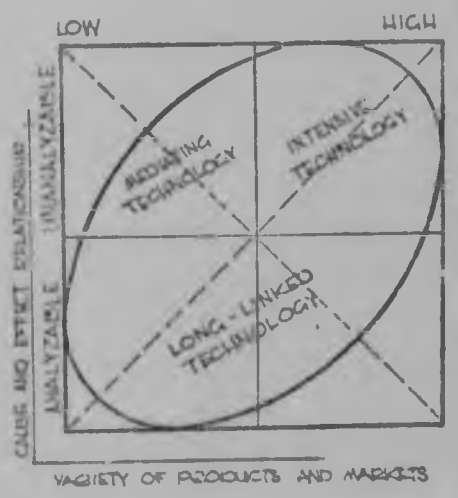
2. Mediating Technology:

This technology involves the maintenance of a collection of mobile resources able to serve different customers distributed in time and space. As it relies on precedent for information and employs standardized procedures to ensure that the processes and products of any one operation automatically interlock with those of interdependent operations, it is best suited to environments where situations are relatively stable and repetitive.

3. Long-linked Technology:

The essence of this technology is the analysable interdependence between operations which will be carried out in the future. The technology is associated with the use of clear-cut criteria for the selection of materials, machines, tools and human operators and the planning of resource acquisition and work-flow arrangements. Repetition of the productive process enhances this techn ogy as it provides the experience on which training can be based and imperfections eliminated.

The diagram on the right illustrates that the Thompson classification, although supporting the continuity of Woodward's scale, nevertheless also includes the comprehensive scope of Perrow's graph. It is possible therefore, on the basis of the discussion above, to differentiate between three technologies which correspond with those of the artist, the craftsman, and the technologist.



A COMPARISON OF THE PERROW AND THOMSON CLASSIFICATIONS

.2 BUILDING TECHNOLOGY

The techniques applied in production and construction operations in the building industry are of particular interest in this thesis primarily because of the extensive and well-documented changes which have taken place since the Industrial Revolution. These changes, which are still continuing today, involve a move from a craft (mediating) technology to the lower levels of an industrial (long-linked) technology. Although production methods do exist which are at the upper end of the long-linked scale, these are limited by the fluctuating demand for buildings and are generally only employed in the manufacture of elementary building materials such as bricks (Olivier, 1970, p.33). That the building industry as a whole, even in highly industrialized countries, has hardly proceeded beyond the 'batch stage' of the scale has been demonstrated by studies into variety reduction in window and door making undertaken by the Building Research Establishment in Britain (Lockwood and Pedder-Smith, 1969; Pedder-Smith, 1971).

In order to determine the extent of the control which must or can be exercised over the environment by the administrative units of enterprise employing either craft or industrial technologies the social, political and economic characteristics of each of these technologies is investigated in more depth below.

7.3 CRAFT ORGANIZATION

Enterprises and individuals working within a craft system operate within fixed policies and procedures which are sustained not only over discontinuities in time but also over the organizational and spatial barriers which divide one ent rprise

from another and one project from another. These policies and procedures are established by craft institutions in order to provide a high degree of labour mobility in situations where the volume and geographical distribution of work is highly unstable.

The keystone of craft institutions is the system of apprenticeship where the tradition and accumulated knowledge of the craft and its relationship to adjacent crafts is carried into the future through the 'technical socialization' of manual workers (Stinchcombe, 1959, pp.168-169). By means of lengthy periods of under-study associated with formal tuition in traditional practices, three-dimensional appreciation and even artistic modelling, work directives are incorporated in the technical socialization of the craftsman*. Provided no major changes are required in the nature, standards or sequences of the work necessary to execute a design, there is no need for detailed directives or co-ordination on the job. In the words of a past-president of the Institute of S.A. Architects:

> 'Some of South Africa's finest historical buildings, for instance those designed by Sir Herbert Baker, were done with only a few necessary drawings even though in today's terms they were complex and difficult and required an incredible input of skill and labour'. (Hallen, 1975, p.25).

By establishing the nature, standards and sequences of the work through the apprenticeship system, craft institutions effectively formulate policy and procedure for construction enterprises in all but the commercial and financial spheres. Even in these spheres the very direct relationship between production costs and the time spent and materials used on a job - brought about by the low

* Harry Stirling, first President of the South African Institute of Building, reminiscing of his experience as a plastering apprentice in Johannesburg in the mid-1920's during a private meeting with the author in June, 1976.

capital investment of individual enterprises and the high mobility of both craftsmen and unskilled labourers - restricts the scope of decision-making of individual enterprises. The administrative decisions required of such enterprises are, therefore, virtually limited to the decision on tender price. Unfortunately this has led to the erroneous impression, still widely held by architects, that the task of all construction or production enterprises, whatever their technology, involves little more than the appropriation of profit.

In the craft situation, the design brief remains substantially static as far as the technical aspects of construction are concerned. Information applicable to one project is therefore applicable to the next, despite changes in time, place and the particular enterprises involved. Provided the building sponsor is appraised of the cost implications of his decisions - normally accomplished via feedback from previous or contemporary projects by the quantity surveyor - there is little advantage, from his point of view, in engaging in any complex procedures or negotiations with production or construction enterprises before the production information (including bills of quantities) is complete. From the point of view of production and construction enterprises, the benefits which can be achieved by making early arrangements for potential involvement in the project organization tend not to compensate adequately for the increased risks and costs incurred by the higher investment required in highly mobile resources which may or may not be used.

In the craft system therefore, where building is carried out through accepted practices, where numerous tenderers of equal standing are in existence and where a stable supply of the necessary resources is available, 'the system' (with its

sequential relationship between the processes required for project procurement) is a suitable form of project organization.

.4 INDUSTRIAL ORGANIZATION

Industrial production, compared to craft production, involves a much greater investment by individual enterprises in the means of production. This investment includes . . only the capital required to train operatives and to purchase, install and eventually dismantle equipment and machinery but also time-dependent costs such as routine maintenance and the salaries of technical staff. Consequently, certain costs are incurred by such enterprises whether or not productive activities actually take place. Efficiency cannot, in the long term, be obtained by dispensing with resources but only by increasing the utilization of the means of production within the enterprise.

The utilization of production resources is heavily influenced by the physcial nature of the object being produced. Olivier (1970, pp.20-32) has, for instance, illustrated how physical characteristics, ranging from site layout to assembly details, can give rise to inefficient or insufficient use of the technology of enterprises constructing buildings using heavy concrete panels. In industrial production there also exists a considerable variety in the technology employed by various firms (Katz, 1970, p.5; Olivier, 1970, p.41). Therefore, limits to the physical characteristics of buildings and other objects cannot be determined on an industry-wide basis and, consequently, must be regulated by decisions at conceptual and procedural levels within the individual production or construction enterprise. In other words, policies, plans and procedures formulated by the

directors and managers of industrially-oriented enterprises must replace the rules codified by craft institutions (and sanctioned by the industry as a whole) as a means of securing the efficient utilization of resources.

Industrial technology has often been criticized as being inherently inflexible. This criticism, especially as far as the lower and middle ranges of long-linked technology are concerned, is largely invalid. It has been observed that it is precisely because there is no direct link between the nature of the demand and the technology of manufacture that the way in which the policy, planning and interpretative functions are carried out becomes so important in enterprises employing these forms of industrial technology (Woodward, 1970, p.xi). It is therefore not the technology per se, but the managerial competence of those fulfilling these functions - to overcome constraints imposed by the economic, social and political environment within which they exist - which determines the variety of products able to be produced. This has been emphasized repeatedly, for instance by Blachère (1974, p.155) who writes:

> 'For anyone who really knows large-panel systems will find in their use a freedom as broad as in any traditional method of building.'

The increasing number of university-educated persons filling managerial positions in production and construction enterprises therefore holds much promise for achieving the flexibility inherent in industrial technology.

In the industrial situation the design brief, with regard to both the technical and financial aspects of construction, can vary fairly substantially as between on enterprise and another. It may also change dramatically, even over a very

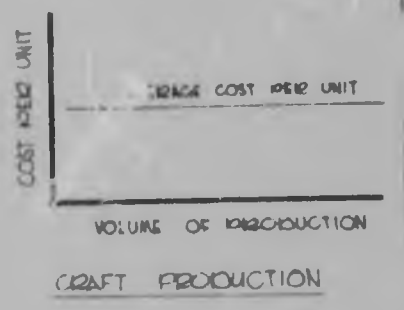
short period of time.

The result, as far as the building sponsor is concerned, is that his risk is increased in that the quantity or quality of the resources required to meet a certain demand in a particular place and at a particular time may either be unavailable or too costly. Even worse, the resources may appear to be available but may be drastically trimmed when a contractor who has underpriced a tender attempts to recoup costs not anticipated because of his unfamiliarity with a particular technique or because of inadequate information and documentation resulting from time pressures. As Crichton (p.15) points out:

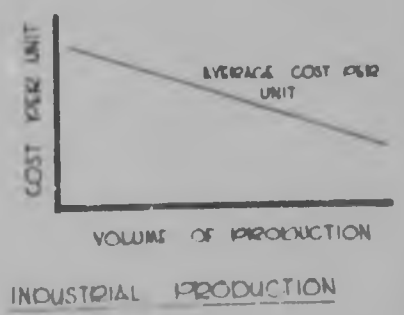
> 'In such circumstances there is little recompense in taking legal action. The damage is done, and shows up later in delays on site, arguments, and claims for increased costs.'

The severity of this situation is aggravated by the various pressures mentioned in Chapter 1, namely the increase in the scale and complexity of projects, increases in public expectatations and the high cost of finance.

The risk assumed by production and construction enterprises employing industrial technology is also increased when compared to that of enterprises employing mainly craft skills. The increased risk arises partly because of the lack of rules and traditions which, in the craft system, ensure that the processes and products of a particular enterprise automatically interconnect with those interdependent enterprises or, indeed, the building demand. Another factor giving rise to increased risk is the investment made by industrial enterprises in their technology which, if not efficiently or sufficiently used, leads to greater unit costs and, ultimately, a drop in the competitiveness of the enterprise.



CRAFT PRODUCTION



INDUSTRIAL PRODUCTION

Typically one of two reactions occur as industrial enterprises attempt to re-establish control over their unit-costs and their competitiveness:
Firstly the output, both in terms of nature and volume, may be artificially restricted as already discussed above.
Secondly, investment may be reduced, for example by falling behind on preventive maintenance, neglecting the training of operatives or even, in extreme cases, disposing of plant as was done by Laings in England with their R1 500 000 heavy concrete panel factory (Irwig, 1974, p.42).
The reduction of risk for both parties can be accomplished by means of some form of arrangement - to replace the craft organization - whereby the availability of resources which may be required by the building sponsor is assured while, at the same time, the freedom of the producing enterprises to manage their technical as well as their financial input and output is secured. A number of alternative strategies have been used and these are discussed in Chapter 8.

.5 OVERLAP AND THE DESIGN BRIEF

The change from craft to industrial technology implies a change in the source of a segment to the design brief from craft tradition to managerial decision. The idea that planned construction methods should be allowed a much more direct influence on building design accompanied the Industrial Revolution. Already in 1816 Rondelet, the theorist whose work on the Panthe6n prevented its collapse, called for greater integration of design and construction (Giedion, 1954, p.211). With the upsurge in what has been termed 'industrialized building' during the 1960's, the concept of integration of design and construction has been adopted as a philosophy by many educationists, for example, Calderwood and Olivier (1970, p.2)

and Harper (1972). The phi' ophy has given rise to a new approach in construction teaching exemplified in the recent publication entitled 'The Building Game' (Nowak, 1976) and in the last year 'Production Planning and Design' course at the University of the Witwatersrand introduced by the author in 1974 (Appendix 4). Similarly, the philosophy has had repercussions in architectural practice. An informal survey of techniques in progressive architectural practices, undertaken by the author while on a private visit to Great Britain in 1968, revealed a swing away from the preparation of standard detail drawings meant for recurrent use because of the rapid obsolescence of such details.

The overlap of project stages illustrated in Chapter 6 and associated with the change in technology outlined above not only allows construction and production enterprises to participate in the formulation of the design brief and evaluation of the emerging design but also allows designers access to reliable information about the specific resources to be employed in realizing the project. This, as pointed out in Chapter 4, increases both the ability and motivation of designers to create designs which reconcile the ends desired by the sponsor with the means available to the producing enterprise.

CHAPTER 8: ORGANIZATIONAL STRATEGIES FOR CONTROL

In 1965 Dr J. C. Weston, the incumbent director of the Building Research Station (now Establishment) in Britain, made a statement which remains substantially true today:

> 'It has become one of the accepted clichés that industrialization involves, among other things, the integration of design and construction; rarely, however, are the possibilities, problems and consequences of this integration considered.'

It is these 'possibilities, problems and consequences' which constitute the content of the discussion from this point onwards. The discussion commences with a review and assessment of the possible organizational strategies for accomplishing integration. Although initially the focus is very largely on the interrelation between building sponsor and production and contruction enterprises - thus continuing the study of the previous chapter - at the end of this chapter the discussion is expanded to include all those specialized enterprises which come together in project organizations.

8.1 ORGANIZATIONAL INTERDEPENDENCE

It has been emphasized that the strategy selected for any particular organization must be closely related to the interdependencies between the enterprises or units involved (Thompson, 1967, p.56). This idea is supported in the work of Lawrence and Lorsch (1967) which related the nature of the interdependence which exists between any two organizational units to the amount of 'organizational

differentiation' which should exist between them. It has further been suggested that the interdependence which exists between any two organizational sub-units is influenced by three interrelated factors:

1. The degree of uncertainty or contingency (arising from lack of information or lack of reliability of information about future events) which each poses for the other.
2. The extent to which the activities of the units interlink.
3. The ease with which the activities or resources of either unit can be substituted by the performances or facilities of alternative enterprises. (Hickson et al., 1971, pp.219-222)

These three factors are, in turn, influenced substantially by the way in which the building design problem is segmented into sub-problems with respect to the domains (that is the present and future areas of operation) of the various specialized enterprises with an interest in the procurement of the building.

Many writers have referred to the fact that the specializations that are incorporated in the division of work do not necessarily correspond with the sub-problems created by the 'factorization' of a problem (March and Simon, 1958, p.193; Schein, 1965, p.16; Woolley, 1970, p.19).

Pooled Interdependence:

Where a correspondence exists between sub-problems and work specialization we have what Herbert (1975, p.10) terms 'ecosystems', which are relatively independent areas of decision and action which can be controlled without much reference to their environment. The interdependence which exists between such ecosystems has been termed 'pooled' by Thompson (1967, pp.54-55) and is associated with a

limited variation in product characteristics over time and a certain amount of spatial separation.

Reciprocal Interdependence:

More fundamental changes in design with respect to precedent and existing organizational capabilities, termed 'reorientations' by Normann (1971, p.205) give rise to a situation where each organizational unit poses contingency for the others. What Thompson terms 'reciprocal interdependence' exists where the design sub-problems created have very little correspondence with the domains of enterprises in the environment and, hence, where the transformation of the environment becomes a prerequisite for the achievement of productivity in the enterprises' core technologies.

Sequential Interdependence:

In between these two extremes there is what Thompson calls 'sequential interdependence' in which the decisions and actions of one enterprise pose contingency for another enterprise whose decisions and actions are only of limited importance to the first. Situations of sequential interdependence imply a limited correspondence between design sub-problems and organizational domains.

As organizational interdependence is substantially influenced by design, organizational strategies employed in project organizations cannot be divorced from the way in which the design problem is handled. However, before this matter is discussed in detail, the types of organizational strategy available must first be outlined.

2 ORGANIZATIONAL STRATEGIES

Two broad organizational strategies exist which can, at one and the same time, provide designers with a full brief and allow production, construction, finance, user and other enterprises to exercise control over their technologies and resources. As mentioned above these strategies are related to the nature of the interdependence between enterprises.

2.2.1 Competition:

Competition is the strategy applicable in situations of 'pooled interdependence' which exists where two enterprises each attempt to secure from the other the maximum possible share of resources, within the framework of fixed rules and regulations accepted by both parties. Craft organization, as described in the previous chapter, provides a very good example of this strategy.

2.2.2 Co-operation:

Co-operation involves a process of interchange between enterprises whereby, to a greater or lesser extent, concern for individual gain is mediated by concern for the gain of the other party. This strategy is functional for those organizations embedded in turbulent environments in which they cannot expect to adapt simply through their own direct actions.

It is therefore, not surprising that this strategy was the one advocated by the

Banwell Committee (1964) as that to be adopted in the building and civil engineering industries in order to promote efficiency and economy in the future.

Thompson, together with McEwen (1958, p.25) and then in his own book entitled 'Organizations in Action' (1967, p.35), isolates three forms of co-operative strategy - contracting, co-optation and coalition - which differ in the timing of entry into the project organization and, therefore, the degree of control they provide over the decisions of co-operating enterprises.

1. Contracting (also referred to as bargaining) involves the negotiation of conditions for the exchange of goods or services in situations where the interdependence between one organization and another is sequential. If negotiation - which involves participation in information-giving only - is successful an agreement is reached in which each enterprise accepts conditions defining its input and output for the duration of the contract.
2. Co-optation is the process of absorbing new elements into the policy-making structure of an organization, the classic example of which is contained in Selznick's study of the Tenessee Valley Authority (Selznick, 1966). Under this form of co-operation, participating enterprises have the right not only to sanction the decision made by another enterprise but are entitled to participate in determining the occasion for a decision, in analysis and the suggestion of alternatives, and in the deliberation of consequences.
3. Coalition involves a greater commitment to participation. It exists where two or more enterprises combine to achieve a common purpose in the longer term but, in contrast to a merger, retain their individual identity.

In the following sections of this chapter each of the four strategies described above will be related to its application in the building industry with respect to the relationship between building sponsor and production or construction enterprises.

.3 COMPETITION - THE COMPONENT APPROACH

.3.1 Description:

This strategy, also known as the 'open-system' or 'système ouvert' relies on the presence of a number of separate enterprises which manufacture building components (such as windows, doors and frames, wall units and other prefabricated items) for stock. It results in a readily-available kit of building parts from which items can be selected and assembled in many different ways within a given hierarchy of structure, sub-structure and form. The means of achieving co-ordination is not unlike that used in craft organization in that:

1. The system relies to a large degree on industry-wide acceptance for its success.
2. Interfaces between one component and another are set down in great detail in what Blachère (1974 p.155) calls 'rules of the game' which are established to ensure that components, or even larger groups of components known as sub-systems, will always interconnect with one another. Modular co-ordination and standardized jointing systems replace the traditional arrangements between trades.

Within the parameters defined by the 'rules', the component producer may

manufacture whatever product he wants; in other words, product design is left almost entirely to the producer. In return, the producer must ensure that the products he advertises are able to satisfy the demand with respect not only to quality but also availability. The building designer, on behalf of the sponsor, then selects from the range available the products which fulfil the sponsor's brief and arranges them in whatever configuration he desires, again within the parameters defined by the rules.

8.3.2 Limitations:

The assumption underlying this strategy is that the physical sub-systems created coincide with the sub-problems formulated by the designer. This assumption is only rational where building requirements and organizational domains are limited and evolve slowly, and consequently do not give rise to the need for integration of sub-systems which cut across the 'rules of the game'. The fact that productivity is not automatically attained by the use of the competitive strategy has been pointed out even by staunch advocates of the 'système ouvert' (Blachère, 1974, p.156). In an industry where very large production runs are not required and where inventory costs are high, the overproduction implicit in this strategy is, in fact, often counter-productive, especially in times of change. In this regard Peter Cook (1967, p.18), the well-known architectural theoretician, has written:

> 'The ideal is a single range of prefabricated parts for all building situations. An attractive idea in the abstract, it ignores a fundamental facet of design: that it exists in the dimension of time as well as space'.

8.3.3 Attitude of the Architectural Profession:

Surpisingly perhaps, it is the architectural profession - dedicated to innovation and flexible constraints - which has been the most ardent advocate of this approach (RIBA, 1962, p.173; Caudill, 1971, p.259). However, this is not as strange as it may seem, for the major merit of the strategy is that it does provide a clear and comprehensive technological brief - in the form of a collection of readily-available technical systems - and thus is capable of reducing contingency both for the architect and the building sponsor. Possibly another reason for the favourable light in which this system is seen by architects is that it tends to retain the traditional structure of the building industry and, therefore, poses no threat to the domain of the profession.

The limits to the application of this strategy discussed above have, however, hindered its introduction and have led to the utilization of the more participative organizational strategies described below.

8.4 CONTRACTING - THE PERFORMANCE SPECIFICATION APPROACH

8.4.1 Description:

This strategy involves planning rather than standardization as a means of co-ordination. The most successful ground for its application has been in public sector development projects such as the CLASP (Consortium of Local Authority Special Projects) and the SCSD (Schools Construction Systems Development) school building programmes (Turin, 1969, p.340).

The strategy is implemented in the following way. Initially the requirements of the sponsor are recorded in a 'performance specification' the purpose of which is to set out objectives and restraints for the design and production of sub-systems or components by independent enterprises. The performance specification constitutes a brief for all those enterprises willing to compete in designing a product which will satisfy the requirements of the building sponsor. Designs, together with a price, are then submitted for evaluation against the performance specification. After evaluation and selection of a producer, a contract is entered into whereby a guaranteed market is assured for the successful producer and suitable resources secured for the sponsor.

The strategy is not dissimilar to the component approach in that it allows production enterprises to control the design of building sub-systems and reserves the right of the building sponsor to freely select the enterprise whose performance is best suited to his requirements. Sub-systems tend, however, to be larger in size and more diffuse than the components which form the content of the 'open system'. As the producer only commences production after sealing of the contract, competition between producers is curtailed to the design phase and is, therefore, not as extensive as in the component approach. Although this contains disadvantages it also displays advantages in that component and sub-system design can now, to some extent, be influenced by the nature and overall design of the particular project in hand rather than be imposed in some arbitrary way as is the case in the previous strategy.

4.2 Implications:

In a performance specification the balance between ends and means determines the extent of control which a production enterprise will be able to exercise over its technical input and output. The greater the number of constraints, the more the control by the producing enterprise of its technical inputs and outputs becomes reduced and the less viable the strategy becomes. Ideally, therefore, performance specifications should be concerned primarily with ends and not means (Mainstone, Bianco and Harrison, 1969, p.125). Research undertaken by Harrison (1969, p.1706) has revealed, however, that performance specifications imposing few design constraints are rare and that many have a very high design content. This is to a large extent due to the fact that building components are what Bredsdorff and Sebestyen (1971) call 'intermediate products', that is products which have little or no value except as parts of the whole which they help to form. It is this combination with other components and sub-systems which gives rise to constraints in order to ensure physical compatibility between the various elements. Processes involved in transporting, fixing and finishing the elements in their final position on site result in additional constraints.

Constraints, and therefore limits to the viability of the strategy, can be reduced by separating sub-systems in space and time. However, in order to justify the high costs involved in separation, it should have advantages over and above those accruing from the greater scope for production enterprises to exercise control over their activities and hence their costs. The achievement of such a division is possible, for instance, in buildings such as the New Johannesburg

General Hospital where a 2 - metre high service plenum serves to:

1. Reduce constraints on the design of individual services and on the design of the building as a whole.
2. Provide space for the maintenance of services without interruption to hospital care.
3. Provide the flexibility required to adapt and change individual services over the life of the building.

In order to obtain advantage from this strategy, the sub-problem which emerges in the design process and subsequently becomes the subject of a performance specification must not only be relatively independent of adjacent sub-problems but must also fall within the domains of a number of similar production enterprises in the building industry. It will be appreciated that the more such sub-problems deviate from the existing or intended future capabilities of these enterprises, the less prepared such enterprises will be to actively compete with each other in meeting the sponsor's requirements. On the other hand, as the level of specification is increased (and hence constraints reduced), the less clear-cut are the advantages and disadvantages of one proposal when compared with those of others (Harrison, 1969, pp.1705-1706). This often leads to further negotiation between sponsor and selected producers on value as well as price.

.4.3 Effect on the Architectural Profession:

The contracting strategy preserves, to a large degree, the traditional positi
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.4.3 Effect on the Architectural Profession:

The contracting strategy preserves, to a large degree, the traditional position of the architect in the building industry although it does make further inroads

and presents additional requirements when compared to the previous strategy. Firstly the architect is faced with a certain degree of regimentation as far as the design process is concerned, which arises from the lack of fast feedback to initial design decisions from those decisions delegated via the performance specification. Secondly, the architect assumes responsibility for the setting up and carrying out of the bureaucratic administrative procedures required to encourage and arbitrate competition and control subsequent negotiation.

When the contributions of a considerable number of specialist enterprises are required in a project, it becomes essential for the main contractor to become involved in initial project stages in order to ensure that the sub-systems subject to performance specification are as independent as possible in time as well as space. Thus the performance specification approach, when implemented to any significant extent, gives rise to the more participative organizational strategy described below.

