MAY/JUNE 1972

NORTH CAROLINA
ARCHITECT

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NORTH CAROLINA ARCHITECT

MAY/JUNE 1972
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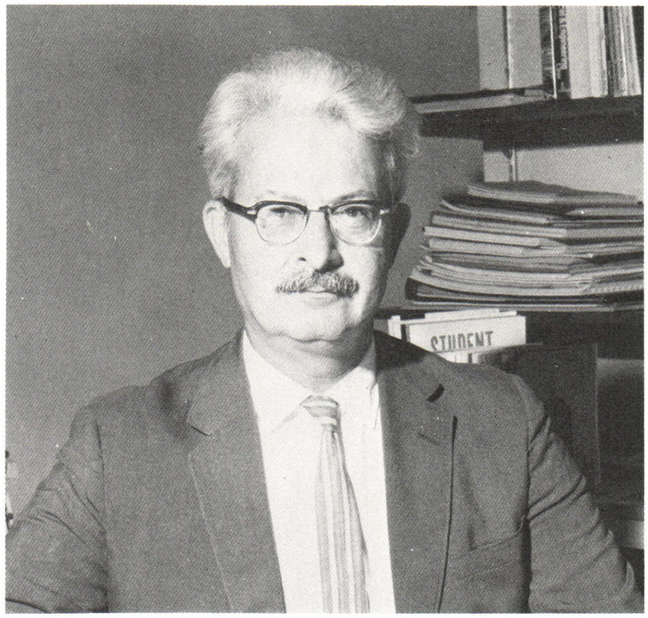
RETIRING DESIGN SCHOOL DEAN HAS BEEN REAL PART OF STATE



It's impossible to describe Henry L. Kamphoefner as simply the man who is retiring after serving as dean of the School of Design at N. C. State University since 1948. He has indeed held that post since 1948, and during those years the Design School has become nationally recognized.

But, Dean Kamphoefner has been more than just the successful administrator of a successful school. He has been a real part of the community and of the state. He has been a sort of gadfly who has, on occasion, amused half the community with flip remarks that also irritated the other half of the community. He has permitted no sacred cows in the field of design, and he has instilled in his students not only the ability to do solid work, but the desire to seek out the innovations which will help set the stage for design changes.

He has managed, too, to get across to the students the idea that they should be active parts of the total community. Recently, for example, some School of Design students designed and made special models that blind students here could use in their study of mathematics. Then, there were the students who have made detailed drawings of things which are passing from the North Carolina scene, things which once were commonplace, such as a log-made, furnace-fired tobacco barn. They also have recorded for generations to come detailed plans on old houses, old barns, etc.

Dean Kamphoefner's almost a quarter of a century of service for the School of Design has been a successful one. Some of the events of those years have included:

Students, faculty members and alumni have won $350,000 in prizes and scholarships.

The $5,000 Paris Prize, the leading academic scholarship in architecture in the United States, has been won by N. C. State graduates five times.

Fellowships to the American Academy in Rome have been won by three graduates.

Eighteen of the 20 Fulbright Scholarships awarded to N. C. State graduates have been won by School of Design graduates.

Five deans of architectural schools and one head of a department of architecture are School of Design graduates.

His colleagues and the 700 alumni of the School have chosen to recognize the contribution Kamphoefner has made as dean by exhibiting the works of the alumni that he has trained.

The exhibit, featuring paintings, photographs of buildings, drawings, and models of product designs, opened April 28 at the School and will continue throughout the summer. The exhibit will be supplemented with students' work from the past year, so that all of the dean's students will be included.

A lecture by James Marston Fitch, noted author and critic, was held as part of the exhibit opening. Fitch, professor of architecture at Columbia University, spoke on "Ideas in Design."

A reception, opening the exhibit, followed at the school. Alumni from as far away as Indiana were expected. Dean Kamphoefner, who is the senior architectural school dean in the nation, was also honored at an alumni luncheon at the national convention of the American Institute of Architects in Houston, Texas, on May 7.

The dean came to N. C. State 24 years ago from the University of Oklahoma where he was a professor of architecture.

He was educated at the University of Illinois, Columbia University, Beaux Arts Institute of Design, and Morningside College which awarded him an honorary doctor of fine arts degree in 1967.

He is a Fellow of the American Institute of Architects and has served as president of the Association of Collegiate Schools of Architecture.

His retirement has been well earned.

— Reprinted from Raleigh Times

COMPREHENSIVE DESIGN

AN INTERDISCIPLINARY APPROACH TO COMPLEX ENVIRONMENTAL DESIGN PROBLEMS

Peter Batchelor
Shafik I. Rifaat

COMPREHENSIVE DESIGN: AN INTERDISCIPLINARY APPROACH TO COMPLEX ENVIRONMENTAL DESIGN PROBLEMS

PETER BATCHELOR, A.I.A., A.I.P.
SHAFIK I. RIFAAT, A.I.A. (ASSOC.), A.I.P.

The future of the profession of architecture, as with other design professions, rests upon its ability to comprehend and manage the complex sets of variables and constraints inherent in real-world design issues. This study suggests that there is a universal process of design whose foundation is based on rational methods of analysis, interdisciplinary management, public and private decision-making mechanisms, and community involvement. The process, called comprehensive design, has a series of identifiable steps capable of application to most design problems.

Introduction 1

THE MILIEU OF THE CONTEMPORARY DESIGNER

For millions of years man lived in harmony with nature in what was, by most standards, a normal evolutionary ecological system. Without technology, man's evolution was very much compatible with the rest of the natural world. Then, as agricultural production, the growth of knowledge, and the subdivision of labor occurred — more or less at the same time in terms of evolutionary history — there was a startling change in man's ability to influence nature. In the last three hundred years this change is reflected in what we call industrial technology.

If one views the progress of technological development in terms of the growth of human cultural institutions then technology has clearly outstripped culture. What this has produced is a definable set of societal stresses as man attempts to cope with the by-products of technological innovation against an archaic governmental and economic structure. Most of our problems in the realm of environmental pollution, for example, are caused by the lack of effective political and economic control systems over a dynamically self-generating evolutionary technology. Consider this: The volume of solid waste from a typical middle income residence is equal to the volume of the residence itself within 2 to 3 years at current consumption levels.

To say that technology is guilty, however, is to sidestep the real issue. Society and its institutions — those activities such as government, religion, and education — have failed to come to grips with the social mechanisms needed to utilize this technological capability. The following pages, therefore, not only describe a revolution in terms of design, but also in terms of an evolving society. It is against this background that the architectural profession must build its strategies for growth and change.

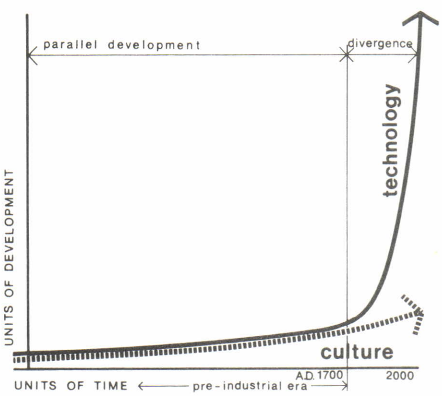
Recent Social Changes

In the early 1950's a growing affluence and detachment of technology from institutional morality gave credence to the concept that specialists could take over the entire spectrum of social decisions. C. West Churchman, renowned in the field of Operations Research, argued as recently as the late sixties that a scientist is in a better position to determine public policy than a politician. The consequence of this form of thinking revealed itself in urban planning in terms of the master plan— a document prepared by specialists for public adoption. Such an approach could rationalize the distribution of urban resources on a gross scale based on the assumption that local government was "good" — that is to say, working for everyone's interests — and on the manifest need for an expertise not clearly understood by the common public.

It is hard to say which assumption was, or is, more fallacious, but neither the beneficence nor expertise of government has yielded its anticipated results. On the one hand, local governments had become so impersonal and internally fragmented that defining a collective public interest for the purposes of adequate planning seemed to be almost impossible. On the other hand, decision makers became extremely dependent on techniques of analysis at a time when great doubts were being cast on both the scientific validity and utility of rational models in a subjective and value-oriented political process. In other words, the growing affluence and technological capability of the country reinforced a fundamental detachment implicit in the master plan approach and pushed it right out of the arena of both public and official relevance.

Master planning evolved into comprehensive planning in the 1960's. It took on the characteristics of open-endedness and adaptability to change, but was still unable to bridge the gap between the planner as the technician and the politician as the decision-maker of the plan. Consequently, large-scale environmental design concepts were largely abstract in nature and were not rooted in political realities. In the mid-sixties, a new movement in advocacy planning began to shift the objectives of large-scale planning back towards its recipients — the community — and some semblance of human utility began to appear in the programs for housing and redevelopment projects. Nevertheless, the planning and design process was still divorced from the political arena.

