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The building design process: an investigation into productivity

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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.

4.2 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.

14.3 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 interpre-a-

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
		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
1610 Palladian Phase - Inigo Jones, Christopher Wren 1750		Appearance of surveyor (master-craftsman) 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
		Emergence of artist architects with no craft training		Certain surveyors undertake supervision only.		Some of surveyors benefited from fortunes created by their fathers were able to develop interest in learning and the arts. Accompanied by newly important status of architects in society
	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 pressures for speed in building
1795 First Occupation of South Africa by Great Britain 1831 1840	Full time artist-architects increase in importance and extend scope of influence.			Surveyor tends to become professional measurer of work		Industrialisation and urbanisation 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
		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
		Appearance of engineering consultants advising architects and undertaking design, drawing and specifications where necessary. Co-ordination by architect.				Increasing complexity of buildings
1940 1948		Quantity surveyor advising architect on cost planning				Growth of population in cities gives rise to larger buildings and increased land costs which makes price of buildings more critical

Regional Trend towards Unification in South Africa

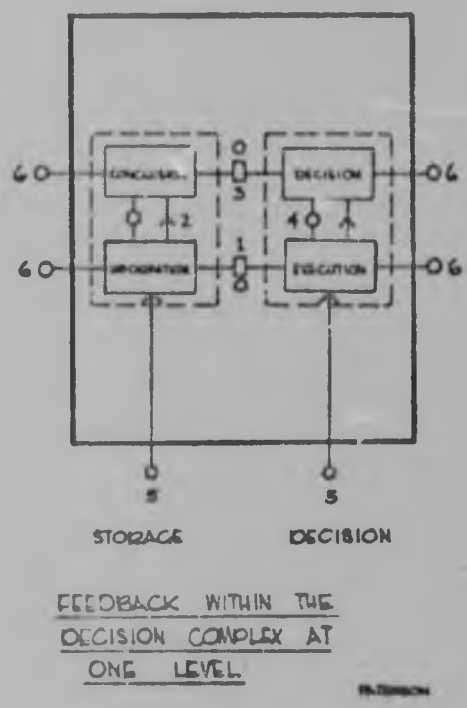
Progressive Unification in Britain and South Africa

The English Renaissance

Age of Neo-Classicism and the Picturesque

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 repo t, 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 familiarize 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 1975 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 April:

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 communica s 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:

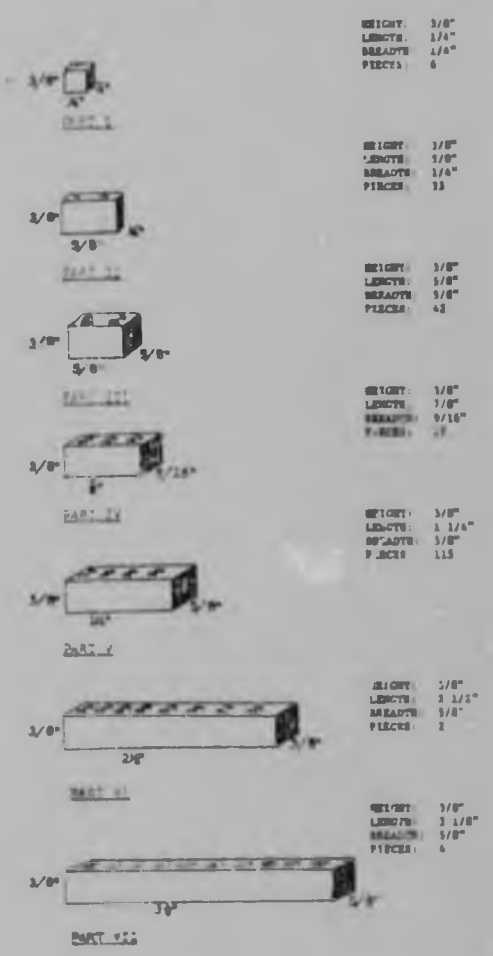
1. Materials specification chart.
2. Time/Profit function graph.
3. Height/Profit function graph
4. Material/Profit function graph.

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

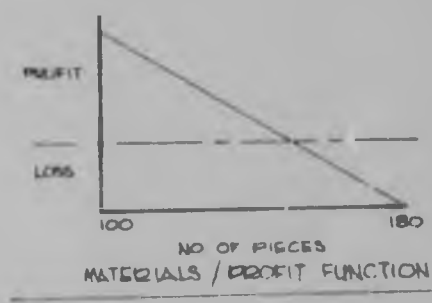
In not more than 10 minutes, each group must contruct a model tower.