1.5 CO-OPTATION - THE INTER-ORGANIZATIONAL APPROACH

1.5.1 Description:

In the building industry this strategy is, of the four discussed in this chapter, probably the one in most general use as, in addition to providing construction enterprises with the opportunity of controlling their inputs and outputs, it facilitates the accomplishment of two other important requirements:

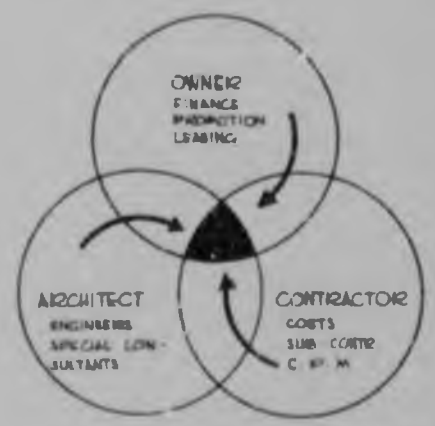
1. The need to effect changes to designs at a late stage, possibly even during

construction. Such changes typically arise from the unexpected availability of new techniques or equipment, or from mergers or take-overs in one or other of the enterprises involved in the project.

2. The need to decrease project delivery time which, although sometimes caused by bad planning, is often attributable to the cyclical economic fluctuations which characterize the building industry in free enterprise economies.

The approach is characterized by the early participation of production or construction enterprises (or others with responsibility for resources) in a complex 'centralized' problem-seeking and solving system concerned with making decisions on briefing, design and design-realization. Affleck (1968, p.259), describing his experience with the Place Bonaventure project in Canada - wherein approximately $80 million worth of building was programmed, designed and constructed in 3½ years - reports:

> 'The triumvirate of owner, architect and contractor functioning in linear sequence and in relative isolation from one another, was replaced by the simultaneous interaction of these entities. The interaction occurred primarily at weekly 'programme meetings', and involved an intensive participation by the most responsible members of the three entities involved. The principal characteristics of the process could be summarized as follows: simultaneity, a total information milieu, conflict exposure, feedback, quantity-quality interweave, and professionalization of all participants.'

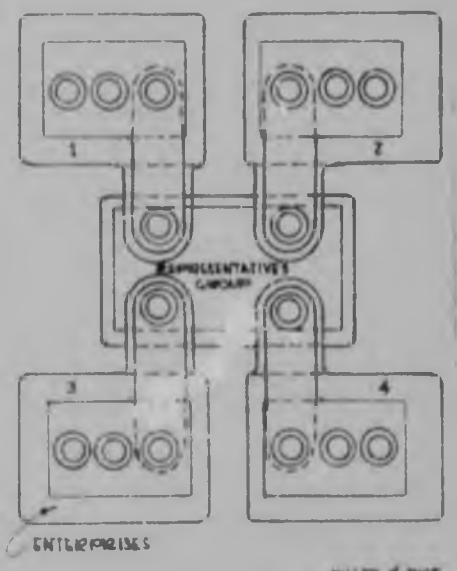


DECISION-MAKING IN CONDITIONS OF TOTAL INFORMATION AND SIMULTANEITY

As indicated in Affleck's description, the reciprocal interdependence which arises in such situations requires the use of meetings as a means of co-ordination.

This is confirmed by Morris (1974b, p.8) who found that, where interdependency between project enterprises was reciprocal, co-ordination was always by way of meetings whereas, when it was sequential, only 45% of the co-ordination was by meetings with often some members missing. Further, he found that when co-ordination was between 'Design' and 'Construction', the membership of the meetings frequently exceeded just the groups directly affected (Morris, 1973, p.602).

Meetings, in which a collection of individuals interact and are mutually aware of one another and of their existence as a collectivity, imply the formation of a group (Sprott, 1958, p.22; Schein, 1965, p.81). Because the members of these groups are subject to the pressures and demands of the different enterprises to which they belong, they form what has been variously termed a 'negotiating committee' (Paterson, 1966, p.169) and a 'representatives group' (Miller and Rice, 1967, pp.23-24), the concept of which is illustrated in the diagram on the right. Such groups differ from teams in that, although members may be able and willing to communicate and co-operate with one another, they are not necessarily committed to a common goal.



THE FORMATION OF THE REPRESENTATIVES' GROUP

2 Implications:

Whereas price and value are the primary criteria for the selection of enterprises under the competition and contracting strategies respectively, it is the willingness and ability of enterprises to co-operate in a joint venture which becomes the primary criterion under the co-optation strategy. In France the importance attached to this criterion is manifested by the lack of competitive tendering

even in situations where price and value is of substantial significance (Hefford, 1963, p.15). In English-speaking countries, the need for co-operation has given rise to the development of various forms of 'cost-plus' contract, all of which allow for participation in the decision-making process of the project organization at a stage immediately after the broad programme has been decided, a stage when it is very difficult if not impossible to select either on the basis of established value or price.

Participation in decision-making implies more than mere consultation; it involves unanimous decisions by all the members of the group on the right way for a project to proceed. These decisions, which are intimately interconnected with the future domains and resources of the participating enterprises must, at the very least, be tolerated by the representatives of the various enterprises in the group in order to create the commitment required for the implementation of the decision. In return for the internal compromise often required of participating enterprises, representatives acquire the authority to demand the reconsideration of proposals (including design proposals) on which decisions are based if these do not meet minimum standards of satisfaction and consequently threaten the future of the participating enterprise.

As the different enterprises will tend, in the words of Schein (1965, p.16) to 'operate at cross-purposes with one another, overlap in function, or compete for scarce resources' some conflict between the representatives almost inevitably arises despite the fact that initial consultation between the parties reveals the possibility of an effective interchange of capacity for resource. On the

other hand however, participation in decision-making allows for what has been termed:

'Co-ordination by feedback' (March and Simon, 1958, p.160);
'Co-ordination by mutual adjustment (Thompson, 1967, p.56);
'Integrative bargaining' (Lawrence and Lorsch quoting Walton and McKerskie, 1967, p.204).

These processes, although concerned with the distribution of benefits between enterprises, also make possible an increase in the overall benefit available for distribution provided that:

1. An integrating design solution can be found which reconciles the requirements of the various enterprises.
2. Representatives, especially of the more powerful enterprises, are prepared to become involved and to adjust their aspirations and those of their enterprises in the light of the requirements of adjacent enterprises and the design solution.

Therefore, although this strategy eliminates the disadvantages conduced by standardization and bureaucratic procedures, it places greater emphasis on design quality, on the selection of participating enterprises and on controlling the process of decision-making in the group.

8.5.3 Attitude of the Architectural Profession:

The strategy has, however, been accompanied by repeated pleas, by leaders of the profession, for a return to 'the system' with its lump-sum, fixed-period contracts

devoid of nominated sub-contractors and its simple, sequential relationships. Generally, co-optation strategies are viewed as aberrations occasioned by the laxity or cupidity of the various parties. The words of a past President-in-Chief of the Institute of South African Architects accurately reflect the sentiments of the majority of architects:

> 'These complicated procedures have become untenable and impossible to administer.' (Hallen, 1975, pp.25,27)

The remaining strategy to be discussed is one in which the intensity of conflict typical of the co-optation strategy is moderated and the procedures for selection and regulation of decision-making are simplified.

8.6 COALITION - THE INTRA-ORGANIZATIONAL APPROACH

8.6.1 Description:

The distinguishing feature of this approach is the permanence or stability of the project organization and also of the problem-seeking and solving group. The strategy is exemplified in a number of organizational forms - known by various names such as 'package deal' or 'direct-labour building' - but is possibly best characterized in the services offered by some of the large successful property developers. Athough it is suitable for use in those situations where there exists a need for a relatively large volume of very specific forms of accommodation such as emergency housing or sub-divisible offices it is often used where large size and the consequent need for stability prompt successful temporary

project organizations to form permanent coalitions, despite the fact that these may be disfunctional in the long term.

This strategy permits direct and full participation at the earliest stages of a project with less conflict, however, than that characteristic of the co-optation strategy. The reason for this is the centralization of policy-making in one body which concerns itself with the joint future of all the parties which, in the other approaches, are completely independent enterprises. Within the policy-making body, the individual responsibility of the sub-unit is replaced by the collective responsibility of a board of directors in which a majority vote is sufficient to authorize a decision. As the need for unanimous consent at the programming level remains and as, even at policy-making level, a unanimous vote is often required, conflict is not altogether eliminated (Newman and Rowbottom, 1968, p.60). However, the net effect of the strategy is that the domains of sub-units tend to be operational in terms of the organization as a whole thus smoothing the decision-making process.

8.6.2 Limitations:

Internationally, there has been an increasing tendency for sponsors to move away from the 'package deal' and 'direct-labour building' and for large conglomerates to reduce the integration between their parts (Higgin and Jessop, 1965, pp. 49-50; Economic Development Committee for Building, 1967, p.vii; Ockell, 1975, p.49). Experience in Czechoslovakia for example, has shown that in spite of certain initial advantages - particularly lexibility with regard to

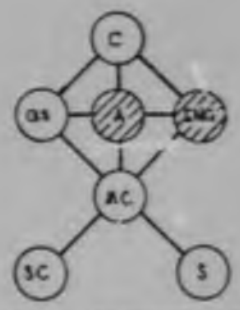
preparedness - the eoconomic and organizational coalition of the enterprises involved in building is eventually characterized by phenomena such as stagnation of construction techniques or lack of attention to the functional, aesthetic and townscape qualities of building (Cervenka, 1966, p.16).

8.6.3 Effect on the Architectural Profession:

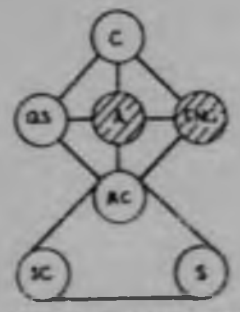
Generally, under this form of co-operation the quasi-judicial function of the architect falls away, being replaced by administrative decisions within the enterprise itself. Not surpisingly therefore, where little attempt is made to alleviate the disadvantages of this strategy, architects feel constrained by what may well be disfunctional long-term decisions which they have little power to alter.

8.7 AN EVALUATION

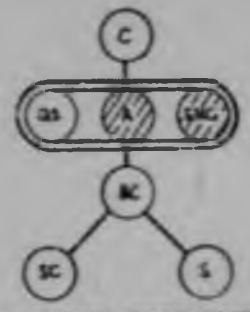
This study of organizational strategies with regard to the relationship between building sponsor and construction enterprises indicates conditions under which each of the strategies is practicable and the reaction of the architectural profession to these strategies. Typically, however, project organization structures are created which, at the same time or at different times, use two or more of the strategies outlined to achieve co-ordination between different sub-units. As the contracting and co-optation strategies tend to be the more popular, it is not surprising that the structure of the building industry has been compared to an enormous mosaic - laid on a constantly changing base in



NORMAL COMBINATION OF SEPARATE FIRMS



COMPLETE CONSTRUCTION SERVICE



INTEGRATED INDEPENDENT DESIGN CONSORTIUM

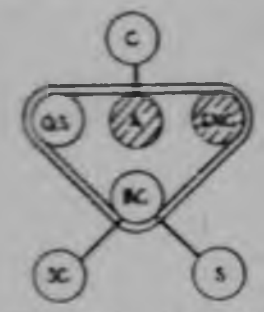
KEY

A ARCHITECT
C CLIENT
QS QUANTITY SURVEYOR
ENG. ENGINEER
MC MAIN CONTRACTOR
SC SUB CONTRACT
S SUPPLIERS

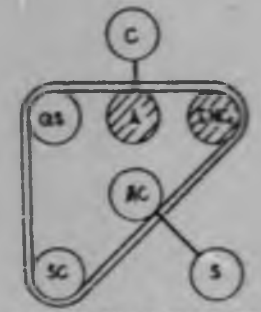
DOUBLE CIRCLE INDICATES PARTICIPATION IN FORMULATING DESIGN DECISIONS

HATCHING INDICATES DESIGN RESPONSIBILITY

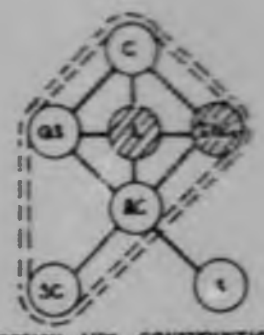
SOME ORGANIZATIONAL ARRANGEMENTS FOR BUILDING (FOLLOWING WALTERS AND RUNERS)



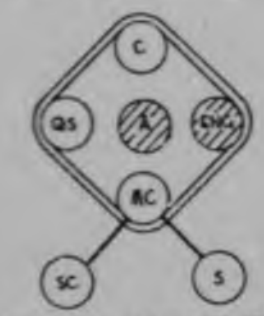
INDEPENDENT DESIGN AND CONSTRUCT SERVICE



INDEPENDENT DESIGN AND CONSTRUCT SERVICE (PACKAGE DEAL)

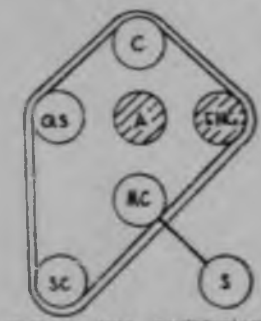


DESIGN AND CONSTRUCTION SERVICE - TEMPORARY CONSORTIUM



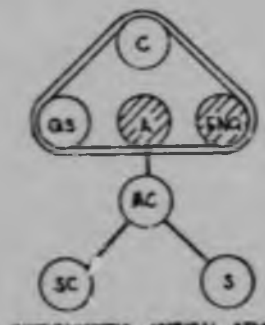
DESIGN AND CONSTRUCT SERVICE - CLIENT MANAGED

EG. LARGE PUBLIC AUTHORITY WITH OWN PROF. CONSULTANTS & DIRECT LABOURS



DESIGN AND CONSTRUCT SERVICE - CLIENT MANAGED

EG. LARGE CONTRACTING FIRM FINANCING OWN DEVELOPMENT



INTEGRATED DESIGN SERVICE - CLIENT MANAGED

EG. LARGE PUBLIC CLIENT WITH OWN PROF. CONSULTANTS

which different types of pieces represent different services, firms, products, markets, owners - with no inherent modular element to ensure effective fit (Bowley, 1966, pp.439-440).

Project organizations in the building industry are therefore not very different from the typical modern business which has been described as 'multiproduct, multitechnology and multimarket' and in which 'organization design is a series of risk-taking decisions rather than a search for the "one best way"' (Drucker, 1974, p.51).

The wide range of 'organizational arrangements for building' which arises from the situation outlined above was first illustrated by Walters (1960, p.119). Subsequently Miners (1971, p.52) expanded the range to that illustrated on the transparency and slightly modified the descriptions, possibly to more closely resemble the South African situation.

These diagrams reinforce the opinion already expressed that seldom will it be possible for a project organization to utilize solely the competition strategy with respect to production and construction enterprises. In effect this means that the architect will seldom be able to escape the implications inherent in the other strategies.

8.8 STRATEGIES WITHIN THE CLIENT SECTOR

The production sector has been used as a vehicle to illustrate strategies which

allow the policies, programmes and procedures of those who have a stake in the result of the design process to become expressed and considered. Strategies for the control of contingency by the client sector, that is users and investors and government regulatory bodies can be similarly analysed and classified. The examples below all illustrate that it is not only the industrialization of the production and construction sector which has given rise to more participative forms of organizational strategy.

8.8.1 Users:

As buildings become larger and more complex it becomes increasingly important for building sponsors to secure major users - be they purchasers of sectional-title units in the case of residential accommodation, or large tenants in the case of shopping centre developments - at the programming stage. Although such co-optation is very common in private sector developments in South Africa, it has not yet, in the public sector, achieved the intensity reached in the USA and exemplified in the forty 'charrettes' funded by the Office of Education of the federal government between 1968 and 1972 (Scriven, 1972, pp.411-412). The purpose of these 'charrettes' was to speed progress and take into consideration the demands of community action groups in school building programmes. In order to achieve this, they brought together, at the start of a school building programme, 60 to 100 educationists, teachers, students, parents and local community leaders to produce a programme and sketch designs for a school within about two weeks.

In South Africa, work is however being done by the National Building Research

Institute in order to find ways of promoting participation by the populations of developing regions in local public building programmes. This work, together with greater demands by society for participation, will tend to accelerate the transposition of patterns now only prevalent in the private sector to the public sector.

8.8.2 Investors:

As finance becomes increasingly scarce, investors need to evaluate their investments more comprehensively than in the past. As projects become larger and more complex and as the expectations of society increase, reliance on an estimate of expected return backed by the financial integrity of the building sponsor no longer provides the investor with the safeguards it did previously. Investors therefore need to become more involved in evaluating the details of the projects they are financing. Although co-optation onto the project organization is probably the most common strategy used to achieve this, there are many examples, both in South Africa and overseas, where financial institutions such as pension funds have formed coalitions with property development enterprises.

8.8.3 Government Regulatory Bodies:

A phenomenon of the last few years has been the increasing tendency by town-planning, fire-prevention and other public bodies controlling the nature of the built environment to abandon descriptive regulations in favour of more flexible procedures, oriented towards performance, which are able to cater more adequately for specific conditions (Webb, 1975, p.33). These procedures allow, for instance,

for the creation of developments which provide for the retention of an existing public amenity (such as an historic building) or the creation of a new amenity which would normally be rendered uneconomic by the application of uniform descriptive zoning or other regulations. Such procedures usually involve a form of performance specification or, alternatively, the co-optation of the regulatory body onto the project organization.

8.9 CONCLUSION

> 'Architects are no longer being permitted to "invent" a building.'
> (Guedes, 1975, p.21)

If, then, the position of the architect in the newer forms of project organization is considered, we find him engulfed in a complex changing organization of overlapping enterprises, many of which have the authority to veto his design proposals. The attitude of the architectural profession, as outlined above, to this situation is well described by Toffler (1970, p.430) in his sketch of the technocrat's reaction to what he terms 'future shock':

> 'He fails to recognize that the faster pace of change demands - and creates - a new kind of information system in society; a loop, rather than a ladder. Information must pulse through this loop at accelerating speeds, with the output of one group becoming the input for many others, so that no group, however politically potent it may seem, can independently set goals for the whole.'

Little will be achieved by reverting to previously successful adaptive routines and these are now irrelevant and inappropriate. The architectural profession must therefore find a way to work within this new situation which is characterized by groups in which members simultaneously compete and co-operate in briefing and evaluation.

CHAPTER 9: PROJECT MANAGEMENT

The objective of this chapter is two-fold:

To investigate why the change to project organizations employing co-operative strategies must be accompanied by a change in the nature of the non-design functions presently assumed by the architect.

To investigate the nature of the changed function which has arisen.

.1 SOCIO-EMOTIONAL ASPECTS IN GROUP DECISION MAKING

'A group solving a problem or engaged in any task, must be thought of as an integrated structure which comprises the activities required by the task situation and the emotional relations between the members.'
(Sprott, 1958, p.106)

The overt and conscious contribution of members to the task of a group obliges them to communicate with one another in certain ways. However, as pointed out in Chapter 5, the role behaviour demanded by the task is not the only determinant of the nature of the inter-personal relationships which pertain. The feelings and attitudes that the members of the group subconsciously develop about each other and about the group - both internally and in relation to the environment of the group - will also affect their behaviour and consequently their relationships with other members of the group (Sprott, 1958, pp.13, 21; Miller and Rice, 1967, p.18). Perhaps the most well-known illustration of this phenomenon is to be found in the results of the celebrated experiment by

Lippitt and White in which groups of 11-year old boys were subjected to different group environments and were found to behave quite differently in different social situations.

The behaviour of individuals, through its influence on other group members, affects task performance. A study by Normann (1971, p.205), of 13 cases of product development in various industries in Sweden, reflects the earlier findings of Miller and Rice (1967, p.132) that the effect of the socio-emotional characteristics of the decision-making group on the characteristics of the final product is at least as significant as the inherent requirements which constitute the design problem. Therefore, as Schein (1965, p.36) so cogently states, 'the informal organization ... cannot be ignored or "forbidden"'.

Various studies have indicated that when the task of the group is concerned with building design, the influence of the 'informal organization' becomes exaggerated. This has been attributed both to the absence of a completely objective basis for determining the validity of judgements about the quality of the design and to the aggressive animal instincts supposedly aroused by matters concerned with the appropriation and redefinition of space (Sprott, 1958, p.34; Rowe, 1974, p.38; Colman, 1974, pp.22-24). Whether or not these assertions are correct, the following examples illustrate observed instances of the power of the socio-emotional aspects of the group during the briefing and design processes.

9.1.1 A New Building for a Medical Practice:

Colman (1974, pp.23-24) describes how, in a large medical practice deciding on a new building, both the secret wish of the founder of the practice for a monument to his work and the covert matter of leadership succession which accompanied his forthcoming retirement gave rise to irrational group decisions about the form of the building. The monumental tower decided upon was not only irrational in relation to the overt task but potentially destructive to the more rational self-interests of the doctors, not to speak of the clinical interests of the patients they would treat.

9.1.2 A Commission for a Housing Scheme:

O'Reilly (1973, pp.1-8) describes how, during a meeting to brief an architect on a housing scheme for which he had already accepted the commission from the Housing Department of a Local Authority, another commission - for the outline civic design of a development which surrounded the land relating to the first commission - was offered by another client department attending the meeting. Although the explicit intention of this department (Town Planning) was to save what was left of the land in the development area in the face of land-control and development decisions by others, it was interpreted by the traditionally strong Housing Department as a covert attempt to increase the status and power of the relatively new Town Planning Department. Negotiation about the priority which should be given to the latter commission resulted in a decision that the architect

was to complete both commissions in the time originally intended for the one, an impossible task in the circumstances. This decision which cannot be interpreted as the result of a logical process, must be seen as a reflection of the existing power structure.

9.1.3 A Group Exercise - Building a Tower:

As a tutorial in the Organization and Management course designed by the author for senior architectural students at the University of the Witwatersrand (see Appendix 5), the group exercise described in Appendix 6 was conducted on a number of occasions. The task in this exercise is to design and build a tower using children's interconnecting building blocks. Although the overt task is to maximize profit - which is related to the amount of blocks used, the height of tower achieved and the time taken to build the tower - the exercise was covertly seen by many of the students primarily as an opportunity to have their design ideas implemented, an opportunity not available in their normal studio design projects. Where the right of fellow group members to contribute to the physical design of the tower was accepted, a typical result was that a number of basic designs were created independently. Then, as time constraints became critical, parts of these designs were added together to form a composite design which, to a greater or lesser degree, satisfied the covert needs of the budding architects but in most cases did not accomplish the task of the exercise.

These examples, as both O'Reilly and Colman also point out, are fairly typical of what happens in the briefing and design stages of the building procurement

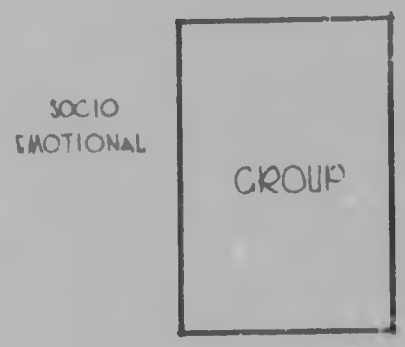
process and are not unique cases. This is confirmed by the Tavistock researchers who stated in their report:

> 'Much design and even building work has proved to be abortive because unresolved and unrecognized conflicts of interests or objectives within the client system have only come to light after the building process has been initiated.'
> (Tavistock, 1966, p.39)

.2 RELATIONSHIPS BETWEEN TASK AND SOCIO-EMOTIONAL ASPECTS

The behaviour of people is, however, not always in conflict with the rational task which confronts them. There must therefore be some relationship between the task and the socio-emotional aspects of the group which determines the outcome of the decision-making process.

The task and socio-emotional aspects of groups have been represented in various ways. Fisher (1974, p.30), using a similar format to that devised by Blake and Mouton in their 'Managerial Grid' (1964), portrays the two aspects as the two dimensions of a rectangle as shown in the diagram on the right. Although this picture emphasizes the relatedness of the two aspects, it is rather simplistic. The model created by Miller and Rice (1967, pp.18-19), and illustrated over the page, is a far more useful one in that it indicates the group operating on two levels, one level called the 'work group' and the other level, the 'assumption group'. A third level is suggested by the diagram and is termed the 'external environments of individuals'. This level, which



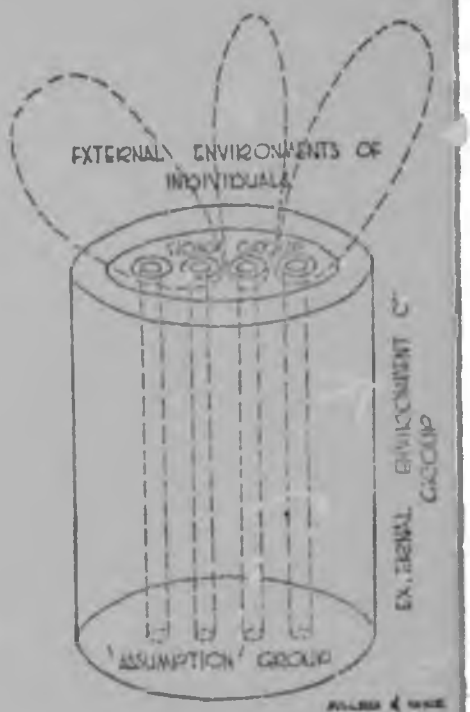
THE TWO DIMENSIONS OF A GROUP

influences both task and socio-emotional components, is particularly dominant in representatives' groups and therefore increases the value of this model in this thesis.