This complacent world of generalized and abstract planning conceptions based on rationality, comprehensiveness and equality, rather than on competing classes and groups, might have gone on for an indefinite period of time if some profound social changes had not taken place in the 1960's. These changes cannot easily be grouped or classified since they are a part of a series of continuous and interrelated events affecting all age groups, races and aspects of contemporary life and thought. It is against this background that a new pattern for the design professions has begun to emerge. The nature of this new pattern is related to the complexity of the issues to be dealt with and contains the following identifiable characteristics: Rational methods of analysis; interdisciplinary management; public and private decision-making mechanisms; and community involvement. This new type of design is what we call comprehensive design.



Comprehensive Design 2

THE SCOPE OF CONTEMPORARY ENVIRONMENTAL DESIGN

Most architects, whether we term them "traditional" or otherwise, are fully aware of the expansion of their practices into fields which overlap with other disciplines. In many ways this state of affairs has been forced upon us by external pressures from sponsoring agencies. That is to say, the client has tended to become an anonymous entity within Federal and State Governments or corporate hierarchies, and as such he (or it) has set standards for review and evaluation of projects which require tools quite dissimilar to those of the typical drawing office or studio. The scope of contemporary environmental design is therefore characterized by a drift away from the single, readily identifiable client and single parcel of land towards the more complex client group. This prevails in both the private and public sectors of design.

Large scale public sponsorship of design and the growth of ubiquitous corporate entities throughout the nation as sponsors of design is paralleled by an increase in complexity, operational scale, and magnitude of time required to complete a project. Thus, the often repeated aphorism that complexity, scale and time are the three characteristics by which we can distinguish architecture from urban design becomes harder to validate as architecture moves into the realm of the complex client group. Indeed, it takes just as much planning to develop an operational program for a hotel chain as it does to provide housing for a Model Cities renewal area. Keeping this in mind, the question must be raised as to the comprehensiveness of existing design techniques. In other words, is there a comprehensive design process, in the same way that we speak of a comprehensive planning process?

The authors are fully convinced that such a comprehensive design process does exist and that it can be defined from the current **modi operandi** of corporate design processes.[1] We will begin by examining the four preconditions which seem to exist in any complex, long-term design and development process:

- Rational Methods of Analysis
- Interdisciplinary Management
- Public and Private Decision-Making Mechanisms
- Community Involvement

While the merits of these preconditions can be debated, and their specificity adjusted to different design problems, we do believe that all of them **must** exist in a truly comprehensive design process. Their relative importance is a function of (a) the specific identity of the client, (b) the nature of the project, (c) its magnitude or scale, and (d) its environmental context. Given such a degree of variability between projects, the reader is asked only to observe the fundamental aspects of the comprehensive design process and not to become concerned with minutiae at this stage.

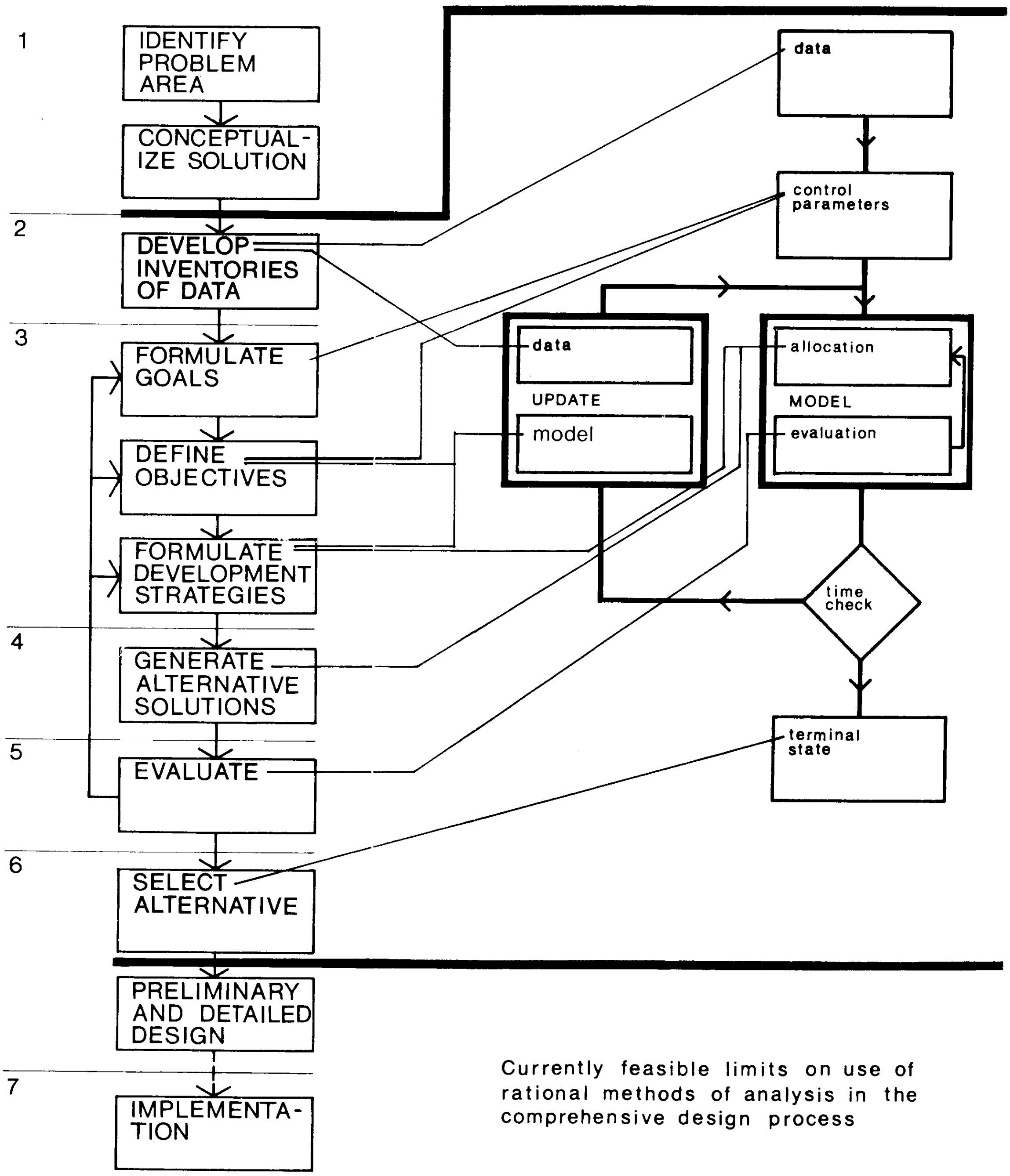
Rational Methods of Analysis

One overwhelming fact characterizes contemporary large-scale design projects: The designer must either utilize sophisticated information analysis techniques, or reduce mountains of data into generalized assumptions. In practice he does a little of both, although most of our schools have traditionally ignored environmental data processing techniques to the point that the designer, new or old, still plays the game by hunch or by conventional wisdom. However, there has been a sort of quasi-scientific attitude in recent years. This has been responsible for the proliferation of Venn diagrams and interaction matrices, but these techniques have not led to a useful synthesis. Indeed, the older generation of designer may have been better off for using his intuition, since faulty reasoning without experience often leads to an easily detectable lack of professionalism.

In recent years a small body of environmental designers have begun to recognize the widespread deficiencies in current methods of design. Drawing from many different areas of expertise, designers have developed several distinct methodologies which are growing in importance in the design fields, particularly in the phases of data analysis, programming, and evaluation. While it is not easy to classify these methodologies, most of them involve some form of computer-aided operation, while others rely on mathematical programming concepts. Among the more common methodologies are the following:

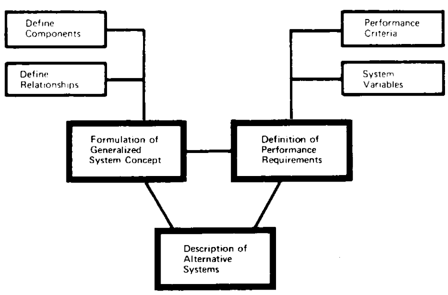
Mathematical Programming
Interaction Analysis
Program Evaluation Review Techniques (PERT)
Digital Mapping and Plotting
Man-Computer Interactive Design
Systems Analysis

Mathematical programming, particularly linear programming, has widespread use in economic feasibility studies, or in problems involving multiple assignment among different locations or different locators. Its chief use is to secure an optimal solution within specific constraints, and therefore serves as an excellent evaluative device. **Interaction analysis** has found its most useful application in specifying the contextual relationships of many different activities within a single space or volume. **Program Evaluative Review Techniques,** perhaps one of the oldest and most utilized of all of the architect's rational methodologies, grew out of a concern for scheduling events in such a way that resources were properly utilized. Construction scheduling and manpower deployment are two of the commoner uses of PERT, although a glance



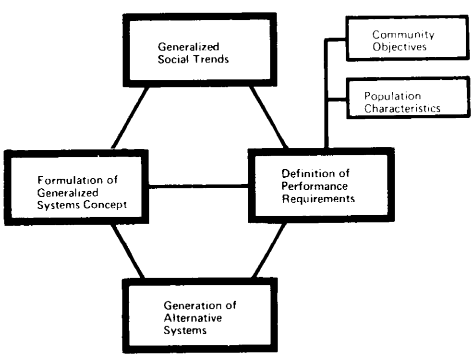
Currently feasible limits on use of rational methods of analysis in the comprehensive design process at the following flow diagram of the comprehensive design process might also suggest an additional use. **Digital Mapping and Plotting** techniques such as SYMAP, GRID, OTOTROL and others are computer-generated methods for two and three dimensional representation. Normally, building the initial data set for a map is a large task, but multiple generation of maps or perspectives at different scales is easily accomplished afterwards. **Man-Computer Interactive Design** circumvents the data collection task of digital mapping and plotting by allowing the user to create designs and the machine to encode and store the information thus created. This form of designing has come the closest to providing a machine-assisted synthesis for the designer.