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

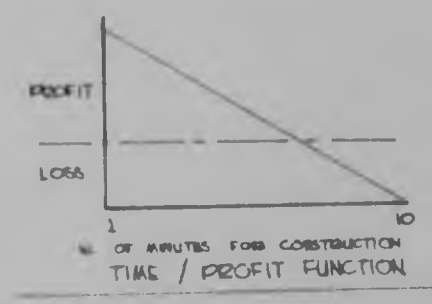
   (a) Planning

   (b) Leadership and Co-ordination

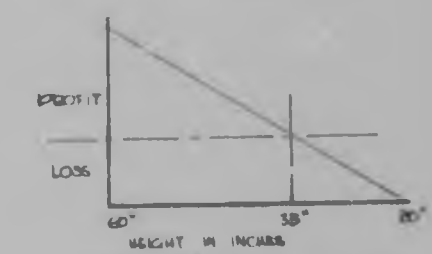
   (c) Organising

   (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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ADDENDUM: THE DIVIDED ARCHITECTURAL PROFESSION - A HYPOTHETICAL CASE STUDY

1. INTRODUCTION

The objective of this case study is to illustrate the applica_ion of the 'attorney/barrister architect' hypothesis to a recent major South African project. The project chosen was designed and built for a large national company in the retailing field and comprises a new corporate headquarters for the company and a dist_ibution centre servicing outlets in the metropolitan area in which it is situated. It was selected because of the unique nature of the development and the large degree of interest, by peopl_ concerned with property development and building, in wh t appears to have been a complex and often traumatic process spanning almost a decade, from the late 1960's to the present time.

Although the process outlined in this study is purely hypothetical, it draws on facts gathered by the author from various sources, both published and other, and a number of personal visi_s to the project. These facts are used with some licence, to establish a comparatively realistic context for the description of professional roles and relationships which, it must be emphasised, are purely speculative and arise from the thesis presented in Chapter 14 of this work.

2. THE PROJECT

In order to provide a framework against which the development process referred to above can be discussed, a broad description of the physical nature of the project is presented.

The project is located on approximately 9 hectares of land situated on a small plateau adjacent to a major motorway interchange only a few kilometres away from central Johannesburg. The land, now valued at R2m, comprises part of a vast belt of mining property - largely owned by a property development company spawned by the mining industry - and divides central Johannesburg from its residential and industrial suburbs to the south. The project is the first major non-residential development on this property (made possible by the grassing of the ubiquitous mine-dumps) and therefore constitutes an important stimulus to the long-term enhancement of an increasingly vital part of the city. It comprises the two major buildings mentioned above and two much smaller ancillary structures, all situated in a landscaped setting which integrates the entire development and provides access for trucks and parking for about 500 cars.

The fully air-conditioned headquarters building, costing approximately R10m exclusive of office furniture and screening, was designed not only to house the administrative staff of the company and its ancillary equipment but also to project the new, progressive, consumer-oriented policy adopted by the directorate of the company.

The building consists of three irregularly-shaped overlapping floors, each approximately 12 000 m^2 in area. The ground floor is given over primarily to public areas which are characterised by expensive indigenous and imported finishes and exquisitely detailed architectural elements all dramatically lit from above. The remainder of this floor comprises a computer facility, plant rooms and utility areas serving the public spaces. The two upper floors, accessible by escalator from the main foyer at ground level, consist of extensive 'open-plan' office space situated between the perimeter of the building and an inner core which contains service areas and expensively finished and detailed washrooms and small conference rooms. The floors of the office space are carpeted throughout. Ceilings consist of an open waffle-type grid which partially conceals air-conditioning ducts, electrical trunking and other services suspended below the floor and roof slabs. Division between spaces is accomplished through the skilful placement of elegant office furniture, screens and planting of many varieties.

The structure of the building consists of circular reinforced concrete columns and towers - the latter also act as the vertical ducts of the air-conditioning system - supporting reinforced concrete coffered slabs. Large tinted-glass panes set in anodized aluminium frames, rough textured precast concrete panels and a small area of baked-enamel steel cladding enclose the building and protect the interior from the elements.

Although the primary function of the building housing the distribution centre is to provide secure storage facilities for goods and space for efficient reception, transportation and dispatch activities, the proximity of this building to the headquarters required that at least the external form and finishes of this building complemented the headquarters so as to form an integrated development.