The distance of separation between the 'work group' and the 'assumption group' can be construed as representing the extent to which the rational task can be reinforced by the socio-emotional processes between group members. The distance of separation represents the degree to which the task in hand coincides with the purpose of the group and, therefore, the possible commitment of the group as a whole to the task.

The actual commitment of members of the group to the task depends, however, on another phenomena known as 'cohesiveness' which has been defined as 'the ability of group members to get along, the feeling of loyalty, pride and commitment of members toward the group' (Fisher, 1974, p.31). Whereas production can be viewed as the output of the 'work group' cohesiveness, or 'sentience' as Miller and Rice (1967, p.xiii) choose to call it, can be regarded as the output of the 'assumption group'.

The greater the cohesiveness of the group, and therefore the greater the extent to which people look for approval from within the group, the greater the willingness of group members to give the group information which may, at the time, seem prejudicial to their private interests or the interests which they represent to the group. Similarly, it is cohesiveness which influences the willingness of group members to maintain flexibility in their levels of

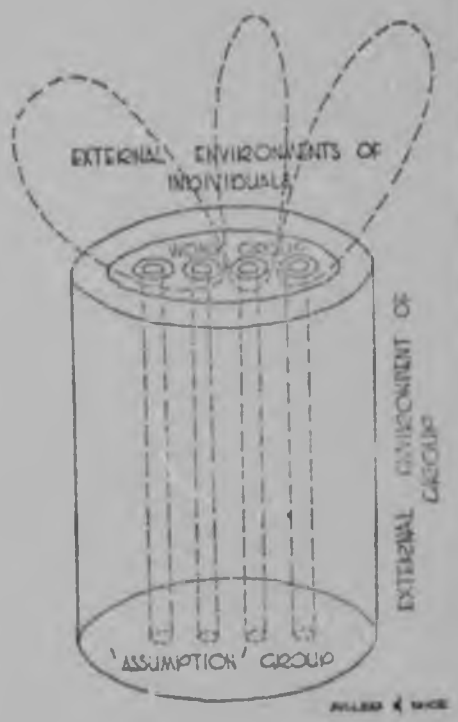


THE TWO LEVELS OF THE INTERNAL WORLD OF THE GROUP

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aspiration for decision outcomes. As the ability and the motivation of those undertaking the design process is positively related to the free flow of information and the responsiveness of the environment to design solutions, provided the decision-making group is to some minimum degree committed to the task, a high level of cohesiveness facilitates the creation of integrating design solutions.

Therefore, with the qualification expressed above and within certain limits to be discussed later in this chapter, cohesiveness of the project group promotes effective performance in project organizations.

9.3 FACTORS AFFECTING COHESIVENESS

Although many of the factors which influence cohesiveness are as yet unknown, the membership, the age and the size of groups are three elements which have been isolated as being of crucial importance.

9.3.1 Group Membership:

Cohesiveness depends primarily on the extent to which the basic assumptions of the members coincide and the degree to which members find themselves obliged to engage in covert politics.

Basic Assumptions:

Differences in basic assumptions and orientation to time, people, things and situations are the result of cultural stereotyping which occurs beyond the immediate awareness of the involved individuals or groups (Colman, 1974, p.26). The greater the differences, the more opportunity there exists in the group for misinterpretation and confusion. The resultant lack of security and support for group members tend to reduce the cohesiveness of the group. Consequently, the less homogeneous the group in occupation and background, the less the potential for cohesiveness.

Covert Politics:

Cohesiveness, however, also depends upon the extent to which group members need to indulge in covert politics (Sprott, 1958, p.118). Covert politics, as defined by Colman, are inter-personal processes which, although they serve the conscious self-interest of individuals or groups, nevertheless operate in unexamined ways in the social field of informal relationships. In a representatives' group the extent of covert politics depends not only upon the complementarity of the personalities and personal role expectations of the individuals concerned, but also on two other factors which are concerned more with the representatives' own enterprises rather than with the personalities in the project group itself.



One of the factors affecting the need of the representative to engage in covert politics in the project group is the willingness of the representative's own enterprise to make what Normann (1971, p.208) terms 'reorientations'. The attitude of the enterprise depends on a large range of variables among which are:

1. The pressures exerted on the enterprise by other components of its environment which have an interest in its activities and power to affect these activities - such as loan sources, suppliers, trade associations, other customers, unions, the general public, governmental bodies, and even competitors.
2. The intended future domains of the enterprise in the light of the pressures mentioned above.
3. The capacity of the human and other resources of the enterprise, and the organizational structure as a whole, to cope with risk and change.

The second factor is the extent of the representative's authority within his own enterprise. This is dependent not only upon the position of the representative but also upon what Paterson (1966, pp.195-205) terms 'goodness'. Goodness defines the ability and willingness of an individual to 'do things which better the enterprise' in spite of the fact that this may involve breaking rules and regulations which define what is regarded as 'right' in the enterprise. Goodness is therefore intimately bound up with the respect by members of the representative's enterprise for his sapiential, personal and moral authority.

Cohesiveness in representatives' groups depends, therefore, on a complex mixture of the personalities of group members and their membership of other groups.

9.3.2 Group Age:

The early life of groups is characterized by a preoccupation with the satisfaction of individual needs (Schein, 1970, p.91). It takes time for members to develop a common belief in the objective of the group and complementary beliefs about their respective contributions to it. The greater the continuity of a group over time, the more likely it is that the group will be a cohesive one provided, naturally, that the membership factors are favourable.

9.3.3 Group Size:

In groups which have been formed for decision-making, the size of the group also has an important bearing on its cohesiveness. Various figures have been put forward - ranging from 5 to 12 - before coherence in feeling and cross-stimulation between members of the group is lost (Mallows, 1965, pp.58-59; Paterson, 1966, p.191; Miller and Rice, 1967, p.20; Fisher, 1974, p.118). However, a group may also be too small; the absence of a group member whose contribution is vital to the objective of the group may also reduce cohesiveness, especially if his contribution is highly interdependent with that of other members. The principle involved is that the size of the group should

be the smallest compatible with the job to be done, if the group is not to split into two or more competing cliques.

By careful control of group membership and the continuity and size of task groups, cohesiveness can be increased, with positive results both as far as the free flow of information and the willingness of group members to adjust their aspiration levels is concerned. Whereas the former facilitates the creation of a solution, the latter irons out differences which might otherwise obstruct the acceptance of a conciliatory proposal.

9.4 THE DANGER OF CONFORMISM

> 'Conformism, in team-work, can be equally as dangerous as rugged individualism.'
> (Mallows, 1965, p.37)

There are limits, beyond which an increase in cohesiveness may result in a decrease in the quality of group decisions. These limits are transgressed when group members, looking for approval solely from within the group, subdue opinion deviation which they feel may prejudice their position in the group but which is, nevertheless, necessary for the group to be able to reach a decision which is regarded as good by those outside the group. Professor Irving Janis of Yale University, in his book 'Victims of Groupthink' (1972), provides evidence - based on an analysis of key decisions at national levels in the United States of America - which indicates that the more

amiable and cohesive the members of an ingroup, the greater the prospect that independent critical thinking will be suspended in favour of group norms and conviviality.

The infamous case of Ronan Point, where a gas explosion caused the partial collapse of a high rise block of flats resulting in deaths and injuries among occupants, reinforces Janis's findings and, in addition, gives credence to the suggestion by Miller and Rice (1967, p.31) that the more a group is committed to a single activity-system, the more it will tend to interfere with independent thinking. Atkinson (1974, p.26), referring to the Ronan Point collapse, records:

> 'The structural design had been carried out by a firm closely associated with the contractor and had never been checked independently because conformance with building regulations was certified by the local authority, which was both housing and building authority, without any serious examination of the structural proposals.'

Control of the membership, the continuity and the size of decision-making groups is therefore also necessary to avoid cohesiveness developing into conformity and thus prejudicing the ability of the group to deal realistically and rationally with matters of importance to its environment.

9.5 THE NEED FOR PROJECT MANAGEMENT

> 'To manage is to forecast and plan, to organize, to command, to co-ordinate and to control. To foresee and provide means examining the future and drawing up the plan of action. To organize means building up the dual structure, material and human, of the undertaking. To command means maintaining activity amongst the personnel. To co-ordinate means binding together, unifying and harmonizing all activity and effort. To control means seeing that everything occurs in conformity with established rule and expressed command.'
> (Fayol, 1967, pp.5-6).

In project organizations constituted under 'the system' or for that matter under the 'component approach' the architect acts not only as designer but also as agent of the building sponsor up to tender stage, and in a so-called 'quasi-judicial' role after the acceptance of tenders. His responsibility as agent involves securing the resources required to accomplish the task as defined initially by the nature of the building required and then later by the design as it evolves. However, the existence of a number of directly competitive enterprises in the environment together with a range of widely-accepted procedures and regulations for ensuring equitable competition reduces this process to not much more than a clerical routine. Similarly, the 'quasi-judicial' role involves administering accepted procedures and systems within the confines of the very explicit quid-pro-quo contract agreements entered into between the building sponsor and production and

construction enterprises. Control of activity outcomes rather than the co-ordination of people is involved.

The change to organizational strategies which involve participation in decision-making - namely the contracting, co-optation and coalition strategies - has changed the nature of both the roles discussed above. Although it is generally accepted that this change involves an enlargement of both functions, through the addition of new duties and responsibilities, there is nevertheless considerable disagreement and confusion about the precise nature of the expanded roles now together dubbed 'project management' (McKenzie, 1971, p.98; R.I.B.A., 1973, p.327). Whereas some see the project management role displacing the contractor in the design group - in order to make available the necessary production expertise without the disadvantages of conflict and lack of competition inherent in the co-operative strategies - others regard the role as incorporating responsibility for the content of all the advice supplied by members of the design professions.

9.6 THE NATURE OF PROJECT MANAGEMENT

The essence of project management derives from the fact that participation in decision-making involves not only a rational problem-seeking and solving activity but also incorporates the inter-personal processes which dynamically influence this activity. The centrality of the human element in participative strategies requires that, in both the selection of project enterprises and in the control of the inter-action between their representatives, attention be given to the socio-emotional as well as to the task elements.

9.6.1 Membership Control:

'You can't look in the phone book ... ' (Gemmill and Wilemon, 1970, p.21)

The successful participation by enterprises in the decision-making process depends not only on their willingness to provide a particular article or service for a given price but more on the ability and willingness of their representatives to accept change and introduce innovation. As discussed above, this depends on many factors within the enterprises and in their environments as well as on the personality and mores of their representatives The selection of enterprises must therefore be based on a continuous monitoring of capabilities, expectations and attitudes with respect to the organizations and individuals who may be drawn into project organizations and groups. In addition, in order to balance the conflicting benefits of cohesiveness and competition, the point and conditions of entry of such enterprises and individuals into the project organization must be controlled with regard to the internal processes of the group.

9.6.2 Process Co-ordination:

The effectiveness of a decision-making group depends not only on the control group boundary but also on the internal rewards available in the group and standards of justice and tolerance exercised in the group. Recognition of the specialized talents and resources of group members, emphasis on the challenge of the common task and the responsibility of group

members in this regard, and the creation of opportunities for achievement all serve to encourage the commitment of members to the group. Focus on the limits of the group and the importance of other groups which constitute the environment of group members will, in contrast, tend to reduce the commitment of group members to the project group. Process co-ordination involves monitoring the group process and intervening in order to ensure that information flow, decision-making and the implementation of decisions are synchronized with each other and related to the design process, that essentials are not misunderstood or overlooked, and that inter-personal conflicts are resolved and alliances mediated so as to promote a solution at the highest possible level of reconciliation.

9.6.3 The Right to Command:

The concept of project management is not dissimilar from what has become known as 'organization development' which has been defined as:

> 'an effort planned organization-wide and managed from the top, to increase organizational effectiveness and health through planned interventions in the organization's "processes", using behavioural science knowledge.' (Beckhard, 1961, p.9)

Implicit in both organization development and project management is the need for structural authority, that is the right to command, which must be backed up by the willingness of the members of the project group to allow sanctions to be exercised on their behalf and the ability, ultimately, of the building

sponsor to supply the total external rewards available in the project organization. However, as Limerick (1975b, p.26) points out:

> 'The right to command is exercised over the process of group decision-making and problem solving, and not over its content - it is there truly to meet the need for order.'

Order is required to allow constructive and open discussion, to provide the freedom necessary for the creation of reconciling proposals, to express the group's commitment to a choice of alternatives, and to achieve co-ordination in the implementation of decisions. It is therefore not surprising that Limerick's research findings indicate that higher percentages of commands given and accepted within groups are associated with higher levels of group satisfaction and higher acceptance of suggestions by others in the group.

The task of project management is, consequently, a dynamic one which requires not only thought and action at the highest levels, but an ability and willingness on the part of those undertaking the task to accept authority and to manage people.

CHAPTER 10: THE ARCHITECTURAL PROFESSION

The newer forms of project organization are characterized not only by the need for competent project management but also by a need for improvement in design quality. This need derives from the increased segmentation of society and from the dilution of tradition which, in societies where development is of limited scale and change is slow, provides a safeguard against acts which threaten the existence or the well-being of other components of society. As the demands for safety, amenity and fulfilment within each of these components, as well as within society as a whole, have expanded, it is not surprising that the increased freedom of enterprises has been accompanied by a rapidly escalating tendency to hold such enterprises accountable for the long-term effects of their decisions and for the impact of these decisions on people and on the physical and social environments which lie beyond their limited domains (Drucker, 1958, pp.459-61; 1973, p.312). In this regard it has even been suggested that the old law of the market place, 'caveat emptor', is today being replaced by the maxim of 'caveat vendor' (Genecki, 1972, pp.214-215). Consequently, the reliance of building sponsors - and also other components of society - on t ,se who are willing to assume responsibility for providing both efficient management and imaginative design services has increased to the point where legislation to reserve work beyond a certain size and scope for such individuals can be countenanced. The attitude of the architectural profession towards accepting these increased responsibilities is the subject discussed in this chapter. However, before such a discussion can be undertaken, an analysis of the nature of professionalism must first be completed.

10.1 THE NATURE OF PROFESSIONALISM

An analysis, undertaken by Atherley and Hale (1975), of the views held by engineers and chemists about the nature of professionalism resulted in the isolation of six categories of traits attributable to professional occupations. These are indicated on the left side of the table illustrated on the transparency over the page. In order to confirm that the traits identified, and the six categories isolated, were not peculiar to the occupations considered, Atherley and Hale compared them with the results obtained by Millerson (1964) in his research. Millerson assembled 23 'elements' from a review of 21 writers in sociology who had offered descriptions of what they regarded as key elements of a profession. The table shows 21 of Millerson's elements distributed into the 6 categories suggested by Atherley and Hale. The objects of the Institute of South African Architects shown on the extreme right of the table, indicate that these traits apply also to the profession of architecture (Institute, 1974-75, p.13).

The fundamental importance of the first three elements in the table to the long-term viability of a profession has been stressed both by Atherley and Hale and by Kaye (1960, pp. 15-17), a sociologist who studied the architectural profession in Britain. The importance of these elements stems from the function of the professional association in providing a substitute for the

ELEMENTS OF PROFESSION		ENGINEERS	CHEMISTS	MILLERSON'S 23 ELEMENTS	OBJECTS OF INSTITUTE OF ARCHITECTS
1. POWER	REGISTRATION	+	−	LICENSED COMMUNITY SANCTION	TO ENSURE HIGH STANDARDS OF PROFESSIONAL COMPETENCE AND INTEGRITY
	ACCREDIATION	−	+	DEFINITE PROFESSIONAL CLIENT RELATIONSHIP	
	SET ACADEMIC LEVEL	+	+	FIDUCIARY CLIENT RELATIONSHIP	
	SETTING ATTITUDES TO COLLEAGUES, CLIENTS, PUBLIC, ETC.	+	+	LOYALTY TO COLLEAGUES ORGANIZED	
	CODE OF CONDUCT	+	+	ADHERES TO A PROFESSIONAL CODE	
2. COMPETENCE	COMBINE ABILITY WITH JUDGEMENT	+	+	SKILL BASED ON THEORETICAL KNOWLEDGE REQUIRES TRAINING AND EDUCATION	TO AFFORD OPPORTUNITY FOR THE INTERCHANGE AND RECORDING OF KNOWLEDGE
	SET BALANCE BETWEEN THEORY AND PRACTICAL ABILITY	+	+	COMPETENCE TESTED PRACTICE MODIFIED BY GENERAL KNOWLEDGE	
	ADVANCE KNOWLEDGE	+	+	APPLICATION OF KNOWLEDGE TO PRACTICE, A	
	CIRCULATE INFORMATION AND	+	−	PRACTICE REQUIRING JUDGEMENT	
	SCIENTIFIC PAPERS	+	+	FORESIGHT BASED ON THEORY & UNDERSTANDING	
3. MORAL PRECEPTS - INTEGRITY	HONESTY	+	+	ALTRUISTIC SERVICE	TO ENSURE HIGH STANDARDS OF PROFESSIONAL COMPETENCE AND INTEGRITY
	HONOUR	+	+	INDISPENSABLE PUBLIC SERVICE	
	INTEGRITY	+	+	APPLIED TO AFFAIRS OF OTHERS	
	PUBLIC SERVICE, COMMUNITY	+	+	BEST IMPARTIAL SERVICE GIVEN	
	FREEDOM FROM BIAS	+	+	INDEPENDENCE	
4. VOICE - STATUS	INFLUENCE IN SOCIETY	+	?	GUARANTEED SERVICE RATES	TO UPHOLD THE DIGNITY OF THE PROFESSION OF ARCHITECTURE
	RECOGNITION	+	+	ASSOCIATION'S PRESTIGE AIDS	
	IMAGE	+	+	SECURING EMPLOYMENT AND	
	DIGNITY AND REPUTATION	+	+	IMPROVING INCOME	
	SOURCE OF PUBLIC STATEMENTS	+	+		
5. ADVANCEMENT OF VOCATION - EDUCATION	ATTRACT PEOPLE TO VOCATION	+	?		TO ADVANCE THE ART, SCIENCE AND PRACTICE OF ARCHITECTURE AND COGNATE PROFESSIONS
	ENCOURAGE JUNIOR PRACTITIONERS	+	+	MEMBER PREPARED TO CONTRIBUTE TO PROFESSIONAL DEVELOPMENT	
	STATUS	+	+	RECOGNISED STATUS	
	LINKS OVERSEAS	+	−		
6. SERVICES TO INDIVIDUAL PRACTIONERS - -TRADE UNION	PRACTITIONER INDEMNITY	+	+		TO WATCH OVER, PROMOTE AND PROTECT THE INTERESTS OF ITS MEMBERS
	JOB SATISFACTION	+	+		
	PRICE FIXING	−	+	DEFINITE COMPENSATION (IE. FEE OR FIXED CHARGE)	
	PRACTICE PROTECTION	−	+		
	SALARY SETTING	−	+		
	SOCIAL CLUBS	+	−		

KEY: + DENOTES PRESENCE IN PROFESSION ; − DENOTES ABSENCE IN PROFESSION

(ATHERLEY & PALEY)

SIX TRAITS OF PROFESSIONALISM

market relationship with its implication of 'caveat emptor'. The need for a deeper relationship than that which exists between buyer and seller before purchase (that is informability) and a more reciprocal relationship than that which normally exists after purchase (that is responsibility) derives from the fact that:

1. Members of the public are unable to evaluate the quality of the service with which they will be provided.
2. Those providing the service cannot accept a problem at face value but need to interpret it for themselves.

The professional association therefore attempts to secure a relationship of advisability between its members and others by promoting the competence and integrity of its members. It is enabled to do this by its sanctioned right to admit or remove members and, in certain cases, to reserve work for its members. A profession is, therefore, not an occupation, but a means of controlling an occupation. It provides clients and other interested components of society with an assurance that those whom they allow to share in decision-making on their behalf are capable of, and committed to, providing comprehensive long-term advice. Such advice must incorporate apposite 'supra-client' values (Kaye, 1960, p.17; Higgin, 1964, p.139) - that is values wider than those necessarily considered relevant by the party or parties whom the professional is advising - and must be unbiased by individual interest or irrational or covert economic, social or political pressure.

Without assurances about the competence and the moral and personal integrity of the members of a profession, the only path left open to sections of society to ensure that their interests are not neglected - resulting, for example, in omissions and excesses such as those which characterized the Industrial Revolution in England - is to impose more and also more rigid constraints on the decisions of the professionals, which, in a changing environment, fails to promote the reconciliation so necessary in a shrinking world.

10.2 THE DEVELOPMENT OF THE ARCHITECTURAL PROFESSION

The development of the project organization in the building industry has been traced in Chapter 6 and Appendix 2 and, as has already been suggested, this development has brought with it implications for the architectural profession. In this section the development of the profession will be traced in order to study how it has responded to the changes in project organization. As the history of the British and South African professions are inextricably intertwined - probably because the rise of professionalism among architects in Britain corresponded with the occupation and subsequent colonization of South Africa by the British - the early development of the profession in Britain, as traced by Kaye (1960), also comprises the early history of professionalism locally.

Perhaps the most crucial process in the formation of the architectural profession was the divorce of the architect from his patron which, in Great Britain, was firmly established by the 1830's. This brought with it not

only greater independence and freedom but also the need to attract and secure the clientele without which architects are unable to practice their art. Unfortunately this resulted in competition between architects on the basis of fee which, according to Pearse (1936, p.33), led to plagiarism (especially of young architects) and the relegation of design work to lowly-paid draughtsmen or to design-supply contractors. The only way open for most architects to ensure that they had sufficient fees to give adequate attention to design themselves was to engage in the practice known as 'Architect and Builder'. This practice - whereby the architect-contractor received a lump-sum from his employer with which he would settle the tradesmen's accounts - allowed the architect-contractor to make contracts with his clients for sums higher than those delivered to himself, thus providing the profit required for him to engage in design and so utilize his talents.