Systems Analysis, as distinguished from the previous methodologies, is a complete process in which the interrelationships between variables are subjected to rigorous analysis. If a system is defined as a set of interrelated variables such that a change in one of them produces predictable changes in all the others, then an urban system requires that we define those variables and their interrelationships. An urban system is dynamic and open-ended — that is to say, capable of evolution — whereas other systems may be static and closed. In general, systems analysis has three interdependent phases: Definition of performance requirements, formulation of general concept, and description of alternative systems. Each phase is capable of recycling and influencing changes in the other two. Thus, the inability of all alternatives to meet specific performance criteria might result in changing those criteria.



General Systems Analysis. In real design processes each factor is capable of changing the other two, thus leading to convergence and ideal, or optimum, solutions.

General Systems Analysis is an all-purpose tool for dealing with complex, but discrete phenomena. Urban system analysis introduces a new dimension in the form of time. Analysis of trends yields data relevant to changing relationships among systems variables, which in turn influences the definition of these variables and the community objectives or performance criteria. An urban system is composed of many subsystems, each of which has its own operating rules and components. Urban subsystems may be both physical and nonphysical, and the descriptions of the components vary accordingly.

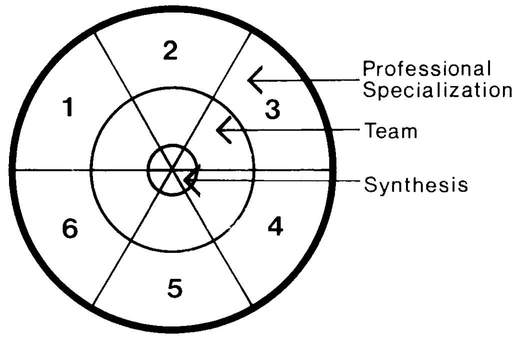


Urban Systems Analysis. The influence of the fourth factor, generalized population trends, leads to an evolutionary, open-ended concept.

The concept and methodology of systems analysis is probably one of the most powerful of all the tools currently available to the designer, since it acts as an organizing concept for the complex sets of variables and parameters included in large scale design problems. It is probably safe to estimate that by 1980 most offices will be working within some form of general systems analysis framework.

Interdisciplinary Management

It is now time to re-examine one of the great concepts by which thousands of architects have established their collective philosophies: The architect as a Renaissanceman, viewing himself as a Philosopher-King, and equating himself, at least symbolically, with the architect of the universe. Never before has it been so manifestly apparent that one man cannot possess the information or talents necessary to execute a large-scale design project. Similarly, it is also apparent that our schools will not be able to define that "core" of information they are so earnestly seeking as preparation for a single, all-embracing professional design methodology. Complex design problems require many different skills and areas of specializations, and the role of the architect in such situations must be no more than that of a specialist contributor within the total process. We can no longer afford the luxury of assuming that we have all the wisdom while others do not.



1 Design Disciplines
2 Applied Sciences
3 Social Sciences
4 Administrative Disciplines
5 Political and Economic Sciences
6 Physical Sciences

CONCEPT OF INTERDISCIPLINARY TEAM

Interdisciplinary management is characterized by a coordinated group of persons working on a common problem at different levels of involvement. Each person comes from an identifiable discipline or interdisciplinary background and may exist as a specialist or as a generalist within the problem context. Persons working at the level of design synthesis must be presumed to have a general knowledge of the other team members' fields. This fact argues for interdisciplinary training at all levels of professional education. In addition, any member of an interdisciplinary team may be its leader since the designer is not presumed to be the only one to possess special management skills.

A natural outgrowth of such cooperation is the interdisciplinary design team. Where very large design problems are involved, such a team could draw from as many as six different disciplines, although the number may increase or decrease without substantially influencing the team's design capability. The architect on such a team may not suffer a setback in terms of his ego; on the contrary, it could be argued that his capacity for giving physical structure to the concepts of others makes him more objective in the long run and better able to perceive the real design constraints which help to give form to ideas.

Public and Private Decision-Making Mechanisms

The number of reviews and check points in a complex design process seems to grow as a direct function of the time span of the project, the size of the client group and its diffusion among different departments and agencies, the general purpose of the project, and the magnitude of resources involved.

In order to define the phenomenon of decision mechanisms, it is first necessary to understand the comprehensive design process. As in planning, seven major process steps can be identified: Problem Definition; Resource Identification; Program Development; Proposals; Evaluation; Detailed Planning and Design; and Implementation. Decision mechanisms operate as mediating devices within the comprehensive design process; they serve to review and evaluate each phase before releasing it to subsequent development.

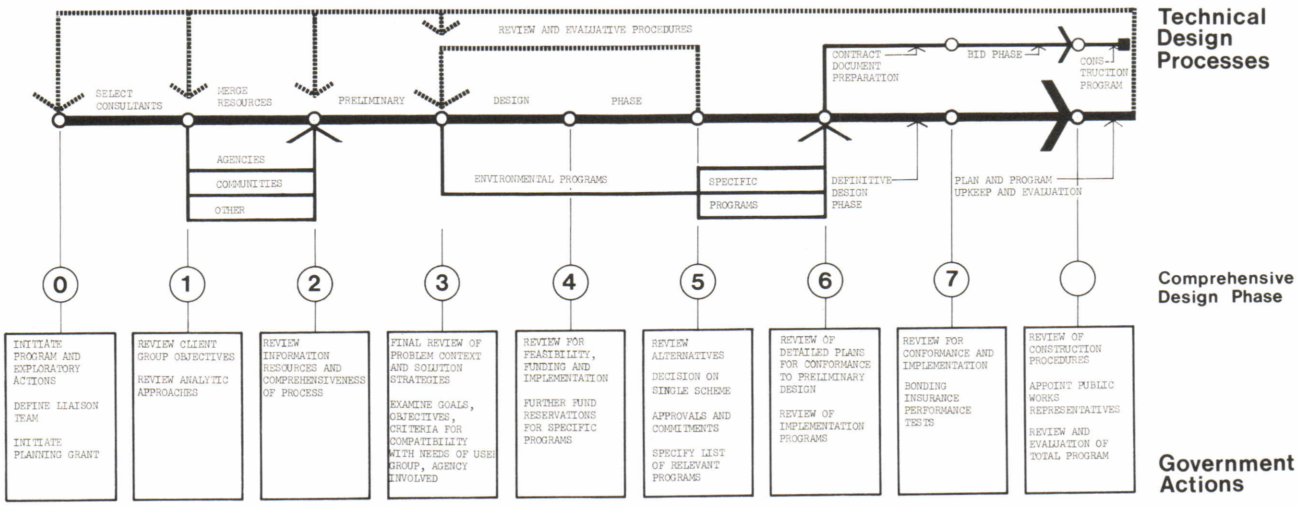
If the client group is represented through a sponsoring governmental agency as in, say, model cities redevelopment, the decision mechanisms are quite varied. Each review stage may be made by a different group of people, with only a small liaison group present at each meeting. Decision mechanisms perform a valuable service in that they provide a means of checking progress and keeping design proposals within the scope of community needs and available resources.

Community Involvement in Design

To many designers the concept of community involvement in the design process seems like just another federal requirement. In reality, a study of the institutionalization of design processes in other developed countries will reveal that citizens are very adequately represented. It is a natural out-growth of complex administrative systems that the frequency for community contact grows as the complexity of the design task increases. Therefore, far from being a restriction on the designer's freedom, the presence of community representatives may serve to realistically define the planning and design constraints. Community involvement in its broadest sense implies representation of interests of the actual users that are both external and internal to the problem. That is to say those whose neighborhood is affected by development decisions, as well as those whose property is similarly affected. Unfortunately, the current narrow interpretation of community involvement is based on the project boundary, often with minority group overtones. One of the biggest biases to shake off is this restricted definition of "community". In current large-scale design projects the government is just as guilty of this bias as the consultant.