The building, costing approximately R2.5m, incorporates 21 000 m^2 of floor space at ground level, most of which is occupied by sophisticated multi-level storage cages and conveying equipment the cost of which is not included in the abovementioned figure. The building is almost square in plan and of uniform height, with a series of doors for off- and on- loading on opposite sides. Its structure consists of a grid of steel columns supporting a framework of tubular steel trusses which, in turn, provide support for the sheet-steel roof and fire-protection, mechanical ventilation and electrical services. The exterior of the building is clad with baked-enamel sheeting (of the same type and colour as used in the headquarters) which is relieved by the sensitive use of rough-textured in-site and precast concrete and a very small amount of tinted glass.

The two smaller structures in the development accommodate the security control for the distribution centre and a workshop and refuse-store associated with the headquarters. The external form and finishes of these structures harmonize with and complement the larger buildings.

3. THE PROCESS:

In this section the process of development and project procurement as conjectured by the author is described, to illustrate how the 'attorney/barrister architect' hypothesis could operate in practice. The description leans on two assumptions: the first is that the division of the architectural profession along the lines discussed in the main work has become entrenched; the second is that the duration of the process is determined largely by factors which have little to do with the organization of the professional services. It must be emphasised that the process described constitutes neither the sole nor the ideal arrangement for the realization of the project and that the description of the process is not intended to be comprehensive but rather to highlight aspects which impact on the roles of, and the relationships between, the participants who become introduced as the process progresses.

In order to create a framework for the discussion of roles and relationships, the continuous process of development has been divided into 7 phases, each with its own identifiable character. It must be emphasised that these phases do not coincide with the functions (processes) described in sub-section 2.2.2 of the main body of the thesis but often include a number of these within a phase. The phases constitute the topics of the following sub-sections each of which deals with the primary focus of the phase, the principal participants, their roles and responsibilities, and the factors which influenced the selection and organization of these participants respectively.

3.1 Introductory Phase: (Late 1960's - July 1971)

The principal characteristic of this phase is the progressive realization, within the retailing company (the building sponsor), of the nature of its future accommodation requirements. This realization was prompted by a number of factors the most important of which were continuing and increasing dispersion of the company's administrative and warehousing facilities in various rented

buildings, the escalating rents in these buildings and the unsuitability of most of these premises for the installation of new warehousing methods invented to handle the type of merchandise marketed by the company. The adoption by the directors of the company of the new policy mentioned in the previous section of this addendum reinforced the idea that a centralized headquarters and an up-to-date distribution centre - to be situated close to the centre of Johannesburg - were priority items and resulted in the appointment of an independent organization to assist in formulating the programme for these facilities.

The main participants in this phase were the directors of the company, one of whom was the head of the company's building services department. This department (comprising the head, an assistant and two draughtsmen) was situated within the administrative offices of the company and acted as 'attorney architect' for the ongoing building programme required by the continued expansion of the company especially with regard to the provision of new retail outlets and the enlargement and upgrading of existing outlets.

As most design work involved in the ongoing building programme is undertaken either by the display department of the company or by 'barrister architects' - appointed directly or by the 'attorney architects' of the company's many landlords - the prime function of the in-house 'attorney architect' is managerial in nature. With regard to building work commissioned directly by the company, this involves the investigation of accommodation requirements, the selection and briefing of consultants, the conversion of consultants' designs into production information and, where necessary, bills of quantities, the negotiation of contracts with contractors and subcontractors, the supervision of their work with respect to quality, cost and time and the provision of overall co-ordination during the total process of project procurement. With regard to work undertaken by others (particularly landlords) for the company, the 'attorney architect' functions primarily as representative of the company in briefing, design evaluation and supervision.

An implicit function of the'attorney architect' is to provide feedback information and advice to other departments in the company and to the policy-making body. With regard to the project presently under consideration, this function was performed by the head of the building services department. He brought to the attention of his fellow-directors the urgency of the need to reassess the accommodation policy of the company in the light of its other policies and the proposed development of mining land near Johannesburg of which he had become aware through his continuous contact with members of the property and building industries.