The change from patrons to clients was accompanied by a gradual formalization of the architectural profession and an increasing acceptance by society. The first step was the formation of a number of clubs and societies such as the Architects' Club (1791) and the London Architectural Society (1806) which created the opportunity for members to discuss matters of common interest amongst which the function of the profession and the education and qualifications of the architect predominated. This led to the foundation of the Institute of British Architects in 1834 for the purpose of:

> 'facilitating the acquirement of architectural knowledge, for the promotion of the different branches of science connected therewith, and for establishing an uniformity and respectability of practice

in the profession.'
(Transactions of the Royal Institute of British Architects, 1836-84, 1 (1935-6) p.x)

The Institute received a Royal Charter of Incorporation 3 years later in 1837, which endorsed both the concept of the architect as 'intermediary' between employer and builder and the attendant rules which, to a large extent, were concerned with the provision of an adequate design fee for the architect in return for the protection of the financial interests of members of the public employing architects. Protection was provided by a code of conduct which precluded architects from:

'Measuring and valuing Works on the behalf of Builders, except those executed from the Member's own designs or directions.
Receiving any pecuniary consideration or emolument from Tradesmen, whose works he may be engaged to superintend on the behalf of others.
Having any interest or participation in any Trade or Contract connected with Building.'
(Institution of British Architects, Prospectus for the Formation of a Society, 1834)

After 6 attempts in the late 19th Century and early 20th Century the 'Architects' (Registration) Act' was finally passed by the British government in 1931, and in 1938 was amended to provide for the limiting of the title of 'architect' to those whose qualifications were acceptable to the Architects' Registration Council. In South Africa, through the passing of the 'Architects'

REGULATION 89 PUBLISHED UNDER THE ARCHITECTS' AND QUANTITY SURVEYORS' (PRIVATE) ACT Nº 18 OF 1927 (INCORPORATING AMENDMENTS UP TO APRIL, 1932). (INSTITUTE, 1933, pp 179 - 182) IN TERMS OF THESE REGULATIONS THE ARCHITECT IS RESTRICTED, UNDER CERTAIN CONDITIONS, FROM:	REGULATION 87 PUBLISHED UNDER SAME ACT Nº 18 OF 1927 (INCORPORATING AMENDMENTS UP TO MAY, 1967) (INSTITUTE, 1969, pp 24 - 26) CHANGES INTRODUCED OVER 35 YEARS SINCE APRIL 1932		REGULATION R.314 PUBLISHED IN TERMS OF ARCHITECTS' ACT Nº 35 OF 1970 (INCORPORATING AMENDMENTS UP TO FEB 1976) (INSTITUTE, 1974-5, pp 4-5 AND SUPPLEMENTS) CHANGES INTRODUCED OVER 9 YEARS SINCE MAY, 1967	
a. ENGAGING IN BUILDING TRADES	a.	=	6.2(6.3	=
b. ACCEPTING DISHONEST COMMISSIONS	b.	=	6.18	=
c. ISSUING ANONYMOUS DRAWINGS AND SPECIFICATIONS	c.	=	6.4	=
d. ISSUING OTHER ANONYMOUS DOCUMENTS	d.	=	6.4	=
e. SHARING FEES WITH NON-PROFESSIONALS	e.	+	6.22	[redacted]
f. PARTICIPATING IN UNAUTHORISED COMPETITIONS	f.	=	6.6	=
g. SECURING WORK SUBJECT TO COMPETITION	g.	+	6.7	=
h. UNFAIRLY INFLUENCING COMPETITION AWARDS	h.	=	6.6	=
i. UNDERTAKING WORK FOR WHICH HE IS AN ASSESSOR	i.	= +	6.9	=
j. (INAPPLICABLE TO ARCHITECTS)	j.	=		OMITTED —
k. REPLACING PROFESSIONALS WHOSE FEES REMAIN OUTSTANDING	k.	=	6.11	=
l. REDUCING FEES BELOW MINIMUM SCALE	l.	+	6.12	+
m. OFFERING IMPROPER INDUCEMENT TO OBTAIN WORK	m.	+	6.13	6.14 ADDED +
n. TOUTING TO OBTAIN WORK	n.	=	6.16(6.17	=
o. ADVERTISING HIS SERVICES	o.	+	6.18	—
p. ENGAGING IN CERTAIN WORK IF NOT MEMBER OF PRACTICING CLASS	p.	+		OMITTED —
q. CONTRAVENING THE ACT OR REGULATIONS	q.	=	6.1	+
r. ACTING UNFAIRLY IN BUILDING CONTRACTS	r.	=	6.19	=
s. COMPETING UNFAIRLY WITH FELLOW PROFESSIONALS	s.	+	6.20	=
t. NON-DISCLOSURE OF PARTNERSHIP	t.	+	6.21	=
u. UNDERPAYING INDEPENDENT QUANTITY SURVEYORS	u.	OMITTED —		OMITTED —
v. CONDUCTING HIMSELF DISHONOURABLY	v.	bb ADDED +	6.31(6.32	=
w. UNDERTAKING WORK IF EXTRACTED	w.	=		OMITTED —
x. REPLACING PROFESSIONALS ON WHOSE WORK HE HAS CONSULTED	x.	=	6.30	=
y. ENTERING INTO ARTICLES WITH NON-MATRICULATED PUPILS				OMITTED —
	ADDITIONAL RESTRICTIONS PLACED ON:			
	y. SIGNING PLANS FOR WHICH HE IS NOT AUTHOR		6.8	=
	bb. OPENING OFFICE WITHOUT PRESENCE OF ARCHITECT OR QUANTITY SURVEYOR		6.28	=

GENERAL KEY

= SHOWS REPEAT
+ ADDED RESTRICTION
— RESTRICTION RELAXED

ADDITIONAL RESTRICTIONS PLACED ON:

6.10 CONSULTING WHILE ANOTHER ARCHITECT EMPLOYED
6.24 CONTINUED MEMBERSHIP OF PRACTICES
6.26 NAMES OF PRACTICES
6.27 NATURE OF COMPANIES FOR PRACTICE
6.29 TIME PERIOD FOR NOTIFICATION OF ADDRESS CHANGE.

A COMPARISON OF THE REGULATIONS GOVERNING THE PROFESSIONAL CONDUCT OF MEMBERS OF THE ARCHITECTURAL PROFESSION IN SOUTH AFRICA IN 1932 - 1933, 1968 - 1969, 1975 - 1976

and Quantity Surveyors' Private Act (No. 18 of 1927)', protection of the title of architect was achieved 11 years earlier than in Britain and was thus able to provide experience on which the R.I.B.A. could (and did) draw in the formulation of their act (Lewis, 1953, p.16). Legal recognition of the profession in both countries was accompanied by the sanctioning and expansion of the rules proposed over 100 years earlier. The comparison of regulations contained in the 1932-33, 1968-69 and 1974-75 handbooks of the Institute of South African Architects, illustrated on the transparency opposite, indic[illegible] that these rules and regulations remain substantially unchanged today despite the fact that:

1. The form of project organizations has changed.
2. The regulation of the quantity surveying profession is no longer accomplished through the Architects' Act.
3. The division of the profession into salaried and practicing classes has fallen away.

The raison d'être of these rules and regulations remains, even today, the preservation of what has been termed 'the personal/professional link between client and architect' (Crichton, p.11).

10.3 THE GRAINS OF A CONFLICT

It is pertinent now to turn to one of the items which delayed the registration of architects in Britain. This was the protest by over 70 eminent personages - amongst whom were the architects, G. Gilbert Scott,

R. Norman Shaw and Philip Webb and the leader of the Arts and Crafts Movement, William Morris - against registration and all systems of examination in architecture (Kaye, 1960, pp.138-139; Jenkins, 1961, p.224). This protest, which was made during the promotion of the 1891 Registration Bill, was published in the form of a 'Memorial' in The Times (March 3, 1891). An excerpt is reproduced below:

> 'To the President and Council of the Royal
> Institute of British Architects
>
> We, the undersigned, desire to record our opinion that the attempt to make Architecture a close profession, either by the Bill now introduced into Parliament or by any similar measure, is opposed to the interest of Architecture as a fine art.
>
> We believe that, while it is possible to examine students in construction and matters of sanitation, their artistic qualifications (which really make the Architect) cannot be brought to the test of examination, and that a diploma of architecture obtained by such means would be a fallacious distinction, equally useless as a guide to the public and misleading as an object for the efforts of the student.
>
> Architecture has for some time been less constantly associated with the sister arts of painting and sculpture than, in our opinion, is desirable and we think that examinations and diplomas, by raising up artificial barriers, would have a tendency still further to alienate these branches of art.

> We think that no legislation can protect the public against bad design;'
> (Kaye, 1960, p.138)

This protest, although it ignored the many unsavoury business customs which had arisen in the profession, nevertheless highlighted a possible conflict between the responsibilities of the architect as artist and designer, and his responsibilities as agent of the client.

In an age where the principles of Benthamism, self-help and individualism were prevalent it is not surprising that the response to this matter by the RIBA was to stress the need for the architect to be 'many-sided':

> 'He should be an artist, a man of science, and a man of business.'
> (RIBA Proceedings, 1891, New Series, VII, p.222)

This philosophy was adopted and promoted by the Modern Movement in spite of the fact that, from time to time, conflict between the interests of the architect as artist and as agent of the client manifested itself (van der Ryn 1966, p.42). An example in this regard was the conflict engendered within the Institute of South African Architects during the 1930's by the reticence of government departments to engage architects for public building projects. This reticence was a response to a series of articles, criticizing the uniformity of 'Government Architecture', which appeared in the South African Architectural Record at a time when architecture as an art was at its height in South Africa - a time when Rex Martienssen, the 'leader' of the

Modern Movement in South Africa was at the helm of the Record (Lewis, 1953, p.16; Herbert, 1975, pp.178-182).

Not surprisingly, the focus of the profession on the aptitude of the individual led to changes in the system of education for architects. The pupilage system, which was the norm at the beginning of the 19th Century, was gradually augmented - first by means of drawing schools and then by part-time university courses - until, by 1945, it was almost completely replaced by full-time university education in Britain (Jenkins, 1961, pp.160-177). It appears, from the published proceedings of the First International Congress on Architectural Education held in London in 1924 (Powers, 1925, pp.135-137) and from subsequent events, that developments in South Africa followed a similar pattern but with a time lag reducing from 30 to about 10 years. Although these educational changes consolidated the profession and brought about some improvement in the business practices of its members, they also reduced the opportunities for intimate contact between teachers, students and practitioners which provided the stimulus for the growth of artistic ability under the pupilage system.

10.4 PRESENT ATTITUDE OF THE ARCHITECTURAL PROFESSION

Despite the increased responsibilities inherent in both the change from project control to project management and in the demand for higher design quality, the architectural profession consistently asserts that designers must retain structural authority (Norberg-Schulz, 1963, p.203; Drage, 1969,

p.393; Shepheard, 1969, p.329; Crichton, circa 1970, p.6; McKenzie, 1971, p.10; Moross, 1972, p.1). The words of a past President-in-Chief of the Institute of South African Architects admirably reflects this consensus:

> 'In the case of buildings the leader must be the designer, usually the architect ... the leader must be the prime agent and accept ultimate professional responsibility towards the client.'
> (Louw, 1974, p.83)

This rigid defence by the architectural profession of its entrenched position is a world-wide phenomenon, at least with regard to the English-speaking countries (Tavistock, 1966, p.44; Burgess and Morris, 1972, p.17; MacEwen, 1976, pp.2 and 10). Although there is disquiet among architectural students during their education, once they graduate they readily accept the arrangement outlined in the above quote as propitious. Again this is more than a local phenomenon, having also been observed and commented on in Australia (Rutland, 1974, p.1). The propriety of the architect accepting both design and project management roles has also been accepted by leaders in the industry (Skeen, 1976, p.36) and even by the McKenzie Commission (1971, p.98), provided that it is associated with the 'necessary leadership qualities, education and training, and experience.'

Before the efficacy of this arrangement can be evaluated - in terms of both the dormant conflict between artist and agent in practice and the separation of theory from practice in education - the way in which the expanded responsibilities have actually been divided within the architectural profession needs to be investigated.

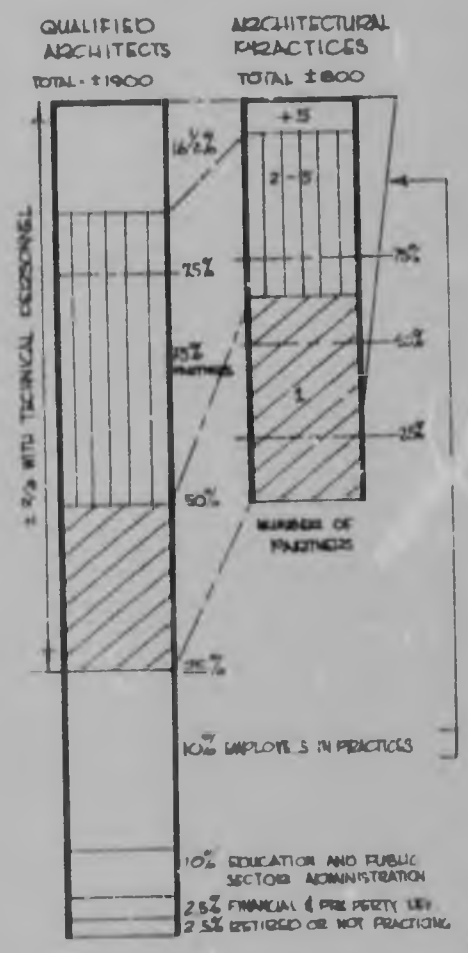
.5 ROLE DISTRIBUTION IN THE PROFESSION

Acceptance of the project management role by the profession as a whole does not necessarily mean that, in practice, every architect assumes this function in addition to his design responsibilities. It is the size and nature of architectural practices which determines the way in which tasks and responsibilities are shared out within the profession.

In South Africa the distribution of members of the profession is shown in the adjacent diagram which has been compiled using information from the following sources:

1. An analysis of questionnaires sent to architects undertaken by the McKenzie Commission (1971, pp.46 and 78-79).
2. A survey by the Department of Statistics (1974).
3. An analysis undertaken by the author, of the size of architectural firms in the Transvaal, the largest province of South Africa and the one containing about half the total number of architects.

The diagram illustrates how the profession is fragmented into a large number of small organizations, with approximately two-thirds of the organizations having only principal. It is interesting that the overall ratio of individual architects to architectural firms is approximately 1:2,4, virtually identical to that found in the United States of America in 1940 (Anglo-American Productivity Team, 1950, p.2). As indicated in the diagram, many architects have no assistants at all with whom they can share the work and very few



DISTRIBUTION OF THE ARCHITECTURAL PROFESSION IN SOUTH AFRICA

single-partner practices have any personnel qualified to accept any of the major responsibilities of practice. Therefore, a significant number of architects are virtually obliged to undertake both design and project management functions in the course of their business.

In architectural firms with more than one architect it is the organizational structure of the firm which determines how the functions are shared out between the members of the firm. However, an analysis undertaken by the RIBA and published as part of the report entitled 'The Architect and His Office' (1962, pp.53-54) revealed that, although two main types of work organization could be isolated, offices with fewer than 10 architectural members were generally characterized by:

> 'the centralization of managerial authority and design initiative, emphasis on decision making by the individual and personal service to the client, and little delegation to assistant architects.'

This finding, taken together with the small size of South African firms and the fact that many of the architects in these practices are partners - and tend therefore to have a high financial and commercial interest in the projects they personally introduce into the practice - leads to the expectation that delegation of a major function to others is the exception rather than the rule.

It is not surprising, therefore, that in a study of administrative practices in 100 architectural firms distributed throughout South Africa - presently being undertaken by Olley* for a Masters degree in Architecture at the University of Pretoria - preliminary results based on interviews held with over 80 firms indicate a very great reluctance among architects, especially those educated in South Africa, to delegate responsibility for any part of their work.

Under the new forms of project organization this implies the assumption of both design and project management roles concurrently by the bulk of the profession. The practice of individual members of the architectual profession therefore, to a large degree, reflects and reinforces the stance taken by the profession and supported by the building industry as a whole. The efficacy of this stance, with regard to ensuring both the competence and integrity of members of the profession, can however only be evaluated by studying the behaviour of architects in their dual role and the effects of this behaviour on their performance.

* Tony Olley is the partner in the architects firm of 'W.O. Meyer and Partners' whose management experience and expertise has had a large influence on the success of the firm, and with whom the author has had numerous enjoyable and fruitful discussions.

CHAPTER 11: THE ARCHITECT AS LEADER OF THE PROJECT GROUP

The assumption of the project management role in parallel with the design role results in the simultaneous existence of relations of 'responsibility' and 'advisability' between the architect and resource controllers in the project group. This provides the architect with a wider choice of behaviour than that which was feabible under 'the system' with its sequential order of processes. The actual form of behaviour chosen will depend on how, at a particular time, the architect interprets his role and the channels of communication which exist between himself and others in the project organization. The understanding, mores and personality of each individual will naturally influence his interpretation, and so it can be anticipated that every architect will, to a lesser or greater extent, choose a different form of behaviour in a given circumstance. However, two somewhat contradictory behaviour patterns can be isolated from the literature (McKenzie, 1971, p.16; Lerup, 1974, pp.100-102) - each of which is accompanied by its own particular effects on performance. One represents that of the 'master architect' and the other that of the 'mistress architect'.



11.1 THE MASTER ARCHITECT

The image of the architect as master is dear to the hearts of many architects and also to architectural journalists, novelists and educationists and is exemplified both in a cartoon by Caudill (1971, p.39) reproduced on the right, and in an anecdote about Frank Lloyd Wright recounted by Lerup:

'Frank Lloyd Wright once had a commission to build a house and a garden.



> He did so, but was displeased with the garden, decided to change it and arrived at the house with a group of students one weekend when the owner was gone, and rebuilt the garden - without consulting the owner.'

The master-architect, or 'prima donna' as he is often referred to, regards himself as the ultimate expert and adopts a potent form of behaviour in which opinion and command are integrated, and consultation is shunned. Information given by others is often misunderstood, ignored or actively disputed without reference to the facts available - a common occurrence as has been observed by Norberg-Schulz (1963, p 16), Freeman (1975, p.308) and O'Reilly (1973, p.6).

The criticism that architects are often 'unsympathetic' or tend to 'dominate' in a common one in the building industry (McKenzie, 1971, pp.15-16). Equally frequent are the complaints by architects that their instructions require an excessive amount of follow-up to ensure that they are implemented. The idea that these two complaints may be connected with the behaviour pattern of the master architect has, however, largely been unrecognized by the architectural profession.

The relationship between autocratic leadership behaviour and these complaints is, however, illustrated both in the experiment by Lippitt and White referred to in Chapter 9 and in a series of student projects which comprised part of the course in Organization and Management at the University of the Witwatersrand (see Appendix 5). In the Lippitt and White experiment the autocratic behaviour of leaders resulted in either apathy or rebelliousness on the part of group

members which, in both cases, was accompanied by a lack of commitment to the implementation of decisions in the absence of the leader (Spratt, 1958, pp. 32-33). A number of the student projects mentioned above revealed a similar association between autocratic leadership behaviour and reticence on the part of group members to commit themselves to decisions reached, as is reflected in the following example.

The example is concerned with a meeting between the architects and the tenants of a partially completed shopping center. The purpose of the meeting was to finalize tenant requirements in connection with a hairdressing salon and to make decisions concerning the interior and shopfronts of the salon. The chairman, who was architect for the shopping centre, was observed to conduct the meeting in a way which gave very little scope for the expression of opinion or decision by others when such expression appeared to threaten the integrity of the design created by himself. The two final year architectural students who recorded this meeting, comment as follows:

> 'Although the tenants appeared to be satisfied with the decisions reached at the conclusion of each subject for discussion, the continual dissension expressed by them seemed to indicate a general preference by the tenants for avoidance of conflict rather than for sincere satisfaction in decisions reached.' (A. Bentel and R. Grinker, 1976)

The master architect flourishes in an environment where building needs and technology are fairly static and where matters of architectural style are the sole province of the esthete. However, where the success of a project is dependent upon the participation and commitment of project members, the autocratic behaviour of the master architect is likely to have unfortunate

side effects. These include not only the lack of commitment discussed above but also a reduction in the capacity of the architect to create designs which will reconcile the conflicting requirements of the participating resource controllers.



2 THE MISTRESS ARCHITECT

> 'By the end of a job, the similarity to that original solution is remote for, meantime, other hands have mauled it, fingered it, pushed it and pulled it, and finally soiled it. Repeat this process, job after job, time after time, and no wonder the urge to experiment is blunted, no wonder the creative desire becomes jaded, ceases to be fresh and, preferring to remain safe, descends from the provocative or experimental to the obvious, from the trouble-maker to the money spinner.' (Gotch, 1969, p.158)

The style of behaviour of the mistress architect is a servile one in which the individual sees himself as an instrument for carrying out the wishes of others. The maintenance of harmonious relationships between resource controllers (especially the building sponsor) and the architect are regarded as being of utmost importance. Much comment has been made about the failure of architects 'to give leadership' in project groups and their reluctance to accept responsibility for communication and design co-ordination (RIBA, 1962, p.180; McKenzie, 1971, pp.12 and 16; Pitt, 1972, p.47; O'Reilly, 1973, pp.6-7). A leading services engineer* has referred to the hesitancy of many architects to commit their ideas to paper while the co-ordination and checking of sub-contractors' designs and shop drawings is increasingly being relegated to the main

* H.J. Spoormaker of Ove Arup and Partners, at a student seminar organized as part of the Organization and Mangement course outlined in Appendix 5.

contractor. On the other hand, there has also been criticism of the short-sighted and unbalanced nature of designs created by architects - especially with regard to overall function and costs (Weston, 1959, p.11; Guedes, 1975, p.81). Clarke (1976. p.14), writing of the deteriorating environment in South African cities, postulates: '...the truth is that architects may have become cowed by their clients.'
This contention is reflected in the complaints by architects that their advice is increasingly being undervalued or ignored.

Research into the behaviour of individuals in their social environment reveals a number of possible explanations for the problems mentioned above. The first of these is that interaction with others during the design process interferes with the performance of the individual; the second is that the individual becomes transposed into what Milgram (1974, p.133) terms 'the agentic state' which arises when the individual submits himself to the authority of another; the third is concerned with the pressures towards conformity experienced by individuals when they join groups on which they are highly reliant for approval.

11.2.1 Interaction with Others:

In a study of a group designing a house, it was observed that:

> 'The main difficulties the group experienced were recalling their choices of options after more than about two steps, remembering what the decision-areas were and whether they were dependent upon one another and finally reaching options on the opposite side of the circuit that were consistent.'
> (Luckman, 1966, p.10)

It appears that these difficulties may arise because:

1. Inter-member communication cannot replace the complex neural processes which occur in the mind of the individual.
2. The quality of thought of an individual tends to decline in the presence of others.
3. The sequence of activities and emotions which comprise the creative process of the individual are disturbed by interactions in the group.

Summarizing a broad spectrum of research findings Sprott (1958, p.114) concludes:

> 'When co-ordinated planning is needed the individual working alone may be more efficient than a group; where a division of labour is possible, or where you want a number of new ideas, or criticism on the part of people who may not be particularly productive themselves, two heads may be better than one.'

11.2.2 The Influence of Authority:

In a remarkable experiment to investigate how people react to authority, Milgram (1974) subjected randomly chosen individuals to an experiment in which they were invited to act with increasing severity against another person masquerading as a learner, under the pretext of taking part in a learning experiment. In the laboratory context it was found that many people were prepared to administer what they believed were severe electric shocks to the learner - despite ever-mounting countervailing pleas by him and despite their own moral

principles - because of their initial commitment to follow the orders of the experimenter, to be obedient, and their need to reduce cognitive d'ssonance with their previous actions. For many subjects the learner became simply an unpleasant obstacle interfering with the attainment of a satisfying relationship with the experimenter. Milgram concluded that there is a propensity for people to accept definitions of action provided by legitimate authority even if this means abandoning responsibility for the content of the actions that the authority prescribes and suffering intense anxiety because such abandonment conflicts with the desires of the autonomous individual.

Many of the behaviour configurations exhibited by Milgram's subjects resemble closely the behaviour characteristics of the mistress architect. An example is illustrated in the two quotations below.

> 'Faced with this fragmented client situation, the architect did not act to correct it, and went on with his design work.'
>
> - O'Reilly (1973, p.6) commenting on the observed behaviour of an architect receiving a commission from a client.

> 'The subject typically wishes to perform competently and to make a good appearance before this central figure... He attends to the instructions, concentrates on the technical requirements of administering shocks, and finds himself absorbed in the narrow technical tasks at hand.'
>
> - Milgram (1974, p.143) commenting on the behaviour of most of the subjects in the experiment outlined above.

There exists little evidence to suggest that the majority of architects are

any more resistant to the force of authority than Milgram's subjects. Considering that the authority of resource controllers in project organizations, and particularly that of the building sponsor, is greater than that of the experimenters in Milgram's experiment - being enhanced by the dependency of the architect on the resources possessed by these individuals for his existence and his work - it is not surprising that the following situation is one which often pertains:

> 'The client, when he comes to an architect is on top of the world and has money to invest; the architect is in a subordinate position and is inclined to play it safe.'
> (McKenzie, 1971, p.12)

11.2.3 The Influence of Conformity:

Although obedience to authority and conformity with group norms differ in certain significant respects, both result in the abdication of initiative to an external source (Milgram, 1974, pp.113-115). The powerful influence of the need to conform is illustrated in the experiments of Asch (1951) in which subjects, when placed in a group which was secretly briefed to select the wrong answer to a simple problem, were consistently found to alter their opinion so as to conform with the rest of the group. This finding is supported by the results obtained in a variation of Milgram's basic experiment. In this variation a confederate to the person administering shocks to the learner was introduced. It was found that the presence of this confederate introduced conformity pressures which, to a considerable extent, could mediate the impact of authority.

Therefore, the attitude of subservience of the mistress architect may also derive from his need to be accepted in the project group. This need may be particulary strong in situations where the architect feels a strong moral commitment to a group, as is often the case in what is known as 'advocacy planning', where work is done directly for the people who are the immediate users of the products or environments being designed rather than for an intermediary sponsor.

In the light of the above three interacting pressures on the architect, it is not surprising that the style of behaviour of the mistress architect is more common than that of the master architect. The mistress architect can be effective in environments where either there exists what Giedion (1954, p.760) terms a 'unity of culture' with little need for innovation and a high level of commitment to the production task, or where a beneficient and all-powerful patron commissions the architect. However, where the success of a project is to some degree dependent on the reconciliation of conflicting interests (especially where some of these interests are inadequately represented), the submissive behaviour of the mistress architect is likely to be inadequate, giving rise to consequences which have been observed to include the distortion of requirements, the loss of good design ideas, delays, abortive work, and frustration of those involved and of the public at large (McKenzie, 1971, p.18; O'Reilly, 1973, p.7).