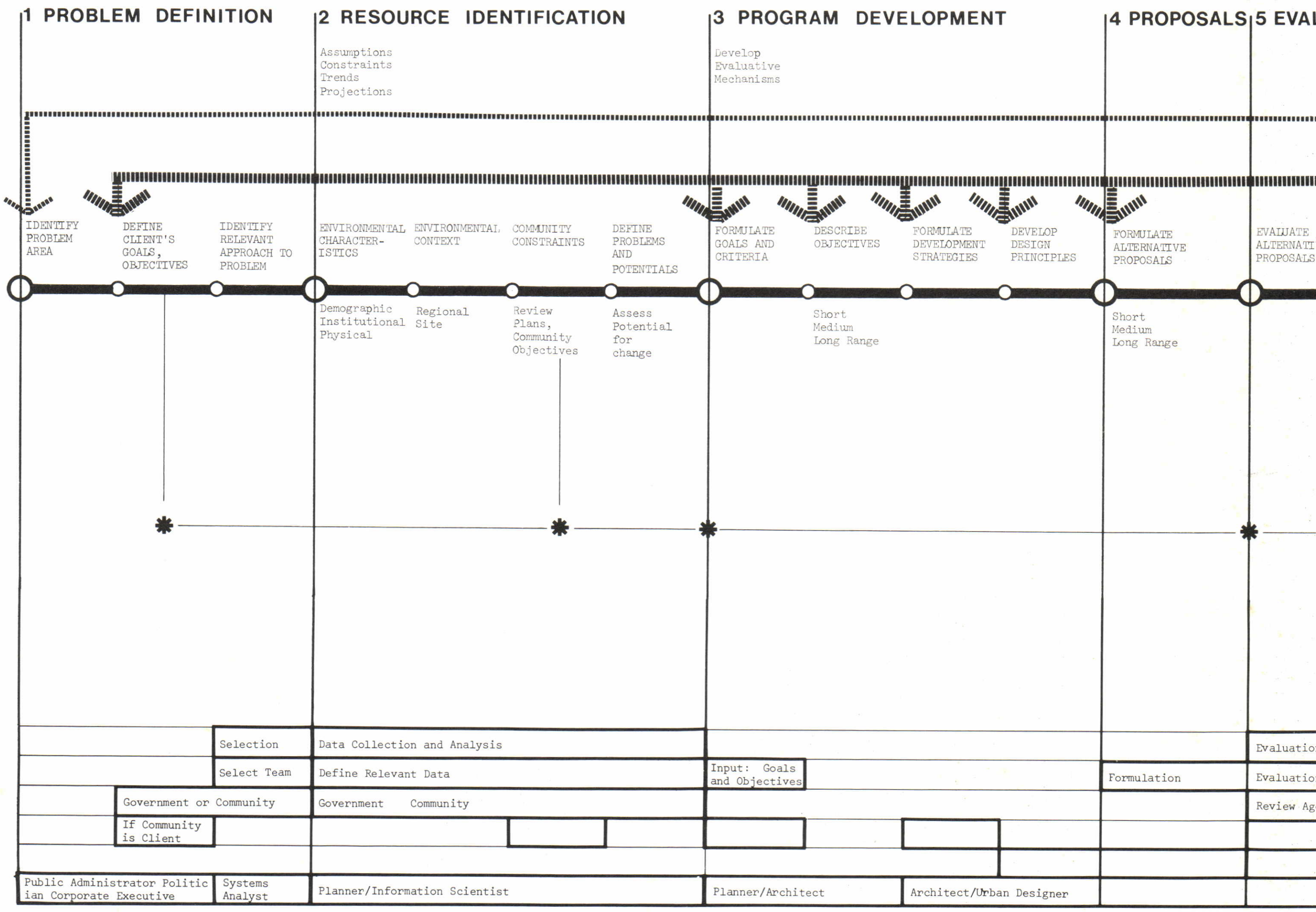
There are some fairly practical reasons for seeking community involvement, not the least of which is to secure approval of the project and cooperation in its implementation. A restless citizens' association can do a great deal towards halting work on an urban freeway or an urban renewal scheme. Several Federal cooperative mechanisms have been set up to facilitate community involvement, and some professions have assumed advocacy roles.

The rather special task of the designer in complex design situations

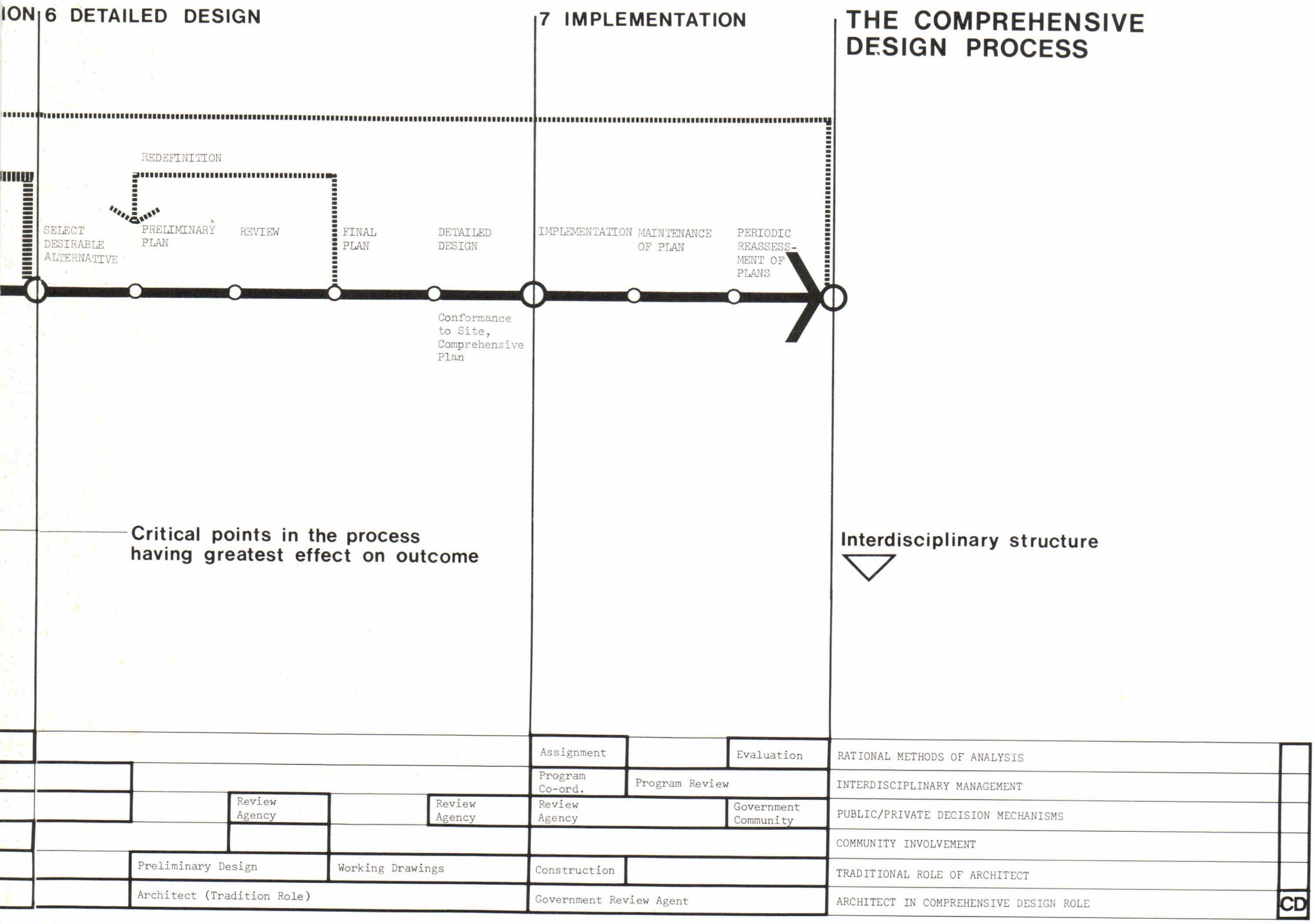


Public and Private Decision-Making Mechanisms. The pluralistic structure of complex environmental design problems requires an interface mechanism between technical processes and governmental jurisdictions. Such an interface takes the form of Governmental review and evaluative actions which, if properly coordinated with the technical design process, yield a minimum of friction and delay.

Community Involvement in Design. A new emphasis on citizen participation in the planning and design process clearly overcomes one of the chief objections to the actions of the bureaucratic and institutionalized planner: That of the formulation of community-oriented goals without the community's input. This new emphasis, however, does have some problem of its own. Citizens, if they are not well informed, are more destructive than professionals acting on behalf of the "public interest." The narrow focus of citizen's groups often precludes the comprehensiveness required to solve large-scale problems.



Comprehensive Design: Step 1, **Problem Definition,** is the part of the process in which the clients' goals are understood and in which the contextual information surrounding the problem area is grasped. This enables the designer to identify relevant techniques and information resources for proper definition of the problem. A common failing in the traditional approach to design problems is to assume a solution before a program has been prepared. In effect, step 1 forces the designer to define the problem rather than accept someone else's solution for it.