An interesting question which arose during this phase was whether or not the in-house 'attorney architect' should undertake the relevant work on the new headquarters and distribution centre. Although the head of the building services department (the 'attorney architect') was initially eager to expand the scope and size of the in-house operation in order to be able to handle the new project, discussion of the advantages and disadvantages of this plan with his fellow directors convinced him that the probable pitfalls far outweighed the possible benefits. The disadvantages included the difficulty of building up the required staff in the short period available, the danger of not being able to sustain enough work to support the staff when the project went through dormant phases or was abandoned, the associated problem of building up a balanced multi-disciplinary team with expertise relevant to the project and the natural tendency of any in-house operation to follow well-worn paths rather than take a fresh fundamental approach. The independent 'attorney architect' eventually chosen to undertake responsibility for briefing was in fact recommended by the head of the in-house operation because of its ability to avoid these problems, its relative objectivity and its history of excellent performance and co-operation on projects with which the company had, in one way or another, been associated in the past.

3.2 Preparation Phase: (July 1971 - December 1972)

This phase is characterized by intensive communication - both within the company and between members of the company and outside organizations - as the various parties involved attempt to anticipate their future needs and understand how these will be influenced by the demands of others. Tours of overseas facilities and developments are the order of the day and there is an aura of keen expectation. The main task during this phase was to analyse the detailed quality, cost and time requirements for the project, to test their feasibility and to evaluate alternative sites in the light of the progressively refined terms of reference. The preparation and review of alternative outline designs resulted in agreement on the detailed requirements which were to be met, the overall form of the project (at that time a high-rise office block with a separate distribution facility situated next door) and the site on which it was to be situated. The agreement reached provided the impetus for all parties to proceed to the next phase of the project which included progressively more detailed design, submission of applications for land development approval and legal transfer of the land.

Among the prime participants in this phase are the senior managers representing the various departments in the organizations involved, namely, the retailing company, its holding company (which was providing the bulk of the finance for the project) and the property development company owning the land on which the project was to be built. Dominant among the specialist units were the independent 'attorney architect' mentioned in the previous sub-section and an eminent 'barrister architect' who was introduced into the project during this phase. The 'attorney architect' comprised a large multi-disciplinary practice which operated on the basis of project teams, constituted under a project manager, with members of the various specialities being selected according to the nature and also the stage of projects. The 'barrister architect', whose work at both the interior design and urban scales has been widely acclaimed, practiced as

an individual within an atelier of ten people who shared rooms in a Herbert Baker house situated on the northern fringe of central Johannesburg. Geotechnical, warehousing and other experts were also consulted during this phase as was also the in-house 'attorney architect' especially with reference to matters concerning the past experience of the company.

The principal function of the multi-disciplinary 'attorney architect' practice during this phase was to co-ordinate, on behalf of the building sponsor, the complex and politic-ridden decision-making process aimed at establishing a viable brief. This entailed ensuring that all relevant information - design, technical, financial and statutory - required for effective decision making was provided accurately and timeously. In some cases, the required information was obtainable only by consultation with experts. It was the responsibility of the 'attorney architect' to advise on the selection and conditions of employment of such experts and consultants, and also to advise on the selection of the 'barrister architect' and to integrate them into the process in a productive way.

The task of the 'barrister architect' was the creation of alternative designs. His obligation to the building sponsor, exercised via the 'attorney architect', consisted merely in providing the best, most comprehensive and most clearly presented advice within his capability and within the bounds of his professional responsibility for the quality of the built environment. Both these qualities were enhanced by the intimate, confidential relationship which was maintained between the members of the atelier in which he had his studio. Indeed it was the assurance provided by this organizational situation which influenced the management of the property development company to accept many of the design suggestions of the 'barrister architect' despite the fact that they appeared, on the surface, to be somewhat contrary to the policies and programmes of this company and to favour the retailing company.

3.3 Crystallization Phase: (December 1972 - February 1973)

The tone of this three-month phase, although less dynamic in terms of social interaction and flow of communication when compared to the phases which preceded it, was nevertheless far more dramatic in its conclusion. The primary objective during this short period was the development of the outline designs prepared in the previous phase in order, eventually, to arrive at a precise definition of the configuration of the buildings comprising the project. Progress towards this objective was being made when, suddenly and almost simultaneously, a series of events occurred which caused the project to be rather hurriedly, if not permanently, abandoned. Among the circumstances which arose were the take-over of the property development company, the resignation of a number of key department heads in the retailing company (occasioned to some degree by disagreements which arose during the previous phase), problems with the land development application because of the proposed height of the office building and increased conservatism on the part of financial institutions in granting bonds to commercial companies. Exacerbating this situation was the strong stand taken by the 'barrister architect' involved during this phase against the compromise solutions which were suggested in order to rescue the scheme.