11.3 ORGANIZATIONAL HEALTH AND THE PERFORMANCE OF THE ARCHITECT

Although the two extreme patterns of behaviour exemplified by the master

architect and mistress architect are academic contructs rather than common conduct, they do serve to highlight the relationship between behaviour and performance. In practice, however, most individuals will attempt to combine the advantages of the one with the advantages of the other in an attempt to be as effective as possible. This gives rise to the 'juggler-like ability' which so impressed the psychologists observing the behaviour of architects in MacKinnon's study (Broadbent, 1973a, p.4). However, this 'juggler-like ability' must, at the same time, be linked with various phenomena amongst which the following are probably the most common:

1. Dissatisfaction, by those who receive messages from the architect, with the quality of the communication process (McKenzie, 1971, pp.15-16).
2. A lack of feedback and appraisal in both design and project management functions (Affleck, 1968, p.258; McKenzie, 1971, p.94; Burgess and Morris, 1972, p.5) and, as innumerable activity-sampling exercises in architects' offices have revealed, a severe lack of time for 'knowledge' activities which are developmental in character (RIBA, 1962, p.218; Chan, 1968, p.342; Drage, 1969, p.397; Rutland, 1972, p.11).
3. The evolution of a non-responsible informal system which inevitably produces, 'acrimonious attempt to place, or, more usually, to avoid, responsibility' (Tavistock, 1966, p.51).
4. A growing lack of mutual confidence between the parties involved in building even in contracts regarded as 'good' by those involved (Norberg-Schulz, 1963, pp.13-14; Tavistock, 1966, p.17; McKenzie, 1971, p.28).

These phenomena, representing what Likert (1967, pp.75-77) terms 'intervening

variables', can be assessed against the criteria outlined below to provide a measure of what has become known as 'organizational health' (Schein, 1965, p.118; Drucker, 1974b, p.46). Bennis (1962, p.273) proposes the following three criteria of health:

1. Adaptability - the ability to solve problems and to react with flexibility to changing environmental demands.
2. A sense of identity - knowledge and insight on the part of the organization of what it is, what its goals are, and what it is to do. Pertinent questions are: to what extent are goals understood and shared widely by members of the organization, and to what extent is self-perception on the part of the organization members in line with perceptions of the organization by others?
3. Capacity to test reality - the ability to search out, accurately perceive, and correctly interpret the real properties of the environment, particulary those which have relevance for the functioning of the organization,'

A fourth criterion which is often mentioned, one which in effect underlies the others, is a 'state of integration' among the subparts of the total organization, such that the parts are not working at cross-purposes.

The health of an organization not only depends upon the performance of its leadership but also provides a measure of the effectiveness of that performance and, therefore, of the competence and integrity of the individuals who provide the leadership. Unfortunately, as this measure involves people as testing agents, it is particularly prone to human error and bias. However, in

situations where goals are neither static nor widely accepted - as was the case in times when patron's requirements for clearly definable building types in one or other accepted architectural style were accomplished by means of traditional craft skills - what Thompson (1967, p.87) terms 'social testing' is the only valid means of evaluating the overall performance of the 'leader of the building-team'.

Based on the criteria of organizational health outlined above, the phenomena which are associated with the 'juggler-like ability' of the architect reflect rather badly on the leadership performance of members of the architectural profession. Professor Harper of the Department of Building, University of Manchester Institute of Science and Technology (1972, p.39) confirms:

> 'There has in fact ... been a decline in standards of ethics, service and trust in recent years.'

This, according to Hanson (1974, p.163), is a worldwide phenomenon which, in the view of both Higgin and Jessop (1965, pp.51-52) and Bowley (1966, p.394), is positively correlated with the demise of 'the system' and the introduction of more flexible forms of project organization in which the architect has greater freedom of choice in role behaviour, and leadership style. Unfortunately 'juggling' in this situation of greater freedom appears automatically to degenerate into 'laissez-faire' with architects seldom able to operate as 'integrated, relaxed, energetic, creative adult professionals, at ease with themselves, their clients, their society and its future' (Mather, 1974, p.73).

An anomalous situation therefore arises in that the leadership behaviour of the architect in the new forms of project organization negates the purpose for which

these new forms were created - that is to provide the flexibility and commitment required for innovation.

11.4 REACTION OF THE PROFESSION

In order to be able to ensure the competence and integrity of its members in this new situation the architectural profession has focused its attention on two activities:

1. Improving education at the undergraduate level and, more recently, organizing and running programmes of continuing education for practicing architects, particularly in connection with management subjects.
2. Becoming involved in monitoring and controlling the performance of architectural practices and in gathering, classifying and distributing information which may assist architects in their practices.

11.4.1 Education:

Worldwide, the matter of education of architects has received considerable attention (van der Ryn, 1966; Rutland, 1974; Guedes, 1975) and continues to do so as is evidenced by the appointment, in South Africa, of a government commission (under the chairmanship of Dr T.I. Webb, Director of the National Building Research Institute) to enquire into the 'education and training of architects'. However, despite this attention and the introduction of new courses such as the one described in Appendix 5, architectural schools still seem to be floundering for direction and the majority of practicing architects remain as reticent as ever to participate in programmes of continuing education.

The solution to this problem advocated by the Professional Competence Group of the RIBA, and published in the September 1975 issue of the RIBA Journal (pp.15-26), was a closer contact between architectural schools, practitioners and researchers. Methods for implementing this idea, were, however, not discussed and, with regard to continuing education, the point was made that what was required besides massive injections of government money (taxpayers' money) was 'a new philosophy in the profession'. Remembering that close contact between education and practice was a feature of the apilage system which became displaced with the rise of professionalism in architecture, perhaps what is required is not so much a new philosophy as a return to an older philosophy in which the architect as artist is given his correct place.

11.4.2 Practice Information and Control:

Among the most recent comprehensive recommendations in this regard were those put forward by the Professional Competence Group of the RIBA (1975). These recommendations suggested an intensification of many of the support activities which were already being undertaken by the RIBA - as a result of an earlier report entitled 'The Architect and His Office' published in 1962 - and which had been exported to South Africa by means of the RIBA 'Handbook of Architectural Practice and Management' and the appointment of its editor (until 1971) as Director of the local Institute. In addition, more intensive monitoring and control of the performance of architectural practices was suggested. In South Africa, the concern by leaders of the profession with their environmental responsibilities has led to the formation of, an 'Environmental Planning Professions Inter-disciplinary Committee' - consisting of representatives of the

civil engineering, landscape design, town planning and architectural professions - which has set itself the task of investigating methods of controlling the designs of the professions with regard to their environmental impact.

Unfortunately, the implementation of all these controls not only requires considerable amounts of finance and a great deal of clerical work but also suffers from severe restraints as far as efficacy is concerned. These restraints derive from the fact that each profession involves an art in which the individual approach of a skilled practitioner to the task immediately in hand is of first importance. As Roscoe Pound (1949, p.352) puts it:

> 'He cannot be made to a model so that everyone can have the benefit of a professional man exactly as good for every purpose as everyone else [...]. The required combination of training, native skill and experience makes each practitioner in some measure and in varying degrees unique.'

Also, as control is incapable of influencing designers at the crucial, early, formative stages of a design, it tends to give rise to confrontation rather than reconciliation in the resolution of conflicts.

It is apparent, therefore, that both educational strategies and the implementation of practice aids and controls have limitations as far as impoving the overall performance of members of the architectural profession is concerned. However, before any suggestions can be made as to how these limitations can be overcome - or how the need for such procedures can be reduced, if not eliminated altogether - the reasons for these limitations must first be studied.

CHAPTER 12: LIMITS TO LEADERSHIP

'More is done, and done better and more easily when one man does one thing according to his capacity and at the right moment.'
(Plato: The Republic)

'The architect is still an ideal, a da Vinci among lesser mortals: artist, technologist, humanist, scientist, a capitalist in business, a Marxist in deference to the public good. Not surprisingly it cannot be done.'
(The Economist, 1966)

What makes for effective leadership performance has long been a subject for speculation and research. A review of the more recent research highlights two areas which have some bearing on the problems outlined in the previous chapter. The first has to do primarily with competence, that is the nature of the tasks facing the individual accepting leadership and its relationship to his capabilities; the second is concerned more with integrity, that is the compatibility of responsibilities and behaviours which comprise the leadership function in decision-making groups. Two approaches to leadership are discussed below, the first focusing on competence and the second on integrity.

12.1 THE SITUATIONAL APPROACH TO LEADERSHIP

12.1.1 Evolution:

Early approaches to leadership searched for those individual characteristics or traits which typify leaders. The many attempts made to pin down the qualities which mark out 'the leader' were, however, largely unsuccessful. The 'trait approach' was followed by the 'leadership styles approach' which focused not on the physical or personality characteristics of the leader but on his pattern of leadership behaviour and its effectivenss when compared with other styles of behaviour. This approach was curtailed by a stream of studies which showed no differences between the effects of different styles, or effects in totally opposite directions to those expected. The reason for these findings was, in the 1950's, traced to the relationship between individual behaviour and attributes and the variables in the situation confronting the leader, one of the most important of which is the task of the group. The 'situational approach' which resulted from this insight is still perhaps the most popular perspective on leadership today and provides a useful tool to investigate the probability that one individual is able to provide leadership in groups whose task is both to create, and to commit to implementation, solutions to design problems.

12.1.2 Design and Management Tasks:

The leadership function in the groups mentioned above (and discussed more fully in Chapter 9) involves both design and project management. As recent thinking, especially in the architectural profession, has emphasized the similarities

rather than the differences between these two activities it is necessary to reiterate the essence of each.

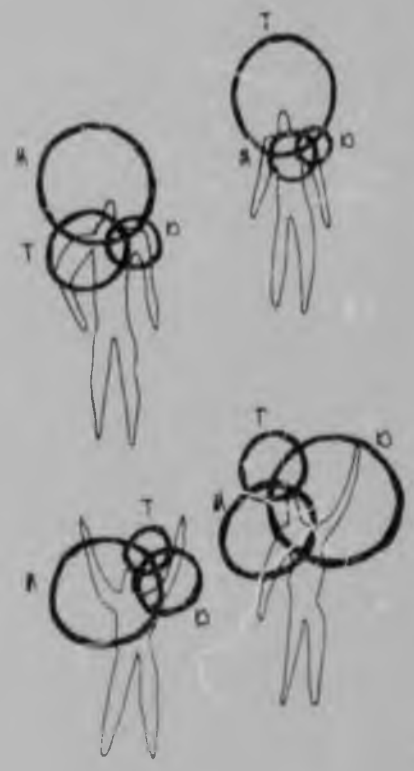
Design involves integrating information and ideas (the content of decision-making) in a concept that achieves a synthesis of objectives and resources. Performance is assessed by the extent to which a synthesis is achieved and the degree to which the synthesis represents an advance in the development of the art. The preservation of the synthesis therefore becomes an important issue which, of necessity, fixes limits within which the decisions of others must be constrained. As Charles Moore says:

> '... what you're doing is making a scheme for directing the energies of other people so that they build something instead of something else. And, just how that's done in an altogether communal and non-hierarchic way, I can't imagine.'
> (Cook and Klotz, 1973, p.224)

Project management, on the other hand, involves regulating and controlling activities, resources and human interaction during the process of decision-making in order to facilitate the achievement and implementation of the design synthesis. Performance is assessed on the basis of the amount of resources required and the maintenance of a state of organizational health in the project organization and in the industry as a whole. Constraints imposed on decisions of others must be flexible, serving merely to prevent those decisions which may prejudice the achievement and acceptance of a satisfactory overall solution.

.1.3 Human Capabilities:

Every human being possesses his or her own temperament and his or her own set of values which, to a greater or lesser extent, either enhances or limits the performance of the individual in the tasks which he or she undertakes. In the discussion which follows the tendency for creative designers to have temperaments and values which are different from those possessed by successful managers is discussed.



T: TECHNOLOGY
M: MANAGEMENT
D: DESIGN

EACH PERSON HAS A DIFFERENT 'LONG SUIT'

CAUDILL

Creative Designers:

A survey of the research undertaken into the personalities of creative architects, especially that incorporated in the massive MacKinnon study into the nature of creative people, reveals sufficient evidence to conclude that creative architects, when compared to 'ordinary practitioners', are generally 'lower in sense of responsibility, in socialization, self-control and tolerance, in wanting to create a good impression, in sense of community and in conformity.' (Broadbent, 1973a, pp. 1-24).

Not only do these characteristics appear to be connected with the possession of high spatial ability but they also emerge as functional when considering the nature of the creative process. As pointed out in Chapter 4 and reiterated by Miner (1975, p.180) and Colman (1974, p.22), the creative process is accompanied by:

intense emotions,

singleness of purpose and itrant attitude,

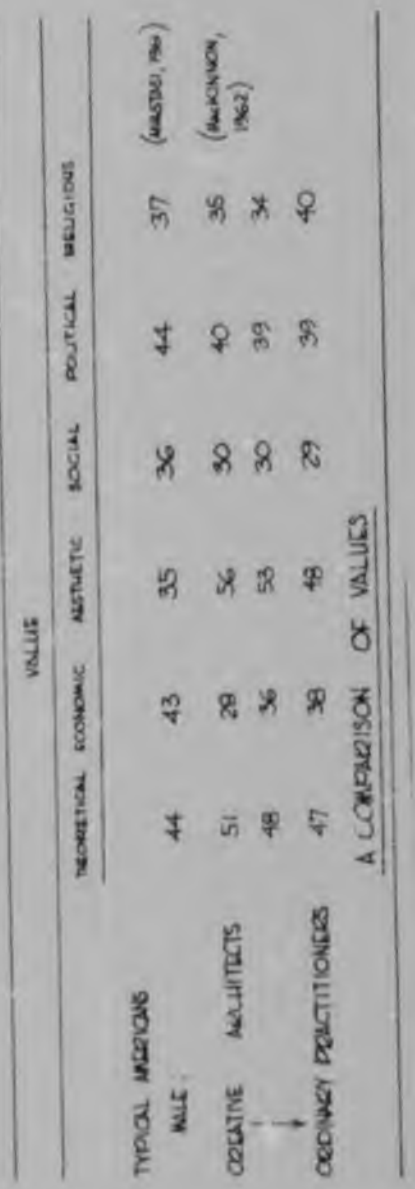
intellectual pre-occupation,

a tendency to live in the future,

all of which reflect the temperament outlined above and in addition indicate a synergistic relationship between the personality of creative architects and the creative process.

The study of values undertaken in the MacKinnon survey revealed that creative architects attach less value to economic, social, political and religious goals than the typical male American (Broadbent, 1973a, p.15). A comparison of these values is illustrated in the adjacent diagram. There is little evidence to indicate that the situation in South Africa is any different. For instance, the presence of political aspirations - other than the promotion of architecture as a national asset - among South African architects is as uncommon today as it was 40 years ago when Lewis, the first registrar of the Institute of South African Architects, felt it an aspect important enough to comment upon in his review of the first 10 years of the Institute (Lewis, 1937, p.147). The high theoretical and aesthetic concerns of the creative architects, as reflected in the diagram, are exemplified in a comment by Gueder:

'... I've always argued that the drawings are more important than the buildings themselves.'
(Menge, 1975, p.13)



Successful Managers:

Miner (1975, pp.276-280) refers to his own research and that of others which

indicates that the following interdependent abilities and motives are common amongst those who learn to manage effectively:

1. The ability to communicate verbally and to deal with routine matters in a structured manner.
2. The ability to vary behaviour and subdue emotions in order to be able to cope with the emotional reactions that inevitably occur when people work together.
3. An active desire to compete even though this implies subjecting oneself to the authority of another.
4. A strong motivation to influence the performance of others and enjoyment of developing and stimulating them to achieve better results despite the fact that this gives rise to conflict situations.
5. A willingness to take responsibility for the productivity of others.

These characteristics reflect those postulated by Fayol over 50 years ago (1949, p.50) but provide a sharp contrast with the temperaments and values established as representing those of the creative architect. The findings of Miner (1975, p.307) - in connection with a group of research scientists - even showed that those with low overall 'motivation-to-manage' scores were actually more successful in creative work than those with higher scores.

12.1.4 Competence:

Although it is accepted that there are people who are capable of developing totally integrated personalities - thus fulfilling the Renaissance ideal of the 'universal man' - generally each individual has, in the words of Caudill (1971,

p.235), his 'long suit'. This 'suit' is made up of the temperament and values possessed by the individual, which equip him to undertake certain tasks more successfully than others. Although psychological testing is, even today, unable to accurately measure either temperament or values, the research findings discussed above reveal sufficiently strong a convergence to conclude that the temperaments and values generally exhibited by those who provide creative leadership in design are at least significantly different from, in not antithetic to, the traits of those who make competent managers. Consequently, it is only the rare individual who can be expected to be fully proficient in both design and project management. Whether or not such prodigies possess the flexibility to undertake both tasks concurrently is the topic discussed in the following section.

12.2 THE FUNCTIONS APPROACH TO LEADERSHIP

In the previous section the possibility of one individual possessing the traits which would enable him to provide competent leadership in groups whose task is both to create and to commit to implementation solutions to design problems was investigated. The question in this section is whether or not there exists any incompatibility in the behaviours required of individuals providing unitary leadership in such groups. To answer this question it is necessary to put aside the assumption that leadership is centered in one person, an assumption which characterizes the situational approach discussed above.

It is the 'functions approach' which shifts the emphasis from the person to the communicative behaviours performed. In this approach leadership is seen as a

function which is distributed amongst the members of a group (Schein, 1965, p.128; Miller and Rice, 1967, p.20); it is a function not necessarily, or even usually, exercised by one individual. At different times and in different circumstances various group members will display leadership in that their behaviour is regarded as right and they are followed by other group members. Bavelas (1960, p.21) states:

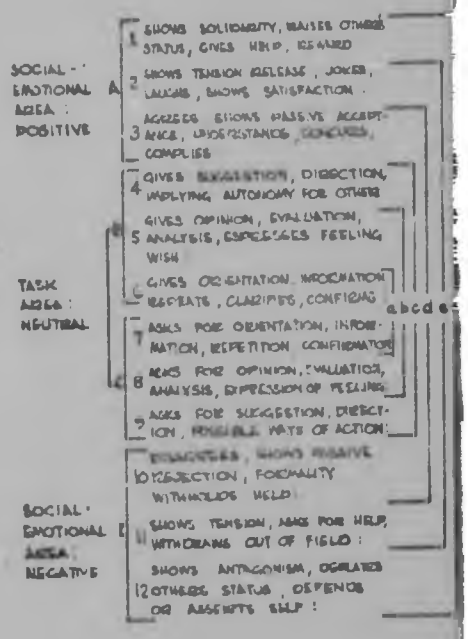
> 'Under this concept it is not sensible to ask of an organisation "who is the leader?" Rather we ask "how are the leadership functions distributed in this organisation".'

In the building industry this question has been almost completely ignored despite the fact that the still popular search for the 'head of the building team' has proved fruitless.

A large number of leadership functions have been postulated in the literature. These are typified by labels such as figurehead, monitor, disseminator, spokesman, entrepreneur, negotiator and so on. Benne and Sheats (1948) were among the first to put forward a classification scheme which enabled some grouping of these functions to be accomplished. Although their classification scheme included three types of roles - group task roles, group building and maintenance roles, and individual roles - it is only the first two which relate to group leadership. To obtain greater clarification it is necessary to turn to work done in the early 1950's and subsequently.

12.2.1 Bales' Study:

The major early work into leadership role differentiation was that undertaken by Bales and his colleagues in the early 1950's. This work involved the study of interactions in unstructured groups engaged in the solution of what were termed 'full-fledged problems'. As can be seen from the adjacent diagram, Bales classified interactions around a task/social-emotional dimension with information-flow and advice (items a, b and c) being relatively neutral task components and decisions (item d) having social-emotional overtones, either positive or negative. In essence, therefore, the greater the autonomy permitted by the communication, the smaller was the intensity of the social-emotional component.



KEY

a PROBLEMS OF COMMUNICATION (INFORMATION)
b PROBLEMS OF EVALUATION (CONCLUSION)
c PROBLEMS OF CONTROL (CONCLUSION)
d PROBLEMS OF DECISION (DECISION)
e PROBLEMS OF TENSION REDUCTION
f PROBLEMS OF REINTEGRATION

A POSITIVE REACTIONS
B ATTEMPTED ANSWERS
C QUESTIONS
D NEGATIVE REACTIONS

BALES' 'INTERACTION PROCESS ANALYSIS'

Bales and Slater (1955) discovered, through the use of Bales' matrix called the 'Interaction Process Analysis', that leadership duties are often divided between two group members. It was found that the leader who emerges as the 'task' leader was not necessarily the same person who emerged as the 'socio-emotional' leader. In fact, the two roles were generally found to be taken by different persons with most of the acts of the 'task specialist' being contained in the task categories and most of the acts of the 'socio-emotional specialist' in the socio-emotional categories.

Although, it is held by some - for instance Fisher (1974, pp.83-84) - that the dual leadership phenomenon is a product of the captive groups used in Bales' experiments, the major criticism of Bales' work is that his attempts to isolate patterns of behaviour typical of the two 'specialists' proved disappointing and

that, therefore, the system of differentiation used lacked any practical significance for role identification (Sprott, 1958, p.133; Limerick, 1975a, p.2). Although a subsequent revision by Bales (1970) of his Interaction Process Analysis categories shows less of a clear distinction between socio-emotional and task comments, for a more definitive work on the subject, we have to turn to the work of Limerick undertaken at the University of Strathclyde, Glasgow. As this work constitutes a development and reinforcement of the ideas of Paterson - with whom Limerick worked in Glasgow in the late 1960's - it is advantageous to discuss the work of Paterson before proceeding to the findings of Limerick.

12.2.2 Paterson's Roles:

Paterson (1966, pp.184-187) suggests that roles in groups are of 5 kinds, each with its own expected pattern of behaviour. The 4 stages of decision-making discussed in Chapter 4 constitute the basis of 4 of these roles while the remaining role is taken up by all those who follow the other roles at any particular time. The four leadership roles - termed eccentric, exemplar, indominus and exdominus - are briefly discribed below:

1. The eccentric role which corresponds with the 'entrepreneurial' function isolated by March and Simon (1958, pp.187-188), is concerned with moving the group towards new fields of principle and action. Behaviour involves the expounding of belief and behaviour beyond the norms of the group, yet acceptable when performed by the role holder.
2. The exemplar role is concerned with the reconciliation of conflicting opinions and the creation of a solution which the whole group can

agree. The behaviour expected of the exemplar is quiet and unobtrusive with a heavy reliance on matters of principle. In the words of Calderwood (1958, p.14) 'This leadership is not tyrannical or influential but is rather the true leadership of understanding.'

3. The indominus role is concerned with the internal relations among the members of the group itself so as to maintain order. It implies structural authority in that it requires the role holder to act as manager in relating one member of the group to another in their discussion and action. The behaviour of role holders is expected to be vociferous, but not bellicose.
4. The exdominus role, overlapping with the 'investing' function of March and Simon, is concerned with the external relations between the group and other groups and also involves structural authority on the part of the role holder. The behaviour expected is also vociferous, and sometimes even bellicose.

In regard to the circumstances under which each of these leadership roles becomes operative Paterson states:

> 'Everyone has sapiential authority in that he has expertness of some kind, but the sapiential authority of the eccentric, in particular, is recognized at the stage of information. When the group moves on to the conclusive stage, the role of exemplar is necessary, for here the group has to agree on a matter of principle which is essentially a conclusion, necessary to policy on action. This is to say, in these two stages of information and conclusion, sapiential authority is exercised through the two functions fulfilled by the eccentric and the exemplar. When it comes to establishing

policy, that is direction of the committee in action (the "right thing to do"), structural authority comes into play. But here there must be collective responsibility in agreement, and structural authority is required to relate one person to another. This is the function of the indominus, who controls the internal relations among the members. The last stage, the decision on execution of the directive policy, is clearly the function of the exdominus, again wielding structural authority.'

Having discussed the essence of Paterson's work, we now have an adequate background to appreciate Limerick's research.

12.2.3 Limerick's Study:

In order to achieve greater clarity in the matter of leadership role differentiation in decision-making groups Limerick, using a system of interaction analysis based on Paterson's axes of 'sapiential' and 'structural' authority, undertook a study of 26 6-man problem-solving groups. The groups comprised 108 managers of various levels of seniority in a Scottish plastics firm, all of whom were participating in 'team development seminars'. Limerick found that role differentiation in participative social systems could, indeed, be considered as taking place around Paterson's axes of 'sapiential' and 'structural' authority and that two dominant roles emerge in most groups. These two roles - task leadership and maintenance leadership - correspond with the exemplar and indomini roles described by Paterson.

Comparing the number of commands and advisory statements accepted and the number of opinions or commands received by group members, Limerick established that group members are reluctant to place both exemplar and indominus functions in the hands of one individual. Whereas the exemplar role tends to be assumed by the individual with the greatest knowledge of the principles which underlie the discussion in the group, the taker of the indominus role tends to be either the person with the greatest authority in the overall system from which the group is drawn or, where such a person is lacking, the person whose behaviour is most congruent with the use of commands and who shows a real interest in the maintenance of the group.