Resource Identification, Step 2, represents a significant amount of activity in terms of data collection. The major objective here is to explicitly define the problems and their potential for resolution. This makes step 3, **Program Development,** possible in terms of concrete objectives, which in turn may be utilized for evaluative purposes. Steps 4 and 5, **Proposal and Evaluation,** follow as a natural consequence of step 3, and allow for step 6, **Detailed Planning and Design** to occur on the basis of a rational analysis of available goals, objectives and resources. Finally, step 7, **Implementation,** provides for the actual realization in terms of construction and development.

is to find the most effective path between community rapport and other resources and constraints. It is fairly easy to develop an imbalance in either direction.

COMPREHENSIVE DESIGN

Comprehensive design, as we view it, is not an invariable process. In all probability, every designer has his own concept of an approach to complex design problems. Nevertheless, there are seven identifiable steps, and as the accompanying diagram shows, a whole host of intermediate process elements.

This flow diagram should not be regarded as a necessarily linear process. Feedback situations are likely to occur at many positions, and the interdisciplinary participants may utilize their capabilities at different points in time, and with different emphases. The bar chart at the bottom of the diagram shows the most likely place in the process for the occurrence of each of the four preconditions of comprehensive design and below this can be found the position of the architect as a "traditional" designer and as a comprehensive designer. The latter case assumes several different professional roles for the architect.

Comprehensive design is not a theoretical abstraction, but a reality. In one form or another, professionals engage in some or all of the activities mentioned here. Recognition of this fact in both the educational and professional realms of architecture might bring about the real revolution of environmental design which we must still witness.

Total Development

We have deliberately kept our discussion down to an exploration of a comprehensive view of the design process. Indications are that a total design service is just one of the elements in a total development service. A few companies, such as those that have built viable new towns, can be said to have created a total development concept, but most of the nation's big developers still fall far short of providing the full range of skills and services required to engage in large-scale environmental design projects. This is especially true in the realm of interdisciplinary management, decision mechanisms for governmental agencies, and community involvement. In time, we can expect to see giant corporations built around the total development theme, but the professions may also have radically changed to meet new concepts of design and development.

Design
Finance
Construction
Project Management
Community/Government Relations

CONCEPT OF TOTAL DEVELOPMENT TEAM

A Case Study in Interdisciplinary Problem Solving

3

Problem Definition

The Bureau of Public Roads and the Department of Transportation have been successful in completing a large portion of the Interstate highway system. This system has been planned to connect most of the urban centers and all of the states in the United States. While the construction of highways in rural areas and metropolitan hinterlands posed no special problems for the engineer, it was radically different in urban areas: The number of variables associated with rural highway design suddenly increased to include social and political characteristics. Accustomed to dealing with numerically defined constraints, engineers suddenly found themselves enmeshed in such things as disruption of community life, residential dislocation, environmental pollution, and so on. In addition, political pressures at the state and local governmental levels created new situations in public relations for the highway engineers to manage.

As a consequence of the new level of complexity of highway design the engineering disciplines have had to broaden their scope of activity to include other professions. Thus, multidisciplinary teams have been formed to tackle joint highway and urban redevelopment projects throughout the nation.

The Multidisciplinary Team

In 1967 the Baltimore Urban Design Concept Team was created as an experimental multidisciplinary team. The team consisted of Skidmore, Owings and Merrill (for urban design), J. E. Greiner (for engineering), Wilbur Smith (for traffic analysis), and Parsons, Brinckerhoff, Quade and Douglas (for mass transportation). The client was the Maryland State Roads Commission's Interstate Division of Baltimore, and was a composite of representatives Federal, State and local agencies.

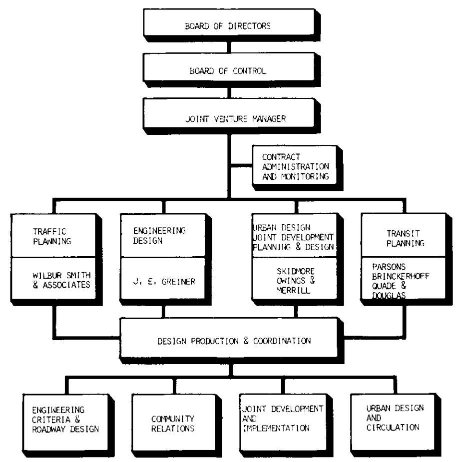
The clients' objectives were stated as follows: "It is the objectives of the Commission and the city to assure that the interstate system within the city will provide for the social, economic and aesthetic needs of the city's environment, as well as provide an efficient transportation facility." The problem was to integrate 24 miles of road corridor into the urban fabric within the objectives described above. Rights of way had already been defined by the Commission.

Team Organization and Design Process

A joint venture was formed between the firms and supplemented as necessary by specialized consultants. A Board of Directors composed of one principal from each firm was to initiate long-range policies and to approve submissions to the client. A Board of Control was set up as a management device and for short-range policy making. A Joint Venture Manager was to be responsible for coordination, administration management, and representation of the team in all formal matters. Finally, an Administration Branch was established to monitor contracts, project phasing, and all matters of finance. All of these entities encompassed the management and policy-making arm of the team.

The technical part of the team consisted of four groups: (1) A Planning and Joint Development Team, responsible for planning, programming, feasibility and implementation; (2) An Urban Design Team, responsible for physical design, circulation and corridor development planning; (3) A Roadway Design and Engineering Criteria Team, responsible for the geometric design of the road and associated structures, signs, lighting and landscaping; and (4) A Community Relations Team which maintained field offices in the various corridor areas and provided information to the community. The work of the technical staff was to be coordinated through review processes at the levels of the team captains, design production managers, and joint venture managers.

JOINT VENTURE ORGANIZATION

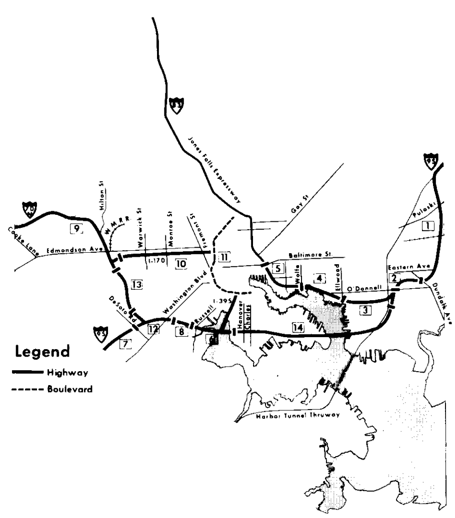


Client Structure

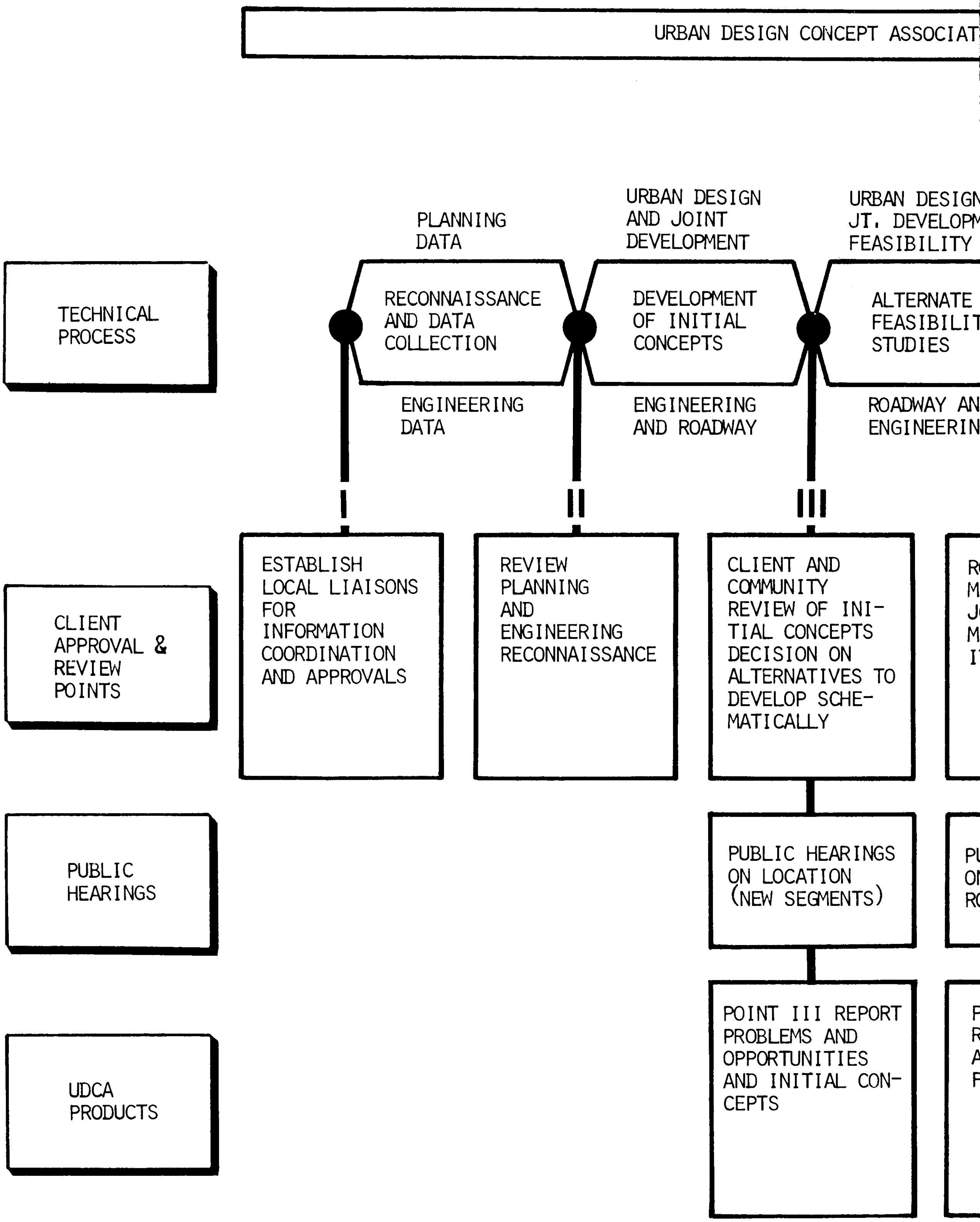
The Interstate Division for Baltimore City (IDBC), a joint city-state body, was the direct client. A Policy Advisory Board was formed with joint chairmanship between the Director of State Roads Commission and the City Director of Public Works. Represented on this board was the Mayor, President of the City Council, Director of Department of Planning, the Director of Traffic and Transit, the Chief Engineer of the State Roads Commission, the Special Assistant of the Attorney General for the State of Maryland, and the Chief of the Planning Division of the State Roads Commission. The Mayor's Coordinating Committee, composed of all city Department Directors, was formed to advise the Mayor on policy matters regarding the road. Contact with the public took place through the site offices, public news media and public hearings. Permission for such contact was granted by the IDBC.