Main participants in this phase were once again the senior managers in the various companies and the multi-disciplinary 'attorney architect' practice, particularly the project manager in this practice. The most important role was, however, played by a junior 'barrister architect' assisted by and practicing in the same atelier as the eminent 'barrister architect' who had participated in assessing the feasibility of the project. Complementing this team were also an increasing number of specialist design engineers who were required to provide advice on the structural, mechanical and other engineering subsystems incorporated into the buildings. Although there was a reversal in the importance of the two branches of the architectural profession in this phase, their functions were very much the same as outlined in the previous phase.

The selection of the junior 'barrister architect' merits some discussion. Although the building sponsor wished to retain the eminent 'barrister architect' mentioned above, a number of factors brought to his attention by the 'attorney architect' influenced him to adopt an alternative arrangement whereby a junior was commissioned as prime designer with the senior merely being retained to provide back-up and guidance. The factors which influenced the sponsor to change his plan were the high fees of the senior (coupled with the extensive amount of design work involved in the project, particularly with regard to the headquarters), his involvement with other large projects at that particular point in time, and the availability of a talented and enthusiastic younger individual who was known to the managing director of the retailing company and ready to devote considerable time to the project, having just emerged from his period of pupilage.

3.4 Dormant Phase: (February 1973 - July 1974)

This phase commenced with the more-or-less simultaneous abandonment of the new project and the emergence of the prospect of purchase, by the holding company, of an existing facility which appeared to be able to meet the needs of the retailing company. After lengthy consideration and related negotiations with the prospective seller of the facility, the decision was reached that this facility was not suitable. During this process the initial brief underwent some modification, especially in those areas previously heavily influenced by the key department heads who, by this stage, had left the company. This resulted in a previously considered site, also owned by the property development company introduced earlier and situated only a short distance from the site of the abandoned project, becoming an attractive proposition. The phase culminated with the purchase of this site.

The main participants in this phase were, once again, the senior managers of the companies involved and the multi-disciplinary 'attorney architect' practice. The primary function of this practice was to assist the building sponsor in evaluating the suitability of the facility mentioned above with respect to architectural, technical and cost factors contained in the brief. An implicit function was to revise the brief in the light of changing perceptions within the company and changing circumstances in the environment as a whole.

Although the appointments of the two 'barrister architects' had been terminated, they were nevertheless appraised of the situation as it evolved during this phase. The junior had also received a number of smaller design commissions via the in-house 'attorney architect' of the retailing company and had undertaken these with considerable success. In addition, he had become interested in the design of open-plan office accommodation and had, in fact, been awarded second prize for his submission in a competition organized by the society of 'barrister architects'.

3.5 Recrystallization Phase: (July 1974 - January 1975)

The dominant characteristic of this phase was an increasing commitment to the revitalized project which was associated with a progressive sense of urgency as arrangements were concluded in connection with the realization of the project and the vacation of existing premises.

The phase commenced with the adroit conception and speedy acceptance of a new outline design which, although subsequently refined and articulated, still remains apparent today. The development of the design was accompanied by the gradual incorporation, into the evolving project organization, of enterprises whose expertise and/or resources or products were required either to further develop the design and/or to realize the project. These enterprises included consultants (such as the structural engineer for the headquarters building),

design-and-supply sub-contractors (of which both the structural firm concerned with the distribution centre and the ventilation and air-conditioning organization are good examples), specialist materials suppliers (especially those importing materials from overseas), large component manufacturers (such as the precast concrete producer) and the main contractor (who possessed a large mobile crane which would considerably expedite the construction of the reinforced concrete structure of the headquarters building). Concurrent with the development of the design, application was made for approval by the city authorities in order to allow construction to proceed on site. This phase was concluded with the granting of such approval.

The central participants in this phase are the multi-disciplinary 'attorney architect' practice and the second 'barrister architect' who was re-appointed with the revitalization of the project. It was felt that it was unnecessary to re-appoint the senior 'barrister architect' especially as the junior would maintain informal contact with him via the aterlier of which they were both members.