The diagram on the right illustrates the findings of the study - which indicate that the assumption of the exemplar role virtually eliminates the possibility that the commands necessary to control interaction in the group, will be accepted if they emanate from the individual assuming this role. Conversely, the assumption of the indominus role considerably reduces the possibility that advisory statements will be accepted if they emanate from this role holder. A membership satisfaction questionnaire administered to 8 of the 26 groups indicated that when no clear exemplar emerged in the group the level of satisfaction with group membership fell. In the tower-building exercise mentioned in Chapter 9, it was found that when more than one exemplar emerged in the group, the actual tower-building operation was characterized by lack of commitment as each exemplar attempted to raise the status of his design when difficulty was experienced in constructing the composite scheme. The end result was also a lack of satisfaction with group membership. Consequently, not only fused leadership but also lack of clear exemplarship can be regarded

	COMMANDS	ADVICE
INDOMINI	48%	2%
EXEMPLARS	0%	10%
OTHERS	20%	2%

LIMER. IX

PERCENTAGES OF INFLUENCE STATEMENTS ACCEPTED FROM INDOMINI AND EXEMPLARS

as disfunctional.

It may be argued that since these findings were obtained in minimally structured groups undergoing training they apply only to such groups. However, there is evidence to suggest that role differentiation also occurs in successful unstructured, untrained groups. For instance, it appears from studies undertaken by Cawood that the reduction in association between content and process behaviours associated with even minimal training tends to persist, an unlikely phenomenon were the disassociation not found to be functional (Limerick, 1975a, p.17).

Possibly a more serious accusation is that the dominance of the exemplar and indominus roles in the findings discussed above are due to the nature of the problems selected and to the fact that the groups were not concerned with implementation of the decisions reached. In this regard it is interesting to note that Limerick refers to preliminary evidence from Cawood's later studies (not published at the time of writing) which indicates a third role which combines commands, hypothetical imperatives and writing. The similarity between this role and that termed 'technologist' by Caudill (1971, pp.126-127) is striking:

> 'The technologist is both product and process minded, concerned with a practical purpose - putting things together ... doing the working drawings, writing the specifications and serving as the construction administrator.'

This role appears to resemble that assumed by the quantity surveyor in project organizations constituted under 'the system'. It is concerned with the external relationship between the group and external groups and parallels the exdominus role of Paterson.

The dominance of the exemplar and the indominus appears, however, to correspond with the situation in representatives' groups. It will be appreciated that in representatives' groups - such as those which characterize the more co-operative forms of project organization in the building industry - each representative must act as both eccentric in, and exdominus of, the project group if he is to justify his presence in the group However, in his eccentric role, each representative also acts as exdominus of his own enterprise. This, as pointed out earlier, not only highlights the need for group exemplarship but also magnifies the role of the indominus.

The criticisms that can be levelled at Limerick's work are, therefore, not pertinent in the context of this thesis. Contrariwise, there is a large amount of evidence, both theoretical and practical, which supports the validity of the idea of dual task and maintenance leadership.

12.2.4 Further Evidence:

Although somewhat tangential, the work of Dr. Meredith Belbin of the Industrial Training Research Unit at Cambridge, England, reinforces the idea of dual leadership (Chambers, 1973, p.22). Belbin, monitoring 6-man problem-solving teams whose members were participants in executive development courses at the Henley Administrative Staff College, found that successful teams usually comprised one 'very bright creative analyst' and a slightly less intelligent but still above average chairman who was a 'good user of resources and allows others to shine'. He also found that groups in which the majority of members possess high analytical ability tend to perform rather badly. He attributes this lack

of performance to a phenomenon also observed by the present author in groups of architectural students participating in the group exercise mentioned above, that is that all group members are preoccupied with the content and tend therefore not to draw on experts.

The instrumentality of the dissociation of content from process behaviours in decision-making groups is also corroborated by experience in the normal working environment. Examples range from the eminently successful Apollo Program to put a man on the moon (Gemmill and Wilemon, 1970, p.19) to the innovative architectural practice of Robert Venturi and Denise Scott Brown (Cook and Klotz, 1973, pp.259-260). Personal discussions by the author with eminent practicing architects and engineering consultants, during which the concept of divided leadership was raised, consistently brought forward reminiscences about situations which were elucidated by the theoretical findings outlined above and which, in turn, supported these findings. The student projects mentioned in Chapter 11 also revealed a number of instances where divided leadership was very positively associated with what was referred to earlier as 'organizational health'.

However, perhaps the most dramatic support of the findings is contained in the remarks of two architects (one Canadian and one South African), both of whom are recognized for the design quality of their buildings, the harmony and efficiency which characterizes their projects and their implementation of the concept of divided leadership.

Affleck (1968, p.259), referring to his experience with the Place Bonaventure project, writes:

'Actually by dropping the pretence of being master of the whole situation, the architect was able to function much more as a real artist, able once again to channel his energies into the compelling issues of urban design as an art form.'

Meyer (1976, p.53), against the background of his experience on the Rand Afrikaans University project, similarly comments:

'The architect is left more free to practice his true skills and fulfil his real calling and responsibility ... to imagine, to conceive and to visualize [and to be] society's social conscience when it comes to the physical environment.'

12.3 LIMITS TO HUMAN FLEXIBILITY

The question which remains is why leadership role fusion appears not be be functional in participative social systems. To be able to answer this question, the causes of ineffectiveness in managerial and design tasks are investigated.

Miner (1975, p.217) suggests that one of the major causes of managerial ineffectiveness is where managerial jobs come to represent 'danger situations' for those who hold them. In simple terms, what is involved is that a person responds to the demands of the managerial job as a personal danger situation. As a result fear and anxiety are aroused; avoidance motives are then activated and the individual attempts to escape from those aspects of the managerial work itself which are disturbing. If many aspects of the work provoke this reaction and their anxiety potential is strong, the avoidance needs can assume a very dominant position in an individual's motivational hierarchy, :

the point where practically nothing else matters. Such deficiency in the 'will to manage' results in the individual relinquishing his responsibilities or, alternatively, behaving, to a greater or lesser extent, in a manner as if they did not exist. In the latter situation, depending on how the individual fulfils his design role, his behaviour may present itself as either autocratic or laissez-faire.

It has been discussed earlier that creative architects tend to be somewhat unsociable, that their behaviour tends to be introverted and that their values tend to be tangential to those held by the bulk of society. As pointed out by many, freedom of action for such individuals is of utmost importance. In the words of Arup (1970, p.3):

> '... you cannot tolerate interference from people who know nothing about the finer points of architectural composition - or for that matter, from those who do.'

It is not unreasonable, therefore, to postulate that for these architects managerial work - with its high degree of human interaction and its constraints on emotional expression and independent action - poses a 'subjective danger situation'. Evasion of such interaction and disregard of the social constraints constitutes an autocratic form of behaviour, the effects of which have already been discussed.

Acceptance of the managerial task, however, also brings with it its dangers. These derive from the need to become involved with the irrational biases and covert politics which exist in the group which is being managed. Colman

(1974, pp.25-26) found - from his observation of groups of architectural students solving design problems while concurrently undertaking an analysis of group processes - that the more the social system is penetrated the more the personal involvement with irrational biases grows. He also found that when designers realized the power of interactions in a group, content leadership was taken more tentatively and only when an individual was sure that he represented a consensus. Consensus rather than creativity therefore becomes the value upheld and, as Gerbier remarked in 1662:

> '... it happens that those passions become the cause of exorbitant features and forms.' (Jenkins, 1961, p.45)

It appears, therefore, that the reason both for the behaviours described in Chapter 12 and the incompatibility of design and project management roles is the inability of most, if not all, people to be proficient in the creation of detailed solutions to problems and the regulation of human interaction at the same time. It is this limit to human flexibility which constrains the performance of even the most competent 'all-rounder'.

CHAPTER 13: ORGANIZATIONAL RE-ALIGNMENT OF THE PROFESSION VIS-A-VIS THE INDUSTRY

> 'If improved output is the answer to problems of productivity threats, exhortations and good intentions alone won't get it. But organization and management restructure might.'
> (Peter Drucker)

It has been demonstrated in the previous two chapters that, at present, both educational strategies and the implementation of practice controls designed to ensure the competence and integrity of architects have severe limitations as far as improving the overall performance of members of the profession is concerned. In order to solve the problems of role overload and role conflict which arise from the leadership role fusion so characteristic of the profession at the moment, it is necessary to turn to the approach termed 'social engineering' or 'job-design' (Newman and Rowbottom, 1968, p.124; Schein, 1965, p.12). This approach involves re-aligning the social structures within which individuals work by eliminating, introducing or modifying channels of communication. The scale at which this re-alignment should occur and the extent to which it should influence the remainder of the building industry is, however, a matter for discussion.

3.1 INTERNAL ORGANIZATION OF ARCHITECTURAL PRACTICES

Considering the internal organization of architectural practices, an analysis which remains of considerable value is that undertaken by the RIBA team who prepared the report entitled 'The Architect and His Office' (1962). As mentioned in Chapter 10, a review of the way in which tasks and responsibilities were shared out in architectural practices, over 60 of which were visited, revealed two main types of work organization. These were called 'centralized' and 'dispersed' respectively. Whereas the centralized offices were characterized by the concentration of managerial authority and design initiative in the hands of one individual and the employment of what Burns and Stalker (1961, p.5) term 'mechanistic systems of management practice,' the dispersed offices displayed diametrically opposite characteristics aptly termed 'organic' by Burns and Stalker.

A point of key interest in the RIBA analysis lies in the difference between the medium-sized 'centralized' and the medium-sized 'dispersed' offices, both of which were found to offer a generally high standard of service. Although the centralized offices could be very productive (if the principal was able to make good decisions readily), they were found to have a relatively short life and to be comparatively unmindful of technical advance or profound studies. On the other hand, the dispersed offices, though more prominent in innovation and also more permanent, were found to be significantly less productive than the centralized offices. The RIBA team did not venture an

explanation of this phenomenon which, as illustrated below, lies in the suitability of certain communication structures for certain tasks and their inappropriateness for other tasks.

Studies by Woodward (1958), Burns and Stalker (1961) and Lawrence and Lorsch (1967) indicate that the requisite relationships between the members of any organization are heavily influenced by the task with which that organization is faced. Indeed, it has consistently been demonstrated that different tasks tend to be accomplished most effectively and efficiently by organizations structured in different ways. Perhaps the most dramatic of these illustrations is contained in the experiments of Leavitt (1951 and 1962) in which the effects of the different communication structures illustrated on the right, on the capacity of 5-man problem-solving groups were studied. Leavitt and his associates found that, by certain industrial engineering-type criteria (speed, clarity of organization and job descriptions, parsimonious use of paper and so on), the highly routinized, noninvolvement, centralized Network 1 seems to work best. On the other hand, if criteria of effectiveness are more ephemeral, more general (like acceptance of creativity, flexibility in dealing with novel problems, generally high morale, and loyalty), then the more egalitarian or decentralized Network 3 seems to work better.



THREE COMMUNICATIONS NETWORKS

The fact that substantial differences exist between the tasks of design and project management has been demonstrated in previous chapters. In the summary of these differences, which appears in Chapter 12, the difference in the criteria used to assess performance in each of these tasks has also been

indicated: whereas design is assessed in terms of novelty and quality, management is assessed in terms of efficiency. On the basis of this argument, therefore, the structure best suited to design is the decentralized one (Network 3) and that best suited to the processes which constitute the management task is the centralized one (Network 1). It can thus be postulated that the root cause of the advantages and disadvantages of the two organizational structures isolated by the RIBA team is that each is used to perform two tasks, for only one of which it is appropriate.

The conclusion of the RIBA study reads as follows:

> 'For the profession and the community as a whole, some means of fusing the good points of both the C [centralized] and the D [dispersed] types would appear to be the ideal solution.'
> (RIBA, 1962, p.57).

Although this conclusion may be interpreted as implying a simple coalescence of the two types of structure, the research outlined above indicates that a more fundamental strategy is required. A number of such strategies have emerged since the early 1960's, of which the two most popular are discussed below.

.2 THE MULTI-DISCIPLINARY PRACTICE

An attempt to reduce the amount of control required over project groups - and hence also the need for the employment of the centralized organization structure in architectural practices - has been the formation of the multi-disciplinary

practice. This has been defined as 'a practice which embraces all or some of the main professional skills at all working levels' (RIBA, 1973, p.160). In these practices, the continuity of working together provides a means whereby differences in basic assumptions can be reduced while the common objective established at policy-making level in the practice mediates the overt politics which characterize temporary professional groups. Consequently, the need for continuous centralized control is reduced by the overlap of the task and sentient boundaries of the group.

As discussed in Chapter 9, there is another side to the proverbial coin which gives rise to two difficulties:

1. The problems of maintaining both a full work-load for each professional group and a balance of representation at partnership level require decisions which, although they may ensure continuity in the life of the practice, inevitably constrain decisions at project level. This ultimately reduces the capacity of the practice to cope with the increasing variety of building projects required by society.

2. The cohesiveness achieved in the practice carries with it the danger expressed so well by John Faber, the well-known engineer:

   'When the ultimate in intimacy has grown in a homely grouping of Architects and Engineers, there is a real risk that both parties function endlessly on a diet of compromise, eventually losing sight of their truest goals of enhanced study and perfect achievements.' (Moross, 1972, p.6)

This reduces the capacity of the practice to solve new problems even within an apparently static market.

The viewpoints collected by the McKenzie Commission (1971, pp.19-21) on what they term 'a co-ordinated professional team' clearly reflect the advantages and disadvantages as set out above. In South Africa the relatively small size of the overall demand for buildings - together with the fact that the increasing use of co-optation as a strategy in project organizations results in the entrée of group members who are, in any event, outside the control of the multi-disciplinary practice - has exaggerated the disadvantages of this form of practice and reduced its advantages. Not surprisingly, therefore, its popularity has never been as great as it appears to have been in the United States of America (Ockell, 1975).

13.3 THE INDEPENDENT PROJECT MANAGER

The appearance of the independent project manager constitutes an attempt to locate the project management function within the project group as a whole rather than merely in the professional arm of the project organization. In essence it implies an organizational separation of sapiential from structural authority, of design from project management. In this respect it not only reflects the functional separation of communication networks discussed in Section 13.1 but also resembles the general pattern in secondary industries employing either low- or high-volume industrial technology (Organization for Economic Co-operation and Development, 1967, pp.35-41).

The existence of this pattern in long-established companies renowned for the quality of their design, such as Husqvarna Vapenfabrik in Sweden, A.E.G. in Germany and Olivetti i Italy attests to the fact that the system is not fundamentally anti-efficiency or anti-design. It is therefore not surprising that the concept of the project manager has become more popular in the last decade, not only in the United States of America but also in Great Britain and South Africa.

The strategy has, however, been resisted by both builders' associations and the organized architectural profession (McKenzie, 1971, p.22; Grotsius, 1976, p.11). The reticence, particularly of the architectural profession, in accepting the central principle involved in the concept of the project manager has led to the grafting of his service onto the traditional professional pattern and a consequent diminution of his role to that of monitor. The result is well described by Meyer (1976, p.51):

> 'The poor consultant ends up drawing networks and setting target dates that are simply translations of information he has to acquire from the other professionals in the first place.'

The unwillingness of the architectural profession to accept a division of content from process leadership therefore obstructs what appears to be a most promising strategy.

13.4 THE CODE OF CONDUCT: AN EVALUATION

The attitude of the architectural profession is entrenched in its code of conduct which, to a large degree, governs the relationships between architects and those with whom and for whom they work. The analysis which constitutes the content of this section seeks to establish the relevance of the existing code of conduct and therefore the attitude of the profession to its relationships with others - in the newer forms of project organization which characterize the building industry today.

13.4.1 Limits of the Present Code:

The prime element in the present code of conduct of the architectural profession is, as has been demonstrated in Chapter 10, the limitation of the architect's involvement with the production and construction side of the building industry. The underlying concept is that entry into the authority system of manufacturing or contracting enterprises might result in subservience of the architect to the objectives of these enterprises, thus prejudicing the giving of impartial advice to the client. In project organizations relying on craft processes and constituted under 'the system' this prohibition was instrumental in preserving the integrity of the profession, especially in the early stages of its development. However, in the newer forms of project organization, in which production and construction enterprises become part of the client system at an early stage of the project and thus also acquire the right to brief the architect, this prohibition loses much of its validity. Under the coalition

strategy of project organization, where the construction unit and the building sponsor are both parts of the same enterprise, the prohibition becomes almost totally meaningless.

On the other hand, there is no provision in the present code of conduct to deal with conflicts which may, and increasingly do, arise between the immediate specialized interests of those who represent the client system in the project group and the wider, long-term values and interests of society as a whole. This contrasts with the code of practice promoted by the International Council of Soc eties of Industrial Design (1973) which is very outspoken about the idea that the obligation of the designer to further the social and aesthetic standards of the community he serves, overrides not only his personal interests but also his responsibility to his client and to his fellow designers. The ostensible reason for lack of any such prohibitions in the code of the architectural profession is that this so-called professional/artist conflict is subject to cessation by the withdrawal of either the architect or the client from the relationship (Higgin*, 1964, p 141).

This explanation does not, however, recognize that, as the processes of project procurement become more coextensive, the possibility of withdrawal by the architect, without serious prejudice to the project, becomes extremely remote. As few architects are financially sound enough to be able to accept

* A sociologist on the staff of the Tavistock Institute of Human Relations and senior member of the research team of the Building Industry Communication Research Project in a paper commissioned by the RIBA in connection with a review of the code of conduct.

liability for damages arising from withdrawal or to forego future commissions which in all probability will be prejudiced by such action, the majority will find themselves in a position in which obedience to the resource controllers in the client system becomes an obligation. In situations of conflict, the resulting need for compliance will tend to hinder the willingness of architects both to interpret the problem in its wider environmental context and to create designs which integrates all aspects of the problem in a unified solution.

Therefore, not only is the existing code (and structure) of the architectural profession becoming somewhat peripheral to the preservation of its integrity but the profession has, on the whole, failed to recognize the increasing degree of conflict in an area which, since its inception, has provided the potential for such conflict.

13.4.2 The Authority of the Architect:

> 'They tend to consider themselves repositories of virtue. But what may have been perfectly adequate as private morality as long as knowledge had no power, is rather irrelevant for a group in power.
>
> 'The men of knowledge are today where the businessman was in the late nineteenth century with his assumption that the morality of business was his "private affair". For a group in power the facile assumption of moral righteousness - if only the heart be pure and the cause just - is crass immorality.'
> (Drucker, 1971, p.452)

The attitude of the architectural profession to leadership role fusion is not as capricious as it may seem. It derives from the basic human need to believe that one is competent in one's task, that one's performance is not subject to unconscious or irrational inter-personal processes and, consequently, that whatever legal means are used to gain control over the decisions and actions of others is justified if it promotes what appears to be a socially acceptable goal. The need to retain structural authority as a means of exercising influence is, however, based on the false premise that it is only tradition and position which constitute legitimate bases of authority. It ignores the fact that there exist three other forms of authority which constitute equally important and legitimate bases of influence:

1. Sapential authority - which stems from the knowledge or expertness of an individual.
2. Personal authority - which stems from the compatibility of the personality of an individual with the behaviour expected of him by others.
3. Moral authority - which derives from the way in which a person has shown that his actions are proper, just, fair and good for the community to which he belongs.
   (Paterson, 1966, p.179)

Indeed, it ignores one of the cornerstones of professionalism - that in situations where entry into an authority system brings with it a conflict which threatens the sapiential, personal or moral integrity of members of the profession, such entry should be expressly prohibited.

3.5 RE-ESTABLISHING COMPETENCE AND INTEGRITY

The difficulty of creating social structures which will enhance the performance of members of the arhitectural profession within the existing professional framework has been demonstrated. The problem, therefore, is to evolve a new professional structure which will both promote and ensure the competence and integrity of its members in the complex, participative project organizations which will be increasingly required in the building industry in the future. In the words of the RIBA:

> 'What we need is a new professionalism, which carries with it a far nigher responsibility for competence - a duty that is owed to the whole community, and certainly to those who use buildings as well as to those who pay for them.'

Methods of promoting the competence and integrity of architects, particularly with regard to their critical design role, are investigated below.

3.5.1 Competence:

As change accelerates, the knowledge acquired during undergraduate education increasingly needs revision and updating (Calderwood, 1958, p.9;

van der Ryn, 1966, p.39; Olivier and Irwig, 1976, p.2). As illustrated by the latter two authors, what has come to be called 'continuing education' is most effectively achieved by dialogue between practitioners and researchers, practitioners and university staff and students, and particularly between one practitioner and another. The absence of such dialogue amongst members of the architectural profession has been mentioned previously and has been brought to the attention of the profession from time to time (Gordon, 1974, p.3). It has even been suggested that the reason why the Modern Movement in Architecture - with its commitment to the solution of the 'real' building and environmental problems of society - so rapidly degenerated into a style was that no means existed to transmit whatever principles were involved in its creation (van der Ryn, 1966, p.42; Arup, 1970, p.3). Knowledge needs to be disseminated not only within the profession but also within the building industry and the public at large if increased participation in the project procurement process is not to degenerate into a confrontation between invention and ignorance (Bronowski, 1973, p.435; Lerup, 1974, p.106). The interchange of experience and knowledge within the profession is, therefore, a precondition both for improving the performance of the architect and for reducing inexpedient resistance to his ideas.

It has been illustrated in Chapter 9 that the assimilation of individuals into cohesive groups promotes the exchange of experience and the sharing of discoveries between them. The efficacy of this procedure is as real amongst professionals as it is within the project organizations discussed previously. Research by Van Rossum (1973), for instance, reveals a very positive

relationship between the development of scientific fields and the extent and nature of informal relationships between scientists engaged in these fields.

In the field of architecture, the formation of cohesive groups tends to be restricted by the lack of contact and the covert politics which arise due to the fact that architectural firms offering their services within a community are intense business competitors. Considering the large number of very small practices in South Africa, it is not surprising that the profession in general is characterized by a lack of dialogue and interchange. The value of the cohesive group as a vehicle for personal development has, however, been appreciated by leading architects as is evidence in the formation of the group who call themselves 'Team 10'.

> 'Team 10 is a group of architects who have sought each other out because each has found the help of the others necessary to the development and understanding of their own individual work.'
> (Smithson, circa 1965, p.1)

Clearly a method of creating the cross-flow of ideas required for the maintenance and development of the competence of members of the profession is by the formation of more such cohesive groups. This requires that the pressures which give rise to covert politics be mediated and that the opportunities for architects to come together informally be increased. Whereas in Team 10 covert politics due to business competition was eliminated

by spatial separation of the practices involved and opportunities for personal contact were achieved by fairly frequent 'family meetings' in different parts of the world, within the profession as a whole less expensive and less disruptive means need to be found to achieve the same conditions.

3.5.2 Integrity:

As the components of society become increasingly specialized, the impartiality of the architect in evaluating and reconciling requirements and resources in the context of the environment becomes increasingly important. The irresolution of the greater proportion of the architectural profession in this regard is, as discussed at length in Chapter 11, due to the need for architects to gain approval from within the project organization.

It has been shown, however, that pressures towards conformity or obedience are mediated by the access of an individual subject to these pressures to a confrère or confidant who either resists or is not subject to the same pressures. Consequently the subservience of architects to resource controllers in project organizations may be reduced both by decreasing their dependency upon resource controllers and by increasing their access to colleagues who are independent of the pressures exerted on them by the particular project organization or, for that matter, architectural practice concerned.

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1.6 DIRECTIONS FOR A NEW PROFESSIONAL STRUCTURE

From the discussion above it becomes apparent that two interdependent means exist for promoting the competence and integrity of architects in their design function:

1. Increasing the sentient boundary of the profession in order to convert the existing loose assemblage of architects - linked by little more than the fact that they share some common knowledge and perform similar services - into what may be termed a 'design community '(van der Ryn, 1966, p.38; Papanek, 1974, p.65).
2. Reducing the overlap of the task and sentient boundaries of the project organization and the architectural practice.

Considering the project management function of the architect, quite the opposite prescription is required at present. Not only must the task and sentient boundaries of the project organization and the architectural practice be made to coincide more than they generally do at the moment, but the sentient boundary of the project organization must also be reinforced.

The problem of reconciling these two conflicting indications is not a new one and has been experienced by those professions whose activities affect not only the lives, liberties and property of their clients but also the life-space of others. The response of these professions, especially the two

'great professions' of medicine and law, is therefore of considerable interest. Although their structures are quite similar, it is that of the legal profession which has achieved the greatest perspicuity and therefore provides the best example for enquiry. However, before such an enquiry is undertaken it is necessary to illustrate that there exists a considerable similarity between the tasks of the legal profession and those of the architectural profession. Members of both professions are concerned with:

1. The provision of an impartial service to clients not necessarily concerned with the impact of their decisions on others.
2. The definition and solution of a wide range of problems (many of which are ill-defined) and the implementation of the solutions to these problems.
3. The upholding of supra-client values with regard to the environmental impact, both social and physical, in the service they provide.