Achievements of the UDCT Team

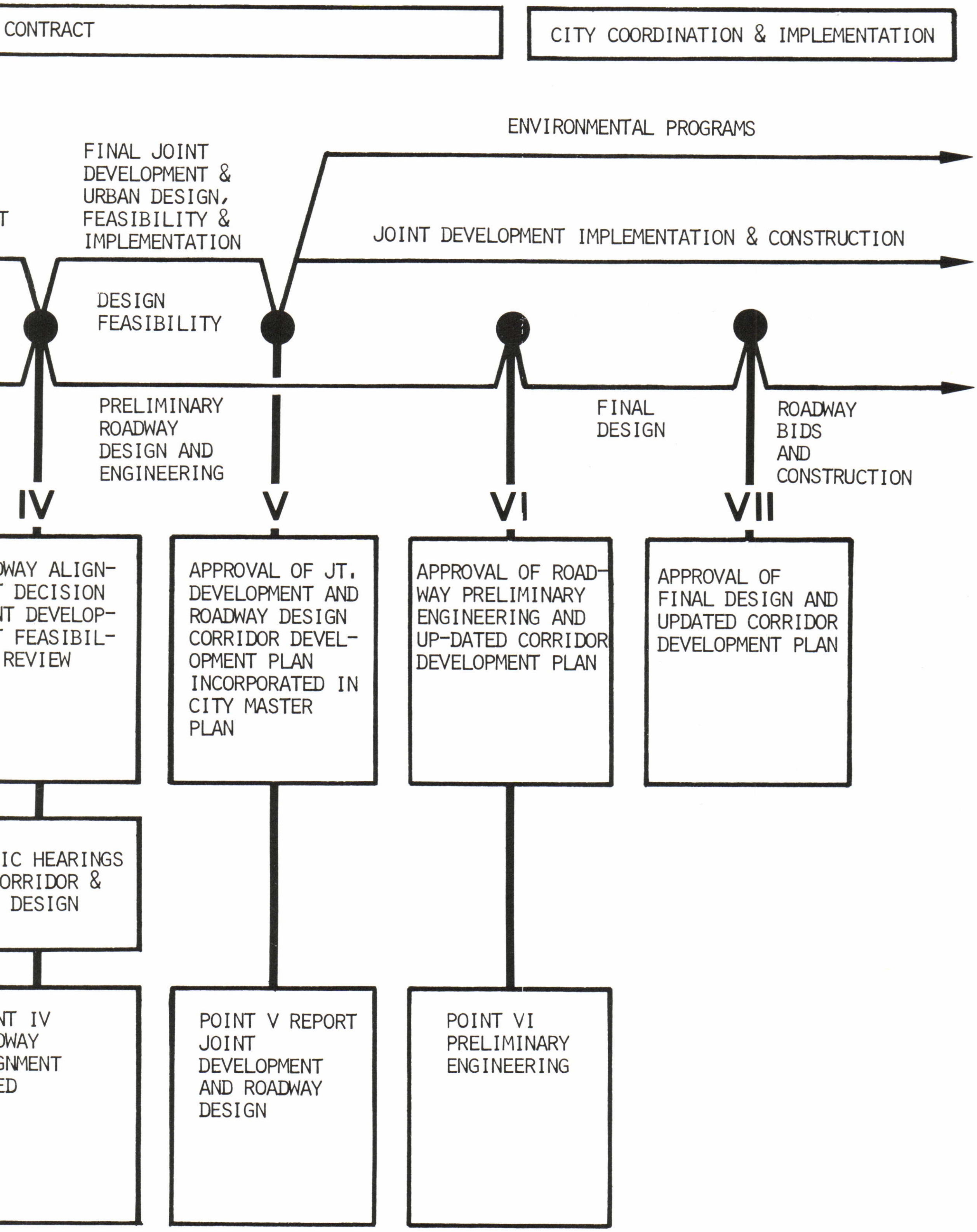
One of the most important achievements of the UDCT was the provision of a public information service. At the end of the project most people in Baltimore were aware of the expressway and its implications for the city. The decision to build the whole system or any part of it has now been placed in their hands. Another important achievement was the routing of traffic around the CBD, rather than through it, and the creation of spur roads terminating in parking areas as a means of relieving pressure on the downtown area. Those parking areas were to serve as connecting elements to an expanded urban redevelopment project, Charles Center. A later modification of the system channeled through traffic from the harbor to the industrial area to the south, thus saving the historic Federal Hill area and other key urban spaces. In addition, alternate transportation modes, such as mass transit, were integrated into the system whenever possible.



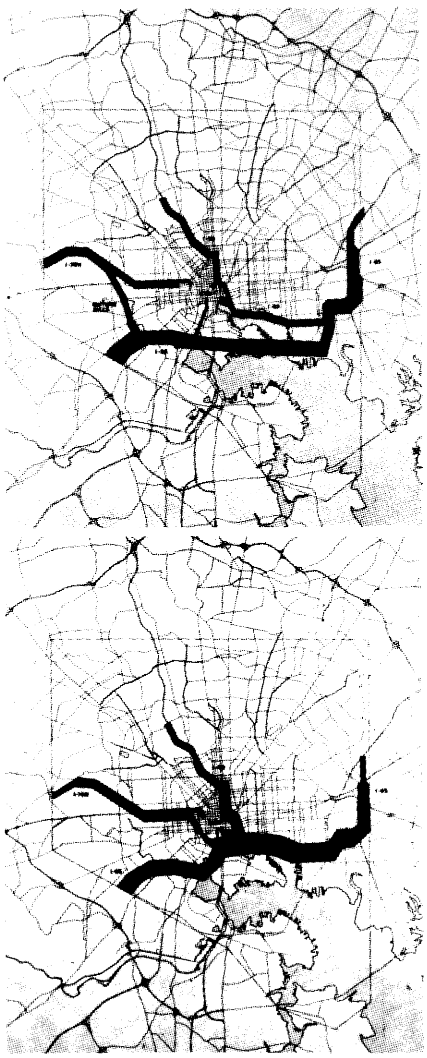
BALTIMORE URBAN DESIG



CONCEPT TEAM PROCESS



Problem areas



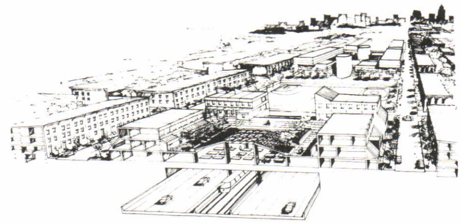
One of the most important aspects of the project is the integration of the highway within the urban fabric through the use of joint development projects. There are two types of this kind of project: Above-the-road R.O.W., and under-the-road R.O.W. Both kinds have the effect of leaving the local street system and related housing intact during the course of expressway construction, thus overcoming one of the chief objections to urban freeways. The joint development project, however, does require extensive coordination between three Federal Agencies — H.U.D., H.E.W., and D.O.T. — and the local authorities. The illustrated joint development construction approach to the Franklin-Mulberry corridor not only acts as an acoustic barrier for noise from heavy construction but also provides instant housing.