The main function of the 'attorney architect' during this phase was to provide co-ordination between the various participants in a way which maximized feedback to all those involved, with minimum disruption of their respective activities and without incurring additional cost to the building sponsor. In addition, the 'attorney architect' was responsible for organizing more-or-less routine design tests (such as wind tunnel analyses) and the supervision of the design to the various regulatory authorities. During the development of the design, the 'attorney architect' also undertook the conversion of the designs (intentions) of the 'barrister architect' into production information (including drawings, schedules, specifications and bills of quantities) and the correlation of this information with that produced by consultants and design-and-supply organisations. As work in this phase proceeded, so also did the involvement of the 'attorney

architect' with the phasing of the project and the selection and negotiation of contracts with contractors, sub-contractors and materials suppliers, in order to meet the time and cost parameters set out in the brief.

During this phase the 'barrister architect' undertook design at many levels of detail, continuously checking consistency between the levels and between the evolving design and the brief, as it was amended by the 'attorney architect', often in order to capitalize on ideas evolved by the 'barrister architect'. During this phase the 'barrister architect' was also required to personally present his design to various organizations in order to gain their approval; these organizations included the building sponsor, the financiers, the property development company and the representatives and public of the city.

The relationship between the two components of the architectural profession was one of mutual 'advisability' as defined in sub-section 6.4.2 of the main body of the thesis (as was also the relationship between the 'barrister architect' and all others on the project, including the building sponsor). This relationship was exercised by means of frequent and intensive meetings between the two parties in order to reconcile quality-time-cost conflicts which arose continuously, especially during the latter period of this phase. Although from time to time illegitimate pressure was exerted by the 'attorney architect' on the 'barrister architect' to compromise his position with regard to design quality, the informal links with his compatriots in the atelier provided not only a mechanism for the in-depth discussion of the validity of his ideas but also moral fortitude to resist the pressures imposed on him.

.6 Realization Phase: (January 1975 - December 1977)

This phase is characterized by increasing activity on the site of the project. The phase commences with construction operations which become more and more intensive and diffuse with the passage of time and which, after the middle of the phase, become overlapped initially with the occupation of the distribution centre and later with the progressive occupation of the corporate headquarters. During this phase the activities described in the previous sub-section continue as the design is developed into detail. Changes required as the work proceeds lead to new smaller-scale versions of the cycle of phases described above as does also the interior furnishing of the headquarters buildings and the landscaping of the site. The phase ends with the handing over of the project to the building sponsor and the withdrawal of most of the building workmen from the site.

The primary participants in this phase of the project are the representatives of the various organizations involved with the actual construction of the project, or with the supply of equipment or materials required for its construction, and also the staff of the 'attorney architect' practice.

The 'new' functions exercised by the 'attorney architect' in this phase involved the control of quality, cost and time against the framework of the contracts entered into between the building sponsor and the various construction-oriented organizations and included the issue of payment certificates and the preparation of final accounts. An implicit function was also to keep the 'barrister architect' appraised of problems involved with the realization of his designs.

Although the 'barrister architect' was not directly responsible for the work on site, he was, from time to time, consulted by the 'attorney architect' with regard to the quality of work, especially where this contradicted or appeared to contradict the contract documentation. Furthermore, the 'barrister architect' regularly visited the site during this phase in order to assure himself that the work was being carried out in accordance with his designs and to gain first-hand feedback of the success or failure of his design decisions. On several occasions such visits resulted in design modifications which were transformed into variation orders by the 'attorney architect' and resulted in both improved quality and reduced cost.

3.7 Alteration and Addition Phase: (December 1977 - Demolition)

This phase commences with the presentation of a comprehensive building manual (including 'as-built' drawings and operation and maintenance instructions) to the in-house 'attorney architect' of the retailing company. The phase extends throughout the life of the project and includes all alterations and additions to the buildings.

The function of the 'attorney architect' during this phase is much the same as that described in sub-section 3.1; there is no need for the appointment of a 'barrister architect' unless the work is of a large scale or requires sensitivity in design. Despite this, however, an implicit task of the 'barrister architects' who were involved with the design of the buildings is to visit the project from time to time in order to monitor how their design decisions are withstanding the test of time and to discuss their findings with other members of their atelier.

4. CONCLUSION

Ideally, this conclusion should have contained a comparison of the roles and relationships illustrated in this hypothetical case study with those actually manifested on the project. This is, however, an undertaking which requires the full co-operation of all those involved in the project. This appears rather unlikely in the present situation. Nevertheless, the case study indicates that the possible success of the divided architectural profession results not from the elimination of the conflicts which bedevil the fused profession. Rather, it is due to the organizational checks and balances which encourage members of the divided profession to work through conflict towards reconciliation which, after all, is the lodestar of the architectural profession.

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