Therefore, although the legal profession is concerned primarily with social relationships and the architectural profession with physical relationships, there exists sufficient common ground between the tasks of the two professions to make a study of the former worthwhile.

13.7 THE STRUCTURE OF THE LEGAL PROFESSION

The essential structure of the legal profession in South Africa closely resembles that which has evolved in Britain since the 14th Century (Holdsworth.

pp.432-457 V6, 1937; pp.242-247 and 440-441 V15, 1965; Jackson, 1972, pp.323-335). Its fundamental characteristic is the division of its membership into two sub-professions which became crystallized in the 16th Century and which is associated with a liberation of English Law from what Holdsworth terms 'the technicalities which were cramping its development'. The members of the sub-professions are termed solicitors (attorneys) and barristers (advocates) respectively. Solicitors outnumber barristers by approximately 8:1 and perform significantly different work, in significantly different settings, as described below.

Solicitors act as representatives or agents of their clients. They belong to the clerical side of the law and are concerned with the processes of the 'legal machine'. Their function, which incorporates dealing with the more or less routine matters which arise from day to day, requires them to run an office and to engage in a substantial correspondence. In involved matters or in complex legal actions or those which are concerned with serious breaches of the law, the function of the solicitor is to isolate the legal problem of the client, to assist the client in obtaining the resources required to solve the problem (including evidence, expert witnesses and the services of a barrister) and co-ordinating these resources in order to achieve and implement a solution to his client's problem.

The function of the barrister is to evaluate the facts of the brief he receives from the solicitor and to translate these into a legal opinion or argument.

Although the barrister must be acquainted with legal forms and procedures, he is not interested in these per se but in the legal principles applied and the precedent achieved through them. In contrast to solicitors, barristers have no contractual obligation to their clients. The barrister is legally incapable of suing for fees; nor can he be sued for negligence. In litigation the barrister has however a duty to the court which, in certain cases, transcends his obligation to his client.

Barristers are prohibited from forming organizations to carry out their function. They are thus able to practice from within 'chambers' which, in Britain, are part of the famous 'Inns'. The Inns are voluntary, unincorporated societies whose duties include the proper education of students and the maintenance of discipline in the profession. Until the middle of the 19th Century they also provided residential accommodation for the barristers who practiced from the chambers in which they lived. Although the residential character of the Inns has now disappeared, the collegiate aspect remains entrenched in the tradition of practicing in 'sets of chambers' each consisting of about 10 members.

The advantages and disadvantages of the division outlined above have been debated at length, probably since the 14th Century. The advantages put forward are the following:

1. The provision of expertise in routine matters can be closely linked, both geographically and synchronously, with the needs of clients as they

arise. The opportunity this presents for continuity of experience with clients and their circumstances enables problems to be isolated rapidly and facilitates both the implementation of solutions and the obtaining of feedback on the efficacy of these solutions.

2. The development of specialist advice is encouraged as is also the flow of experience about novel legal problems and solutions.

3. When specialized expertise is required, it can be comparatively freely selected from a pool of relatively uncommitted individuals, one or more of whom can be selected - on the basis of their particular ability or motivation - to participate in the solution of the particular problem isolated.

4. Independence of advice in complex situations is encouraged - which tends to prevent important aspects of the problem being overlooked, especially those which derive from the context of the problem rather than directly from the client.

The problems which arise from the sub-division of the legal profession are essentially problems of human collaboration. These problems, which are directly related to the advantages outlined above, include difficulties in overcoming differences in orientation between solicitors and barristers, in avoiding duplication of work and in synchronizing work loads. A discussion with Professor E. Kahn of the Faculty of Law at the University of Witwatersrand revealed that, in practice, these difficulties occur primarily

in situations where changes in social patterns render the division of the tasks between the two sub-professions obsolete. The major problem, therefore, of the organizational structure of the legal profession is a lack in the flexibility of the profession to redistribute its tasks among its two branches.

The balance of advantages against disadvantages, as seen by the legal profession, is summarized by Holdsworth (Vol. 15, 1965, pp.243-244):

> 'But the reasons in favour of the continued separation of the two branches of the profession, though much less obvious than the reasons against it, seem to me to be stronger. In this, as in many other cases, further consideration shows that much in our legal system which we rightly prize would be jeopardized if this reform were made. My reasons for this opinion are as follows:
>
> In the first place, though a division of the legal profession on these lines would be impossible in a primitive community, some such division naturally appears as soon as social and economic progress produces a more complex legal system. In America in earlier days such a division would have been neither possible nor necessary. But as soon as a more complex legal system was developed it naturally appeared. Lawyers found that it was convenient that court work should be done by one member of a firm, and other work by another. In the second place, such a division of labour in a complicated case, or in a case in which strong feelings are aroused

is useful to the client. The attorney or solicitor who has been in close contact with the client, and who has been actively engaged in getting up his case and the evidence to support it, cannot advise upon it with the same impartiality as the barrister to whom the attorney or solicitor submits the client's story and the evidence in support of it. The client gets a more valuable opinion as to whether or not it is advisable for him to bring or defend an action and how he should shape his claim or his defence. In the third place, such a division makes for a clearer d[illegible]ition of the law. Because the barrister can view the case with more detachment than the attorney or solicitor, he can state to the court with greater clarity its legal implications; and because it is thus presented to the court, the court is more likely to reach a decision which is logically correct, and in accordance with the principles and rules applicable to the particular branch of the law which governs the case. Moreoever the consequent specialization amongst members of the bar, and the inducement given by this division to the attorney or solicitor to consult a specialist, are not only beneficial to the client, but are a further safeguard that the law will be applied and developed on the right lines. In the fourth place, barristers are not, like attorneys and solicitors, officers of the court. They can only be disbarred by their Inns of Court, which are self-governing and independent societies. No doubt they can be dealt with by the court if, in their conduct of the case, they are guilty of anything like disrespect to the judge or contempt of court.

> But, apart from this, they have a large measure of independence in their conduct of their cases. In times past this independence has been of great service to the cause of liberty. Some of the great constitutional cases of the seventeenth century, and some of Erskine's famous cases in the eighteenth century, sufficiently illustrate this fact. It is probable that this independence would be menaced by a fusion of the two branches of the profession. Lastly, the fact that barristers and their Inns of Court have this large measure of independence and the fact that judges are chosen from their ranks, have, when combined with the security of the tenure of the judge's office, helped to produce that courage and impartiality which, for two and a half centuries, have distinguished the English bench, and have been a principal safe-guard of the rule of law and the liberties of the subject. It is these considerations, sometimes instinctively felt rather than precisely formulated, which have led the most experienced solicitors, and the majority of the bar, whether leaders or juniors, to maintain this division in the ranks of the legal profession.'

Although the legal profession has received its fair share of public criticism and, in Britain, is presently being subjected to investigation by a royal commission, the inherent advantages of the dual system seem likely to ensure its future endurance (The Economist, February 21, 1976, pp.15-16).

The division of the work of the legal profession between its two branches thus allows each branch to operate within the social framework best suited to the promotion of the competence and integrity of its members. It therefore accomplishes the fusion of the advantages of the two organizational tures suggested by the RIBA in 1962 and provides a model for the restructuring of the architectual profession.

CHAPTER 14: A NEW PROFESSIONALISM

> 'There is an age-old conflict between intellectual leadership and civil authority... And that is a crisis of choice that leaders have faced over and over again: Socrates in Athens; Jonathan Swift in Ireland, torn between pity and ambition; Mahatma Gandhi in India and Albert Einstein, when he refused the presidency of Israel.'
> (Bronowski, 1973, p.429)

14.1 AN OVERVIEW

After identification of the problem facing the architectural profession, namely that the established patterns of professional conduct may have become dysfunctional in terms of the substantive function of the architect, the context of the building design activity was defined and the meaning and importance of productivity in this activity explained. The centrality of the human creative process as an input in design was then established and it was shown that the organizational environments within which designers work have a direct influence on their capacity and their motivation to engage in the creative process. The structure of project organizations in the building industry was subsequently investigated and found to be quite different from the situation as it is assumed to be by the architectural profession at large. It was shown that, due to changes in technology and increased expectations in society, project organizations - which constitute the primary organizational environment for architects - are increasingly characterized by groups in which members simultaneously compete and co-operate in briefing and evaluation.

The task of project management arising from the newer forms of project organization was defined and compared with the work content of the non-design role assumed by architects under the traditional, sequential form of project structure. This comparison revealed that the task of project management is much more dynamic and requires thought and action at much higher levels than do the traditional roles of the architect as agent of the client and moderator in the building contract. In addition, an increased ability to manage human interaction is required of those who wish to undertake this process successfully.

Next, the function of the professional association in maintaining and encouraging certain levels of competence and integrity was outlined as a background to studying the response by the architectural profession to the concurrent assumption, by its members, of both design and project management roles. It was shown that neither its code of practice nor the practice of its members, nor indeed the opinions of many of its leaders, indicated any hesitancy on the part of the profession to assume responsibility for both design and project management functions on any one project at any one time.

The behaviour of architects in their dual role was then studied and the effects of this behaviour on their performance assessed by means of the organizational health of the building industry. It was concluded that the performance of architects has deteriorated and that this deterioration has accompanied the move away from the traditional, sequential form of project organization. A review of attempts to remedy this situation - by means of

education and the monitoring and control of architectural practices - revealed that these strategies incorporate severe limitations and disadvantages which constrain their efficiency in raising levels of competence and integrity within the profession.

A review of research into leadership was subsequently undertaken and it was shown that the probability that any one individual can equally successfully undertake both design and project management roles is fairly low. In addition, and more critically, it was shown that limits to human flexibility impose constraints on the concurrent assumption of both roles as the form of behaviour effective in one severely limits the adoption of the behaviour patterns required for successful performance in the other.

In the penultimate chapter of this thesis, a review of various attempts to restructure the roles and responsibilities of the professional group showed that the most promising of these, the introduction of the independent project manager, was constrained by attitudes which arise from the code of conduct of the architectural profession. An analysis of the code of conduct revealed that it is outdated and that a new professional structure is required to ensure the competence and integrity of architects in the newer forms of project organization. A possible method for restructuring the architectural profession was shown to exist in the sub-division of the legal profession into two interdependent sub-professions, a sub-division which closely reflects the form of role differentiation found to be effective by studies into the nature of leadership.

8.2 SUB-DIVISION OF THE ARCHITECTURAL PROFESSION

The suggestion of a division in the architectural profession is not new. In fact a division existed at the time of the foundation of the organized architectural profession in Britain and consisted of a differentiation between 'fellows' and 'ordinary members'. This differentiation, initially based on the length of experience in practice, was reinforced in the second decade of this century by the restriction of fellowship to those members who possessed certain minimum educational qualifications. Subsequently, with the widespread introduction of formal educational programmes which were required to be completed before entry into the profession, the fellowship class was abolished - but not forgotten. The President of the RIBA, in fact, recently proposed to the Council of the Institute that the idea of reinstating the fellowship class should be considered. He said:

> 'If the idea can be linked closely with the now very topical and important issues of competence, and with the principle of mature professional responsibility, it could commend itself widely in the profession and to the public generally.'
> (RIBA, 1975, p.25)

The Council, possibly due to the absence of any knowledge of a principle of differentiation which is more fundamental than age or length of experience, or even educational qualification, decided to shelve the matter. However, as illustrated by the legal profession, a fundamental principle of differentiation - about the axes of structural and sapiental authority - does

in fact exist for the sub-division of professional associations.

When applying this principle to the architectural profession, an important consideration is that members of this profession are not the only ones serving the building industry. As the study in Chapter 6 showed, members of other professions (namely quantity surveying and the various branches of engineering) are commonly involved in projects in one or more of a number of subsidiary roles. In addition, as development in each of the various allied professions has occurred, so members of these professions have increasingly assumed wider roles, with enlarged responsibilities at policy-making, programming and interpretative levels in the project organization. This has resulted in some conflict as the domains of the professions have become overlapped - a factor which has been instrumental in promoting the concept of the multi-disciplinary practice and which has also given rise to attempts, by those who assume the role of prime adviser in the project organization, to take on the project management role as well.

The disadvantages of the multi-disciplinary practice have already been discussed and the problems of role fusion in the architectural profession illustrated. As it is likely that these disadvantages and problems will, at least to some degree, be applicable in the other building professions, it is necessary that any differentiation of the architectural profession should also provide a means whereby the work of the various professions serving the building industry could become more integrated than current professional boundaries encourage.

4.3 THESIS

On the basis of the argument presented, the thesis proposed in this work is that productivity in building design (and also efficiency in the other processes of project procurement) will be promoted by the re-alignment of the architectural profession along the following lines:

1. The formation of an unincorporated society of 'barrister architects'.

   The purpose of this society would be to foster the competence and integrity of those architects whose function and interest it is to design buildings or the larger sub-systems of buildings. The society would comprise a multiplicity of small ateliers which would provide the opportunity for individual designers to share essential administrative and other services with each other and to have ready access to colleagues whose thought and work was of interest to them. Individual designers would however be prevented from entering into any long-term agreements to work for or with each other and would be precluded from making their services available directly to clients, be they building sponsors, financiers, users or constructors. In addition, they would be precluded from providing any services other than the creation of a design and the advocation of that design in private or in public. Membership of the society should, however, not be restricted to those who are registered architects under current legislation but should be open to all those professionals whose sole function is advising in building design matters, be they engineers, industrial designers or even quantity surveyors.

2. The re-orientation of the remainder of the architectural profession towards those activities comprising the project management function, namely briefing and design realization.

This implies a stronger focus not only on managing the project procurement process on behalf of the building sponsor but also on providing services of a more or less routine nature to resource controllers of all kinds during all phases of the building life cycle. At the same time membership of this, the larger section of the profession, would be reserved for what might be termed 'attorney architects' who would be precluded from undertaking responsibility for the design of large, complex or otherwise important building projects without the intervention of a 'barrister architect'. The change in orientation of this segment of the architectural profession would reduce the differentiation between it and associated professions whose prime responsibility lies in the maintenance of the efficiency of the total project procurement process. The opening up of membership to these professions, particularly the quantity surveyor, would therefore be a logical first step in reducing the conflict which presently exists between the professionals serving the building industry.

The anticipated advantages of the re-alignment described above - based both on the experience of the legal profession and the findings of research into the effects of organizational structure on the behaviour of people - are outlined hereunder:

1. The creation of small ateliers of building designers will allow for the development of design knowledge and theory at a more fundamental level than is presently the case. This will, in the longer term, provide not only better criteria for the evaluation of designs but will also make possible the dissemination of this information to the public at large, thus increasing its design consciousness. Better understanding of design issues will, in turn, tend to reduce disfunctional resistance to new ideas and concepts in the future.

2. The mediation of the social pressures which presently tend to divert architects from the totality of building design problems (especially those areas which have to do with environmental impacts of one sort or another) will promote a more balanced view towards solving these problems and, at the same time, reduce the resistance of designers to speak publicly about design issues in society, especially when these affect the fortunes of powerful resource controllers in project organizations or in society at large.

3. The division of the profession into two will allow more appropriate selection criteria to be used in the choice of professionals. Designers can be selected on the basis of their design ability and their expertise in the design of particular building types rather than on some fairly arbitrary admixture of these qualities and managerial capability, as is presently the case. On the other hand, the choice of individuals or organizations providing project management services of one kind or another can be based on the technical and managerial expertise required by the building sponsor

rather than on the assumption, which so often accompanies the appointment of architects today, that a commission for the design of a building will be involved. Fees for services can also be more closely tailored to the services provided.

4. The division of the profession will also allow each sub-profession to work at its appropriate scale. Thus 'attorney architects' may form organizations which derive all the benefits of economy of size and which allow them to provide both an efficient and continuous service to even their largest clients. In contrast 'barrister architects' are restrained from forming organizations which, through their scale or continuity, may restrict innovation and variety.

In summary, therefore, the division of the architectural profession into two branches enables each branch to utilize a structure which best suits the tasks with which its members are faced and to maintain only those organizational links which encourage the competence of its members and to eliminate those relationships which unnecessarily constrain the performance of members.

14.4 IMPLICATIONS AND FURTHER RESEARCH

It is clear that the organizational re-alignment outlined above implies substantial changes in the rules and regulations which govern the profession and in the contracts and agreements which are used not only by the profession but by the industry at large. However, before the detail of such changes can

be considered, it is necessary first to obtain a more precise and detailed understanding of exactly how the roles discussed in this thesis are distributed between clients, consultants, contractors and others in actual projects and to ascertain to what extent this is influenced by the regulations and agreements mentioned above. A review of the extant distribution of roles within the legal profession, where the sub-division proposed for the architectural profession already exists, would probably provide a useful comparison in this regard especially in connection with the mechanism required to achieve flexibility in the continuing definition of the two sub-professions. In addition a study of the differences between perceived and actual roles and the results of various patterns of role distribution would provide a deeper understanding of the factors which need to be taken into consideration in revising the structure of the profession.

Eventually, however, for any organizational system to be viable, it must be manned by people who are both able and willing to exercise the skills required and adopt the behaviour patterns necessary for effective performance. Therefore, structural re-alignment, even at the highest level of the profession, will alone not enhance the competence and integrity of members of the profession; it must be accompanied by the mental and moral development of individuals entering into and practicing in the profession. Paradoxically, the system of education required to achieve this objective implies a freeing up of the rigid, sequential, professionally oriented programmes which have characterized architectural faculties up to the present time. What is required is a complex, interwoven network of courses at undergraduate and post-graduate level, melded with periods of practical experience and more structured

sequences of courses (accompanied by challenging problems) in those fields that individuals select as their prime areas of competence, fields which are strongly related to one or other of the architectural sub-professions described. Although the outlines of the educational system required to complement the differentiation of the architectural profession can be sketched, detailed programmes require further research and planning to suit their specific contexts.

The results of the research outlined above will only be of value, however, if members of the architectural profession recognize that they need to adopt a more open attitude to their function in society.

APPENDIX 1: AN ILLUSTRATION OF DECISION LEVELS

The two situations described below serve to illustrate the differences in decision-making at various levels of the decision complex described in Chapter 6. These illustrations, which are taken from Paterson's book entitled 'Management Theory' (1966, pp.27-29), were used as a guide in defining the roles of the various professions involved in project organizations in the building industry. The context of the first situation is a firm making and selling shoes while that of the latter situation is a larger social organism, the civil service.

Situation 1: A Shoe Firm

'Letters (stimuli) arriving in the office are received by the office girl who does the odd jobs such as making tea and running errands. She opens the letters with an envelope-cutting machine (she makes vegetative decisions) and hands them to a clerk who, in sorting them out, makes purely automatic decisions; letters addressed to sales go to sales, letters for production go to production and so on. When the letters arrive on the sales clerk's desk, he examines their contents, and if they can be answered according to a fairly standard pattern, i.e. a rule, he replies with a routine style of letter; he makes a routine decision.'

'But there may be some letters which he cannot answer according to routine, and so he passes them to, say, the sales manager or some such

person who deals with them uniquely, with a particular kind of letter for each particular case. He makes an interpretative judgement and decision on each within the limits set by the programming decision. If he is unable to answer a particular letter because it does not come within these limits, he passes the letter to his chief, say the sales director, who may either answer the letter himself, or tell the sales manager that the policy is this or that, so that the letter can be answered in accordance with that policy. But the letter may contain some information, a stimulus, of such a nature that it may affect the policy of the firm, so the director brings it up at the next Board meeting and the Board decides what, if any, change in policy should be made. Thus a stimulus affects the higher decision bands only when it cannot be dealt with by lower decisions. The whole firm is not involved in reacting unless the stimulus is strong enough.'

Situation 2: The Civil Service

'Faced by an income tax problem because I have an income from writing and broadcasting and the like in addition to a salary, I decide to take my problem to the local income tax office. A young clerk sees me come in and reacts - a vegetative decision - by getting up and coming towards the desk to receive me. I tell her I have problems and I bring out my income tax return form. She immediately answers by saying "Well, you fill this one in here, and fill that one in there" (automatic). This cannot solve my problem, and she does not know how to solve it either, whereupon she lifts up the flap in the counter and takes me through the office into a room in which sits somebody I take to be a chief clerk,

by reason of his oak desk and 10 square feet carpet. He examines my problem and takes out a large book of rules governing income tax. I should give an answer on my return according to Section 23, paragraph A, but, unfortunately, this does not quite suit my particular case. He gives me routine answers according to all the rules and regulations, but these rules do not fit my unique case.

'I am then taken into a room which belongs to someone I assume to be chief inspector because he has a mahogany desk and the carpet is fitted to the walls. He sees that my case is unique and the answers lie between the paragraphs A and B; therefore he decides (because he has the right to) that I should answer somewhere in between. He has made a decision which is unique in that the rules do not govern my case, but he makes a decision lying between the limits set by the rules. Such rules have been laid out, in the first instance, by people in the Inland Revenue in London, so as to give limits within which chief inspectors may make such new, unique decisions, or regulations which the chief clerk can obey precisely. These rules have been produced by the Inland Revenue as programming of a policy set by the Minister in Cabinet, the Chancellor of the Exchequer, a policy of Government and of the country.

'The decisions made by the clerk and the chief clerk do not affect the "thinking" of the policy making at the Inland Revenue offices in Whitehall, for the "administrative" is not aware of the automatic and routine decisions of the "executive". The unique interpretations of chief inspectors may, however, make the "administrative" think if sufficient of these interpreta-

tions are sent to London, and the programming people may be forced to produce a new section in which there is a paragraph 23A, sub-section I, to cover all such cases as mine, that is to say, if the threshold value of the stimulus is strong enough. Similarly, if many of these cases arise, then the feed-back from the "administrative" to the Minister may be of such a kind that the policy may be altered in order to squeeze more money out of impecunious academics.'

APPENDIX 2: EVOLUTION OF ROLES IN THE BUILDING INDUSTRY - MIDDLE AGES TO SECOND WORLD WAR

The table over the page has been contructed by the author in order to give some historical perspective to the present division of roles in the building industry discussed in Chapter 6. The development shown in the table, although outlined as a sequence of distinct steps, must not be seen as such but as a series of overlapping stages during which older patterns of organization were gradually modified by the abandonment of older or the addition of newer roles.

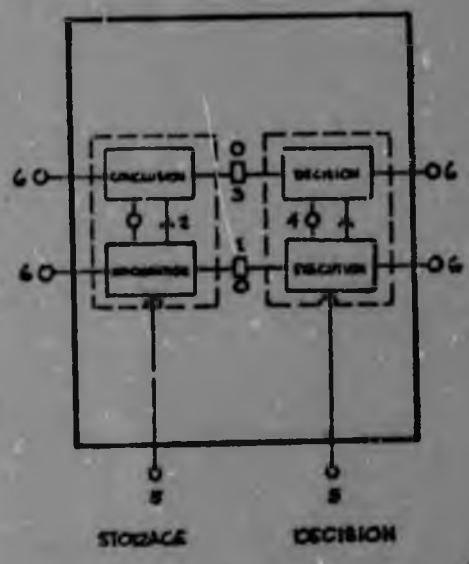
Unfortunately there is little historical information readily available about the evolution of the building industry in South Africa. The information used to prepare the table has, therefore, been obtained from published information about the British building industry (Jenkins, 1961; Kaye, 1960; Higgins and Jessop, 1965; Bowley, 1966). The table nevertheless reflects fairly accurately the situation in South Africa, especially from the 19th century onwards, as since that time the conventions and procedures of the industry have been closely modelled on their counterparts in the United Kingdom (Lewcock, 1963; Miners, 1971, p.3; Kearney, 1973, p.75).