For the first time in the history of roadway design in the U. S. all structures, pavements, signs, lighting and landscaping were treated as a whole system both geographically and functionally.

From the outset the R.O.W. designed ten years earlier and known as the "10-D Alignment" turned out to be a formidable constraint. Proved to be a poor transportation corridor by the UDCT, it nevertheless had a large number of allies from engineering firms who had once helped to design it and were now part of the new project. The 10-D Alignment, designed ten years previously, dislocated 3794 families, eliminated 4457 jobs and created a tax loss of $1,877,936. It took two years of strong leadership on the part of the urban design division of the UDCT to have a more effective system approved which displaced 2018 families, eliminated 3780 jobs, and created a tax loss of $1,460,034. The engineer's tenacity to the former scheme had something to do with both a lower initial construction cost and an allegiance to an old idea, but the social costs were so much less in the second scheme that most of the economic arguments seemed hollow by comparison. Nevertheless, the design of a new alignment was seen as an impediment to construction, since three major expressways were tied up at the urban fringe while corridor negotiations were being made.

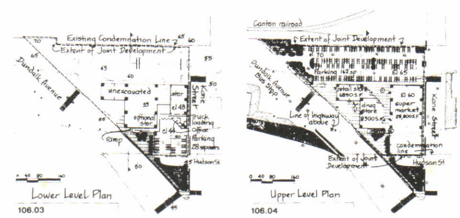
Being accustomed to a single client, or a less complex client, the architects approached the political aspects of the project with great naivety. A great deal of friction developed because of this lack of political sophistication. On top of this the architects exhibited their usual tendency to treat esthetic problems as discrete phenomena, while planners talked only in terms of social values, and engineers only about highway geometry. The internal communication problems did, however, decrease over time as the different professionals in the multidisciplinary team learned about the concerns of each other.

When the new road R.O.W. was approved all disciplines moved under one roof and had the common goal of designing the new system. At this point the multidisciplinary team was functioning smoothly and with considerable momentum.

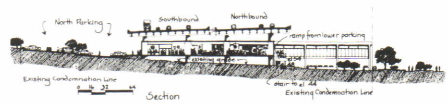


The Baltimore Project as an Example of Comprehensive Design

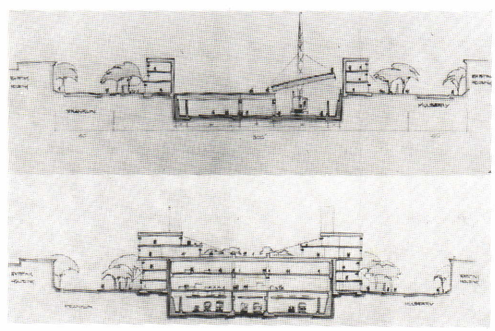
While the project had all of the elements of the comprehensive design process some observations can be made as to the deficiences that occurred. In the first place, rational methods of analysis are not an end in themselves and should not be seen as necessarily producing the best solution to a problem. This was very much in evidence when the engineers' least-cost solution also produced the highest degree of social costs. Community participation and both public and private decision-making, if they had been coordinated within the design process, could have forestalled this problem.



Another special problem kept occurring as a result of professionals assuming special rights to specific branches of knowledge — namely that their specialized knowledge could not be challenged. While part of this reflects a communications gap, it also has something to do with the training of persons in the design disciplines. In order for a synthesis to take place within a team there must be a common core of information about the other person's field of specialization. This would suggest that all design-related disciplines should be built on a general environmental design background before specialized education occurs.



Finally, the concept of a multidisciplinary team, as its name implies, guarantees only that the contributing professions will supply their own brand of expertise. Interdisciplinary management, on the other hand, requires coordination of specialists focusing on a common problem with overlapping concerns for every other person's field of specialization.



Implications for the Profession of Architecture

The Baltimore experience raises some questions about the method of formation of interdisciplinary teams. As a temporary consortium of firms, much of the time spent by the UDCT in developing common channels of communication will be lost. A permanent consortium does overcome this problem, but still faces the need to overcome distance between firms, unless they agree to jointly operate and staff a new organization at a central location. On the other hand, the creation of a giant super-consulting firm with all of the services "in-house" would require a steady stream of large and similar kinds of jobs to maintain the staff. Some firms do bill themselves as complete planning and design services, but the definition of completeness often excludes most of the steps 1, 2 and 3 in the comprehensive design process.

CONCLUSION

The number of case studies which would be required to validate the work of the authors is far greater than we have indicated. Nevertheless, drawing upon our experience on projects as diverse as the Potomac River Basin study, the Fort Lincoln New Town, urban renewal projects throughout the United States and Canada, as well as the Baltimore project illustrated here, we can draw the following conclusions about complex environmental design problems:

Role of the Architect. As a design specialist, the architect forms part of a larger group of specialists each of whom contributes, at certain times, managerial and synthesizing capability. The architect's special role is to give form or expression to the total conceptual capability of the team, and not only to his own independent notions of the solution.

Role of the Client. If the client falls into the private category of decision-making his responsibility is to take a special interest in the environmental and community-related aspects of the design process. If the client falls into the public category, his responsibility is to force an effective liaison between the technical processes involved and the community being served. This is effectuated in part by review and evaluative mechanisms, and in part by formal community representation. If the client is the community itself, it must be made aware of its rights and the available resources and programs.

Utilization of Technology. The application of new technologies is valid only as long as they serve the goals of the client and community. Both the client and the interdisciplinary team have a responsibility to utilize technology where its benefits are maximized and its problems are minimized. This means that the use of such devices as mass transit, urban freeways, industrialized housing, and central energy systems should be fully analyzed before their application to human environmental problems. The role of client and team can be viewed positively as an attempt to guide technology and make it harmonious with the needs of its users.

Conservation of Resources. The United States has a long history of the utilization of resources for environmental change without guarantee of success in human terms. Millions of dollars have been poured into fragmented planning studies, and billions of dollars have gone into urban renewal. Since resources are expended without coordinated national programs to guide them, it stands to reason that a special objective within the comprehensive design process is to conserve resources. This is equally true of both natural and economic resources.

Flexibility. The open-endedness of the comprehensive design process suggests flexibility of role on the part of all team members. It also suggests that unforeseen events should be capable of absorption into the mainstream of development with only minor adjustments in the outcome.

The future of the profession of architecture, as with other design professions, rests upon its ability to comprehend and manage the complex sets of variables and constraints inherent in real-world design issues. The foregoing study suggests that there is a universal process of design whose foundation is based on rational methods of analysis, interdisciplinary management, public and private decision-making mechanisms and community involvement. This process, called comprehensive design, has a series of identifiable steps capable of application to most design problems. Architecture, if it is to serve mankind, must build its theory and practice on such a base.

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SHAFIK I. RIFAAT, A.I.A. (Assoc.), A.I.P., Architect, City Planner and Urban Designer is a principal in Urban Design Research Group Incorporated and a specialist in urban redevelopment and new communities. He holds the following degrees: Bachelor of Architecture, Alexandria University, 1960; Master of Architecture, Massachusetts Institute of Technology, 1962; Master of City Planning, Harvard University, 1965; and Doctor of Architecture (pending), Catholic University. He has had eight years of professional practice in the United States and overseas on architectural and planning projects. His skills and experience include work on some of the nation's largest urban design and transportation planning studies. His professional and research experience includes a full range of skills needed to handle architectural design and city planning, and he has had considerable experience in population analysis and participatory planning. Mr. Rifaat has contributed to publications arising out of many nationally significant planning and redevelopment projects, including the Newark Model Cities Program and the Baltimore I-95 Highway Corridor study. He is currently an Assistant Professor of Urban Design in the Urban Design Program at North Carolina State University in Raleigh and has held a previous teaching position on the Faculty of Engineering in Alexandria University.