EVOLUTION OF ROLES IN THE BUILDING INDUSTRY - MIDDLE AGES TO SECOND WORLD WAR

	BRIEF	DESIGN	DESIGN REALIZATION	CONSTRUCTION		ENVIRONMENTAL FACTORS
Medieval Period	Tradition	Craftsmen slowly modifying traditions of previous generations. Co-ordination achieved by liaison between craftsmen				
1530	Patrons take greater interest in nature of accommodation	European craftsmen introduced for classical details. Patron becomes more involved in co-ordination of work				Rise of Humanism in Great Britain.
The English Renaissance		Introduction of illustrated architectural pattern books	Local craftsmen co-ordinated by patron under separate contracts.			Difficulty in employing foreigners due to Henry VIII's break with Rome.
1612 Palladian Phase - Inigo Jones, Christopher Wren		Appearance of surveyor (master-craftsmen) with knowledge of pattern books and building practice who co-ordinates work on behalf of patron				Difficulty in cost estimation and quality control experienced by patron because of separation of design from construction
1620		Emergence of artist-architects with no craft training		Certain surveyors undertake supervision only.		Some of surveyors benefited from 'grammar oriented by their fathers were able to develop interest in learning and the arts. Accompanied by newly important status of architect in society.
1750	Clients take greater interest in economic and financial feasibility		Craftsmen become grouped into independent commercial trade units.			Rise of bourgeois culture. Also stimulated by the quick rebuilding required after the great fire in London.
			Emergence of main contractor as co-ordinator of commercial trade units			Continuation of processes for speed in building.
1791 First Occupation of South Africa by Great Britain 1802	Full-time private-architects increase in importance and extend scope of influence.			Surveyor tends to become professional measurer of work		Industrialization and urbanization give rise to new building types and relaxation of tradition. Cost becomes an increasingly important factor.
			Surveyor prepares bills of quantities rather than measuring on site.	Emergence of specialist sub-contractors		Introduction of new building materials and techniques and increasing prefabrication of building units.
			Architects take on preparation of detailed instructions in drawings and specifications and co-ordination with bills of quantities			Decline in standards of craftsmanship. Formation of the Royal Institute of British Architects.
Migration from Great Britain to South Africa		Emergence of specialist sub-contractors supplying design and construct service in engineering aspects.				Development of new materials and techniques into building sub-systems such as lifts and central heating.
Progressive Colonization by Britain of South Africa		Appearance of engineering consultants advising architects and undertaking design, drawing and specification where necessary. Co-ordination by architect.				Increasing complexity of buildings.
1900		Quantity surveyor advising architect on user pleasure				Growth of population in cities gives rise to larger buildings and increased land costs which makes price of buildings more critical.
1939						

APPENDIX 3: FEEDBACK IN THE DECISION COMPLEX

The following exposition, taken from Paterson's book 'Management Theory' (1966, pp.151-153), illustrates that there is a form of feedback in the decision complex. This feedback gives rise to additional relationships between the various units as indicated in the diagram opposite and explained below.



FEEDBACK WITHIN THE DECISION COMPLEX AT ONE LEVEL

'1. To be able to say what 'can be done', the information unit must know what the execution unit can do. It is a necessary part of information upon which a conclusion is based. The information unit must feel 'obliged' to take this information into consideration, though it is not wholly obliged to do so. It will be wholly obliged only if the conclusion unit commands this information. Hence there must be communication between the execution and the information units, and in the form of the hypothetical imperative. This will include information on what the execution unit has done, or has ordered to be done, if that information is necessary for a conclusion.

2. For the conclusion unit to come to its best conclusions it requires information of a particular kind, and this requirement is a perfect obligation; a relation of responsibility lies between the conclusion and information units. (Just as a senior can tell his junior to get information on, or prepare a report upon, certain items for the purpose of coming to a conclusion). This contrasts with the relation between the execution and information units (1), for the execution unit cannot command or order the information unit to

accept his report, nor can Information command or order Execution to submit a report upon what he needs to pass on to Conclusion who has commanded it, or who has commanded that this be obtained from Execution. Information thus has the right to ask for this advice, not to command it. Execution is responsible to Decision, who depends upon the quality of the conclusion given him for his decision. Therefore Decision has the duty to command Execution to provide this advice for Information when he asks for it. But Execution's responsibility in that duty is to Decision.

3. The relation between the conclusion and decision units must be one of advisability, and this must be reciprocal. Conclusion cannot come to any end result of the conclusive process unless he knows what Decision requires for a decision. Decision can say, 'You must give me that kind of conclusion for my decision'; and Conclusion could correspondingly say to Decision: 'You must give me advice on the kind of conclusion suitable for your decision'. Advisability also entails informability, as 'ought' accompanies 'must'.
4. Although Execution is responsible to Decision for carrying out the policy as commanded by Decision, he must have the right to pass information to Decision upon the problem of execution - since he cannot be ordered to do something impossible to carry out and yet be held responsible. Moreover, decision cannot decide upon a policy unless it has information upon what Execution has done or can do.

A decision complex can be one whole unit (the continuous rectangular line of Figure 12) or it can be composed of two people (the interrupted lines), or it can be composed of three where the execution

and decision units or the conclusion and information units might be one - a dual unit.

5. Since each unit is, or could be, a decision complex in itself, information can come from a variety of directions. It may come from *below*, from within the total system, towards both the information and execution units.
6. Information from *external* sources can also come to any one of the four units provided there are means of receiving such information. In the case of a human social system, such as a firm, this is possible as it is composed of individual people. It is the variety of such external stimuli on each of these units which causes so many disruptions, or dysfunctions of the firm as a social system; each person is a sensory receptor unit within the total.'

APPENDIX 4: PRODUCTION PLANNING AND DESIGN COURSE FOR FIRST YEAR BUILDING STUDENTS AT THE UNIVERSITY OF THE WITWATERSRAND

This appendix includes both an outline of the major section of the course, as given to students in the 1976 academic year, and an example of a project. The outline illustrates how the philosophy of the 'integration of design and construction' has been interpreted in the educational situation while the project illustrates how the philosophy is translated into reality for the students.

COURSE OUTLINE

Overall Objective The objective of the course is to develop your powers of observation, analysis and synthesis as well as your ability to communicate - in relation to the discipline of building.

Context: The provision of small-scale residential accommodation is the context in which the objective is set.

Targets: At the conclusion of the course the student is expected to understand:

1. The inter-relationship between the materials and components of buildings.
2. The process of construction of buildings.
3. The effect of process on the inter-relationship between materials and components.

An appreciation of the manifest properties of building materials

and components, the tools and equipment used in building, and standards of workmanship is expected from the student.

Also, the student is expected to have developed his ability to efficiently communicate concepts relating to the above matters.

Method:

1. Lectures will be given on the principles of communication and building construction, and it is expected that the student supplements knowledge thus gained with private reference to recommended text books, codes of practice and standard specifications.

2. Site visits will be arranged to enable the student to gain an overall appreciation of the practice of building and to familiarise himself with the three-dimensional nature of building. The purpose of the site visits is also to provide information which the student can analyze, and then synthesize with other information, to achieve the objective of the course.

3. Log books are to be kept by all students. The log book is intended to be a notebook in which any information relevant to building (and especially that obtained during site visits) is recorded in a form suitable for reference in projects and tests. Information should be gained not only from programmed exercises but also from private site visits and broad enquiry into the building activity which surrounds us.

4. Projects involve the solution of problems. Satisfactory results can only be achieved if lectures are fully comprehended and information from site visits comprehensively obtained and recorded. However, in addition, careful analysis of the projects themselves must be undertaken to achieve satisfactory solution of the problems set.

5. Seminars involve discussion between student and student, and student and staff. The primary purpose of seminars is to give the student feedback on projects and therefore improve the approach to problem-solving as well as to monitor the correctness and validity of the information collected and used by the student.

PROJECT: JUNCTIONS AND COMPONENTS

Background: The junctions between building components are not only important from a structural and environmental-control point of view (also from an aesthetic viewpoint) but are also closely related to the process of construction - the way components fit together implies the way they are put together.

Objective: The objective of these projects is to assist you in understanding the three-dimensional relations between building components and elements and also the relationship between the process of building and the details of connection.

Problem: To the largest scale possible on A4 size transparent paper or plastic, draw a detail of the junction or component selected from the master-list put up in the studio. As these details will be used for projection they should be clear, distinct and well-annotated. On another A4 transparency outline the process of construction required to complete the junction or component.

Assuming that one or other of the materials or components required is unavailable or that delivery has been delayed, show how the detail could be altered to allow construction to proceed. Materials used may be changed where necessary. Also show how the process of construction is altered.

(The master list of junctions and components will be changed from week to week over the next 4 weeks and will cover the following areas of construction: openings in walls (including windows and doors), floor-wall junctions (e.g. thresholds), roof-wall junctions (eaves, verges, parapets) and sundry junctions in bathroom and kitchen.

Exercise: Each project is to be completed by 11.35 a.m. on the Thursday of the following week when each student will be expected to be able to present his own project for discussion.

APPENDIX 5: ORGANIZATION AND MANAGEMENT COURSE FOR SENIOR ARCHITECTURAL STUDENTS AT THE UNIVERSITY OF THE WITWATERSRAND

This appendix includes an outline of the course as it was presented in 1976 and also a resumé of the situation which gave rise to the introduction of the course and which accompanied its evolution during the past 7 years.

COURSE OUTLINE

OBJECTIVES: To provide an understanding of management principles and skills so as to enable the graduate to make his best contribution in the field of architecture.

To provide a means by which the mature student can interact with colleagues, practitioners and others so as to assist him in formulating vocational objectives and strategies.

GENERAL NOTES: The course extends over the first two terms.

Commitment: 2 double-period lectures per week Mon 11.35 - 1.15
Fri 11.35 - 1.15
1 afternoon tutorial Wed 2.15 - 5.00
(for working on and discussing projects)

The course is designed for the mature sixth year student. His classmates in other fields have secured their Bachelor degrees and have left campus to secure practical experience or have remained to undertake graduate studies. Involvement, rather than mere information assimilation, will therefore be required to

develop understanding.

The course is designed to permit equal and constructive participation by students, faculty members and outside practitioners. Course planning is based on the sharing of knowledge by all participants and on adopting the subjects in discussion periods to the interests of all participants.

Although the techniques of today's practice are used to explain and demonstrate certain basic philosophies and principles, the course is intended to encourage the student to think about the long range future of his career: the focus of the course is on principles which be of value to the students.

The amount of benefit you will derive from the course will depend on your contribution, exercised through reading, participation in lecture-seminars and hosting sessions and the preparation and presentation of projects.

Projects and Hosting Sessions during the year will constitute 50% of the final assessment at the end of the year; an examination (the form and date of which will be decided near the end of the course) will provide the other 50% of the total mark.

Please feel free to contact Henry Irwig, Department of Building Science, at any time about any aspect of the course.

PROGRAMME: Mon 16th February - Fri 19th March:

DISCUSSION OF TOPICS 1 to 10 INCLUSIVE:

These topics constitute the content of the lecture notes which deal with the application of the principles of management in the field of architecture

Mon 22nd March - Fri 23rd Ap[illegible]

DISCUSSION AND EXERCISES IN CONNECTION WITH THE FOLLOWING TOPICS:

FORMATION OF GROUPS
Reasons for Formation of Groups
Rational Tasks
Culture of the Group - Hawthorne Experiments

THE SMALL GROUP: INTERACTION
Advantages and Disadvantages of Groups in Task Effectiveness
Influence of Group Size
Communication Patterns

THE SMALL GROUP: PSYCHOLOGY
Hidden Assumptions
Politics
Effect on Rational Task of Grouping

MEETINGS: EXPRESSION OF THE GROUP
Purpose and Form of Meetings
Review of Techniques
Meetings of Planning and Design - Requirements

LEADERSHIP:

Bases of Authority

Styles of Leadership

Relationship between Task and Style

Mon 17th May - Fri 4th June:

STUDENT PRESENTATIONS:

These presentations will focus on the past, present and future environment (social, political and economic) within which architects work.

Mon 7th June - Fri 9th July

DISCUSSION AND EXERCISES IN CONNECTION WITH THE FOLLOWING TOPICS:

Introductory lectures will be presented by practitioners who have developed techniques in the following areas:

MARKETING, PLANNING & CONTROLLING THE ARCHITECTURAL SERVICE:

Obtaining and Securing Commissions - need, problems and techniques

Planning and Controlling Projects - need, problems and techniques.

FINANCE & ACCOUNTING FOR ARCHITECTURAL SERVICE:

Budgeting & Accounting - need, problems and techniques

Financial Implications of Legislation - income tax

- companies vs partnerships

INSURANCE AND ARCHITECTURAL SERVICE:

Ascertainment and Minimization of Risk
Basic Principles of Insurance
Types of Cover

Mon 12th July - Fri 23rd July:
HOSTING SESSIONS:

Preparation, presentation and feedback.

PROJECTS: All projects are to be done in conjunction with a particular architectural practice of your choosing. The objective of this procedure is twofold: Firstly, to provide you with a real situation for study; and secondly, to assist the practice with concrete proposals for improvement. Projects may be altered to suit better the particular circumstances of a practice - however, any such alterations must be discussed with Henry Irwig. It is important to observe that some information must be treated as confidential and the onus is on you to decide, in conjunction with the practice, what information should not be divulged.

There will be 4 projects. The subjects of the first three are allied to the topics of the three hosting sessions and the projects are designed to give you the maximum opportunity of contributing to the hosting sessions. The fourth project is designed to promote feedback to the practice you have been studying.

The objectives of each of the projects is set out below:

1. To define the functions involved in the practice of architecture and to isolate the management concepts which you consider vital for carrying out these functions effectively.

2. To trace the development of one or other sector of the total social, political and economic environment in which the S.A. architect finds himself, to forecast how this environment will change in the future and to analyse how such changes will affect the practice of architecture.

3. To analyse the roles assumed by those participating in design meetings and to isolate organisational,political and cultural sources which allow the observed assumption of roles to take place. Also to investigate the effects of role distribution on the solution of the task in hand.

4. To analyse the inter-relationship between the organisation and style of an architectural practice and the techniques it employs and to make practical suggestions for improvement by altering the existing, or introducing new techniques into the practice.

HOSTING SESSIONS: Three sessions, to take place during the week beginning Mon 12th July are intended to encourage interchange between practitioners and yourselves.

Each session will be regarded as an assignment for a team, the task of the team being to arrange and conduct a panel session on a selected aspect of management related to architectural practice. The panel sessions must be co-ordinated so as to form an integrated presentation and each should include formal contributions by final year students as well as by outside members and should be open to attendance by a suitably sized and mixed audience (e.g. students, practicing architects, property developers, etc.)

The responsibility of each team is to select resource personnel, venue, etc., organise and plan the session, invite an audience, brief and co-ordinate participants and carry out all post-session obligations. Each team is to submit a report which together with the reports of other teams can be bound together as a record of proceedings. This report is to be submitted not later than 23rd July 1976 and will be used in evaluating the hosting session.

Session 1. The Job of the Architect - Expectations

Session 2. The Architect's Role as Exercised in the Building Industry Today - Problems

Session 3. Meeting Expectations and Solving Problems.

BACKGROUND

In 1970 the late Professor W.D. Howie, Head of the Department of Architecture at the University of the Witwatersrand at the time, requested the author to prepare and introduce a course in management for final-year architectural students. This request was based not only upon the exhortations by the RIBA Education Board for the introduction of such courses into architectural schools (RIBA, 1962, p.15) but also on the findings of Professor T.J. Olivier, then a lecturer in the Department of Building Science, which indicated that architectural students lacked an appreciation of both management problems and an understanding of team-work. The content of the course was not rigidly defined but the objective, in common with the view taken at most other schools of architecture, was to level the scales a little so as to 'enable yogis (contemplative thinkers) to also become commissars (men of action who have things in ship-shape)'.

The development of the course by the author - under the guidance of Professor D.M. Calderwood, Dean of the Faculty of Architecture and, until 1976, Head of the Department of Building Science - was accompanied by a shift in the foci of managerial and architectural thought. In the 1960's the emphasis in both fields was on pseudo-scientific methodology (allied to high intellect) which would search out, analyse and overcome all problems infallibly and invariably. Although this approach incorporated many positive aspects, which were related to achieving maximum results with minimum resources, it was realized in the early 1970's that such confidence not only was grotesquely misplaced but always will be. The reaction, which continues today, was a swing towards participation, industrial democracy and motivation work groups which, in many respects, deny the

work of the previous decade and result in compromise, rather than reconciliation of ends and means.

In the development of the Organization and Management course, the need to integrate the two approaches outlined above was recognized. It was found that, in order to achieve such an integration, both traditional management as well as traditional architectural principles need to be synthesized with these approaches. The achievement of such a synthesis within the traditional framework of the architectural profession was however found to be a problem at both an intellectual and a practical level. It is this problem which has substantially determined the direction for this thesis.

APPENDIX 6: AN EXERCISE IN GROUP WORK

The exercise described in this appendix constitutes a tutorial in the Organization and Management course outlined in Appendix 5. The objective of the tutorial is to illustrate to students the importance of the socio-emotional dimension in group work and to show the effect of role distribution and behaviour on the decisions made by the group. Students are required to form themselves into groups of four or five, each of which represents a company contracting to build a communications tower. The instructions given to each group are outlined below.

Instructions:

TEAM TASK 1: Time : 1 hour

(a) As a management team, examine the handouts headed:

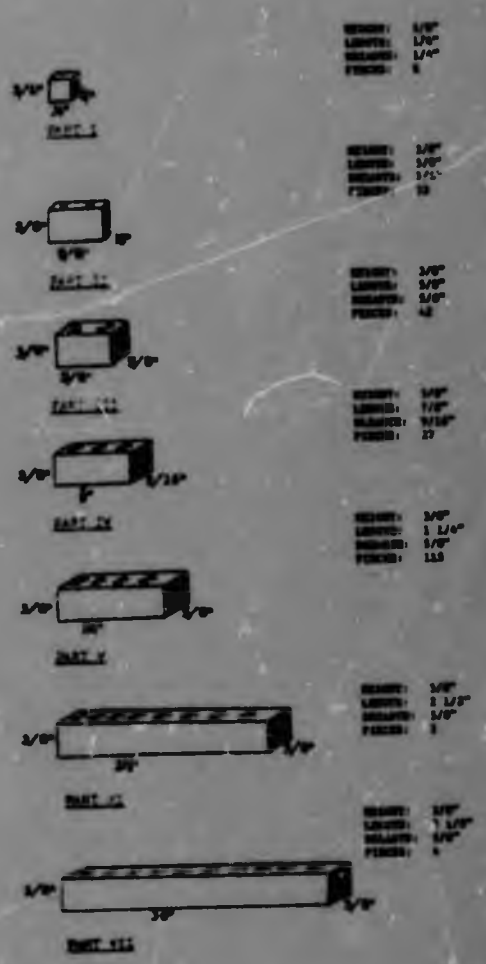
1. Materials specification chart.
2. Time/Profit function graph.
3. Height/Profit function graph.
4. Material/Profit function graph.

NOTE: Final product must be within all three profit/loss functions.

(b) Set objectives for maximization of profit.

(c) Plan for materials to be used, construction techniques, control techniques, etc.

(d) Requisition and collect building material (last 10 minutes of the hour).

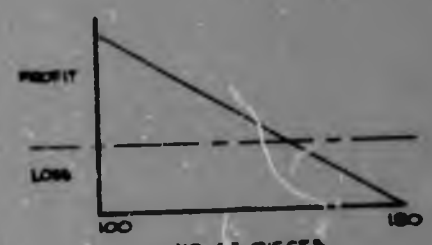


MATERIALS SPECIFICATION

TEAM TASK II: Time : 10 minutes

In not more than 10 minutes, each group must contruct a model tower.

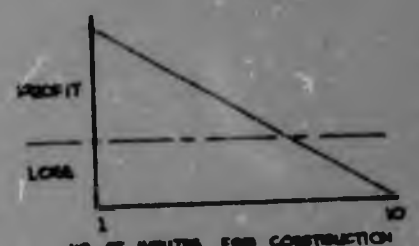
NOTE:
1. Minimum height - 35".
2. Tower must be rigid enough to stand unsupported long enough to be measured.
3. No materials other than those issued may be used.
4. Should the tower collapse before it is measured, or if it fails to reach a height 35", the team concerned will incur costs of R120,000.



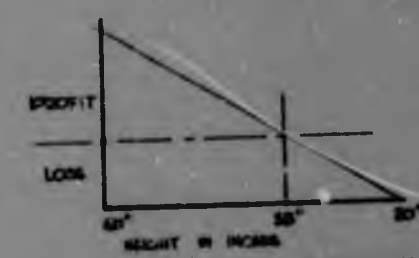
MATERIALS / PROFIT FUNCTION

TEAM TASK III: Time : 30 minutes

1. Complete the statement of profit and loss on the form provided.
2. Analyse the bearing of the following factors on the success (or failure) of your group efforts
   (a) Planning
   (b) Leadership and Co-ordination
   (c) Organising
   (d) Control or evaluation.
3. Elect a group speaker to give a 5-minute presentation of your findings culminating in the four most important brief do's which can easily be recorded on the board.



TIME / PROFIT FUNCTION



HEIGHT / PROFIT FUNCTION

TEAM TASK IV: Time : 5 minutes for each group

Speakers give 5-minute presentations of their group's analaysis (Team Task III).

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in situations where changes in social patterns render the division of the tasks between the two sub-professions obsolete. The major problem, therefore, of the organizational structure of the legal profession is a lack in the flexibility of the profession to redistribute its tasks among its two branches.

The balance of advantages against disadvantages, as seen by the legal profession, is summarized by Holdsworth (Vol. 15, 1965, pp.243-244):

> 'But the reasons in favour of the continued separation of the two branches of the profession, though much less obvious than the reasons against it, seem to me to be stronger. In this, as in many other cases, further consideration shows that much in our legal system which we rightly prize would be jeopardized if this reform were made. My reasons for this opinion are as follows:
>
> In the first place, though a division of the legal profession on these lines would be impossible in a primitive community, some such division naturally appears as soon as social and economic progress produces a more complex legal system. In America in earlier days such a division would have been neither possible nor necessary. But as soon as a more complex legal system was developed it naturally appeared. Lawyers found that it was convenient that court work should be done by one member of a firm, and other work by another. In the second place, such a division of labour in a complicated case, or in a case in which strong feelings are aroused

is useful to the client. The attorney or solicitor who has been in close contact with the client, and who has been actively engaged in getting up his case and the evidence to support it, cannot advise upon it with the same impartiality as the barrister to whom the attorney or solicitor submits the client's story and the evidence in support of it. The client gets a more valuable opinion as to whether or not it is advisable for him to bring or defend an action and how he should shape his claim or his defence. In the third place, such a division makes for a clearer definition of the law. Because the barrister can view the case with more detachment than the attorney or solicitor, he can state to the court with greater clarity its legal implications; and because it is thus presented to the court, the court is more likely to reach a decision which is logically correct, and in accordance with the principles and rules applicable to the particular branch of the law which governs the case. Moreoever the consequent specialization amongst members of the bar, and the inducement given by this division to the attorney or solicitor to consult a specialist, are not only beneficial to the client, but are a further safeguard that the law will be applied and developed on the right lines. In the fourth place, barristers are not, like attorneys and solicitors, officers of the court. They can only be disbarred by their Inns of Court, which are self-governing and independent societies. No doubt they can be dealt with by the court if, in their conduct of the case, they are guilty of anything like disrespect to the judge or contempt of court.

> But, apart from this, they have a large measure of independence in their conduct of their cases. In times past this independence has been of great service to the cause of liberty. Some of the great constitutional cases of the seventeenth century, and some of Erskine's famous cases in the eighteenth century, sufficiently illustrate this fact. It is probable that this independence would be menaced by a fusion of the two branches of the profession. Lastly, the fact that barristers and their Inns of Court have this large measure of independence and the fact that judges are chosen from their ranks, have, when combined with the security of the tenure of the judge's office, helped to produce that courage and impartiality which, for two and a half centuries, have distinguished the English bench, and have been a principal safe-guard of the rule of law and the liberties of the subject. It is these considerations, sometimes instinctively felt rather than precisely formulated, which have led the most experienced solicitors, and the majority of the bar, whether leaders or juniors, to maintain this division in the ranks of the legal profession.'

Although the legal profession has received its fair share of public criticism and, in Britain, is presently being subjected to investigation by a royal commission, the inherent advantages of the dual system seem likely to ensure its future endurance (The Economist, February 21, 1976, pp.15-16).

The division of the work of the legal profession between its two branches thus allows each branch to operate within the social framework best suited to the promotion of the competence and integrity of its members. It therefore accomplishes the fusion of the advantages of the two organizational structures suggested by the RIBA in 1962 and provides a model for the re-structuring of the architectual profession.

CHAPTER 14: A NEW PROFESSIONALISM

> 'There is an age-old conflict between intellectual leadership and civil authority... And that is a crisis of choice that leaders have faced over and over again: Socrates in Athens; Jonathan Swift in Ireland, torn between pity and ambition; Mahatma Gandhi in India; and Albert Einstein, when he refused the presidency of Israel.'
> (Bronowski, 1973, p.429)

14.1 AN OVERVIEW

After identification of the problem facing the architectural profession, namely that the established patterns of professional conduct may have become disfunctional in terms of the substantive function of the architect, the context of the building design activity was defined and the meaning and importance of productivity in this activity explained. The centrality of the human creative process as an input in design was then established and it was shown that the organizational environments within which designers work have a direct influence on their capacity and their motivation to engage in the creative process. The structure of project organizations in the building industry was subsequently investigated and found to be quite different from the situation as it is assumed to be by the architectural profession at large. It was shown that, due to changes in technology and increased expectations in society, project organizations - which constitute the primary organizational environment for architects - are increasingly characterized by groups in which members simultaneously compete and co-operate in briefing and evaluation.

Author Irwig H G
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