Credits. Text and layout by the authors. Graphic examples for the Baltimore project supplied to Shafik Rifaat from the Urban Design Concept Team and the Interstate Division for Baltimore City. All other graphics by Peter Batchelor. Some portions of the introductory section "Recent Social Changes" were taken from an article by Peter Batchelor entitled "Socially Responsive Design Processes" in volume 20-2 of the Student Publication of the School of Design, **Collaborative Design in Community Development (1972).**

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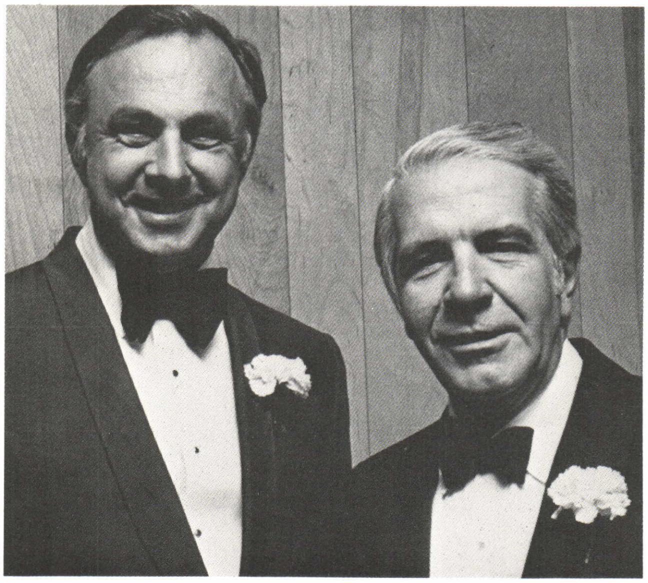
KING HEADS ASHEVILLE CHAMBER OF COMMERCE



King with commentator Harry Reasoner at C of C banquet.

J. Bertram King, FAIA, President-elect of the North Carolina Chapter, The American Institute of Architects, should learn his lesson in presiding well this year. For on April 11, he was installed as President of the Asheville Area Chamber of Commerce. In this role, he will direct Asheville as a "City in Search of Quality," working co-operatively with other area cities to seek a general upgrading of the economic level and preserving the quality of life of the mountains.

Under King, the Chamber has gone through a basic reorganization, a restructuring which has set it on a course of achieving priority objectives and away from a multiplicity of projects. A first goal is the carrying forward of a quality water program for Buncombe County, and to achieve county-wide zoning.

A native of Greenville, S. C., King is married to the former Julia Nelson Hipps of Asheville. The couple has three sons. King graduated with honors from the School of Design of N. C. State University in 1949. He was a member of Tau Beta Pi and Sigma Pi Alpha Honor Fraternities. This year he was named to the honor society of Phi Kappa Phi, N. C. State University Chapter. He entered the private practice of architecture in Asheville in 1952 and has earned numerous awards for his designs.

NORTH CAROLINA ARCHITECTURAL FOUNDATION CONTRIBUTORS

In September 1971, the North Carolina Architectural Foundation presented the North Carolina Design Foundation with a check for $6,500. Of this amount, thru Fellowships in Architecture of $1,000 each were authorized as well as two scholarships of $500 each. In addition, the Architectural Foundation has contributed to the educational funds at UNC-Charlotte, W. W. Holding Technical Institute and Piedmont Community College.

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In addition to a substantial contribution from the architectural profession via the North Carolina Architectural Foundation, the following firms and/or individuals made contributions to the Design Foundation during the period September 1, 1969-December 31, 1971. The funds are used in support of the University's School of Design in four key areas—Urban Design, The Departments of Architecture, Product Design and Landscape Architecture.

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(Continued from page 35)

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AIA ELECTS OFFICERS: ROGERS TO SERVE AS FIRST VICE PRESIDENT

Baltimore architect Archibald C. Rogers, FAIA, was elected to the office of first vice-president and president-elect of The American Institute of Architects at the AIA Convention, Houston, Texas, May 7-10. Rogers' term of office will begin in December, and he will serve as first vice president during 1973, after which he will succeed automatically to the presidency of the 24,000-member professional society.

The Institute also elected three vice presidents — Van B. Bruner Jr., of Haddon Township, N. J.; Louis de Moll, FAIA, of Philadelphia, and David A. Pugh, FAIA, of Portland Ore. — and a secretary, Hilliard T. Smith Jr., FAIA, of Winter Haven, Fla. The newly elected officers will also take office in

December, with the vice presidents serving one-year terms and the secretary a two-year term.

The current first vice president, S. Scott Ferebee, Jr., FAIA, of Charlotte, will succeed New York architect Max O. Urbahn, FAIA, as president in December. Ferebee's succession to the presidency of the Institute next year will be automatic.

Rogers is founder and chairman of the Baltimore firm RTKL Inc. He developed guidelines for a team approach to federal highway planning and, in 1969, received a citation from the National Seminar on Urban Transportation.

He is currently a vice president of the Institute and chairman of its Task Force on National Policy.

Bruner, chairman of AIA's Commission on Community Services, has been in private architectural practice in Haddon Township since 1966. He is also chairman of the building construction technology department, Spring Garden College, Philadelphia, and is active in community programs.

De Moll, currently a vice president of the Institute, is partner in charge of design of the Ballinger Company, architects and engineers, Philadelphia. He has served on numerous national AIA committees, and is a past chairman of the Institute's Committee on Architecture for Commerce and Industry.

Pugh, a general partner of the firm of Skidmore, Owings, and Merrill, has been in charge of all projects in the firm's Portland office since 1962. He has served as director of the Portland AIA chapter and of the Oregon Council of Architects, and is chairman of the Board of Trustees of Portland's Human Resources Council.

Smith is a member of the national Board of Directors of AIA, representing the Florida Region. He serves also on the national Labor Liaison Task Force and the Commission on Government Relations.

Elmer Botsai of San Francisco, Institute treasurer, will continue in office for another year, having been elected in 1971 for a two-year term.

SARC 72

NEW DIRECTIONS THEME FOR SARC 72

Gene Jones, AIA, of Raleigh, Chairman of the South Atlantic AIA Regional Convention 1972, has announced that plans are well underway for SARC 72, scheduled for the Carolina Hotel, Pinehurst, N. C., September 27-30. Architects from South Carolina and Georgia will join North Carolina AIA members for their biennial meeting, hosted this year by the Raleigh Section of NCAIA.

Along with the golf for which Pinehurst is noted, the professional program will be developed by such notables as Senator William Proxmire of Wisconsin, C. C. Cameron, President and Chairman of the Board of First Union National Bank, Dr. G. Neil Harper, President of CLM Systems, Cambridge, Mass., and Archibald C. Rogers, FAIA, President-elect of the American Institute of Architects.

For non-golfers, a choice of programs or entertainment will be offered, including a tour of the Research Triangle, and the Planetarium in Chapel Hill. Gala evening events will provide old friends the opportunity of visiting in a relaxed atmosphere.

Superior exhibits of new products and materials will be displayed for architects' information.

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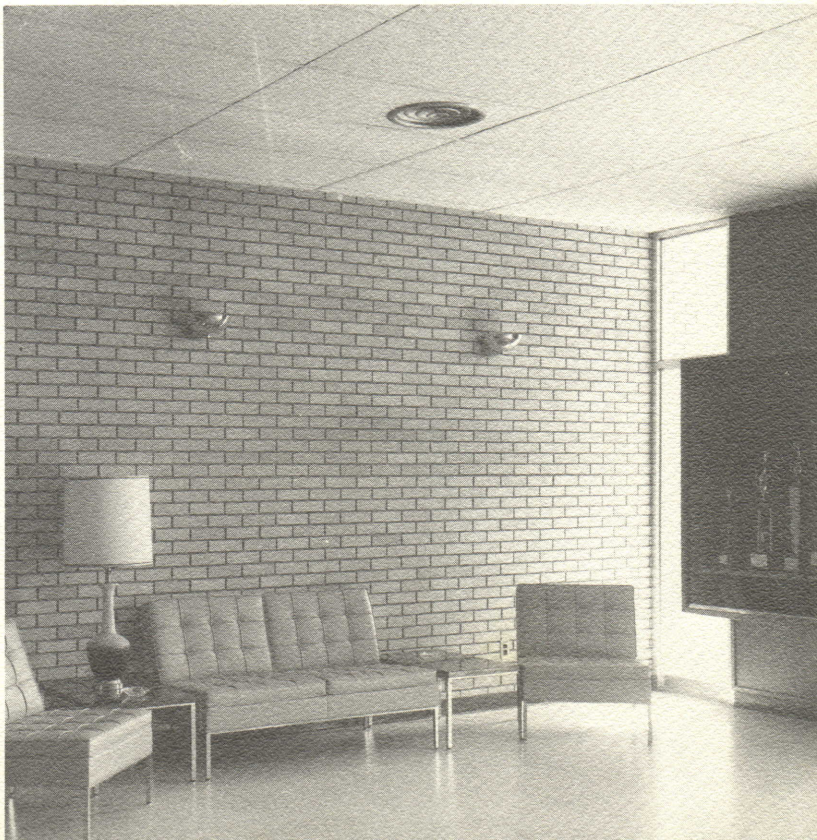

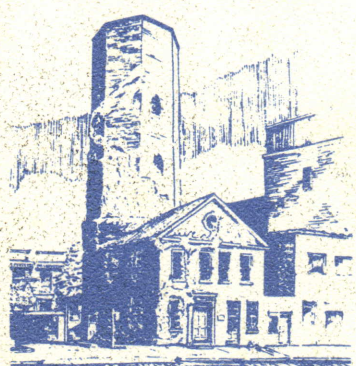

AIA TOWER