APPENDIX C

MXC

MINNESOTA EXPERIMENTAL CITY

VOLUME III

AREAS FOR STUDY AND EXPERIMENTATION

UNIVERSITY OF MINNESOTA / EXPERIMENTAL CITY PROJECT

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University of Minnesota

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College of Environmental Design
University of California, Berkeley

O. Meredith Wilson, Director
Center for Advanced Study in the
Behavioral Sciences
Stanford, California

Paul N. Ylvisaker, Commissioner
Department of Community Affairs
Trenton, New Jersey

Whitney M. Young, Jr.
Executive Director
National Urban League, Inc.
New York City

*Appointed January, 1969

MXC

MINNESOTA EXPERIMENTAL CITY

VOLUME III

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Study of the concept of an experimental new city in the 250,000 population range, in which the human condition would be improved significantly and where, as a national proving ground, technological innovations could be demonstrated and evaluated.

1969

PREFACE

This volume contains a listing of areas for future study and experimentation which were suggested during the multi-disciplinary study phase of the University of Minnesota Experimental City Project. Each of the areas identified was viewed as holding promise for the planning, development, and administration of the Minnesota Experimental City (MXC).

A series of workshops was convened in 1967 and 1968 to consider the concept of an experimental, new city in the 250,000 plus population range, in which the human condition would be improved significantly and where, as a national proving ground, technological innovations could be demonstrated and evaluated.

Workshop participants were asked to survey the "state of the arts," identify major gaps and issues, and suggest areas of potential innovation. The studies and experimental projects in this volume derive from the reports of those workshop sessions and from the specially commissioned papers. (Vol. I: Socio-Cultural Aspects of MXC and Vol. II: Economic and Physical Aspects of MXC.) A small number are suggestions put forth by individual consultants.

Since the identification of areas for future investigation was an implied task cutting through the charge to the workshops, no attempt was made by workshop participants to limit their discussions to critical study areas. Therefore, this listing of suggested projects does not represent an inclusive list of areas in need of investigation preliminary to construction of the city. Furthermore, the listing is an unbridged one; suggestions have not been recast into precise research statements, nor have they been culled for duplication or overlaps. No ranking, or ordering of priorities has been attempted. (See also discussion in Chapter III of the Progress Report, MXC.)

Most of the suggestions stem from spontaneous reactions to gaps in knowledge which were brought to light in the workshop discussions; many are

largely conceptual in nature. Some require development of materials and content, drawing on clearly specified concepts appropriate for MXC application; others require building and testing of prototypes.

Organization of Contents

This volume has been sub-divided into the same five major topical areas as those diagrammed on the fold-out chart appended to this volume. That section of the chart with the appropriate topical area has been reproduced at the beginning of each section of this volume.

The first four topical areas represent major models which must be developed for effective planning. The last area, implementation-effectuation, includes suggestions directly concerned with strategies to anticipate and to meet problems.

At the beginning of Divisions I and II only there appears a project viewed as generic to all investigations relevant to the particular topical area.

Obviously, many of the projects possess an umbrella-like quality with implications for other models. Still others would appear to fall within two categories; these have been classified under the more relevant category.

Project Coding

Each of the studies has been assigned a code number from the chart which identifies the specific content category within which it falls. For example, study (I.A.1.) deals with: the socio-cultural subsystem, (I.); education, (A.); the purpose and structure of the university, (1.). Studies appear in the sequential order shown on the chart. The reader will note that in some areas no project suggestions were received. For example, suggestions for investigations of community structure and growth related to the physical subsystem, (II.A.), are absent.

Walter K. Vivrett, Project Director
Experimental City Project
May, 1969

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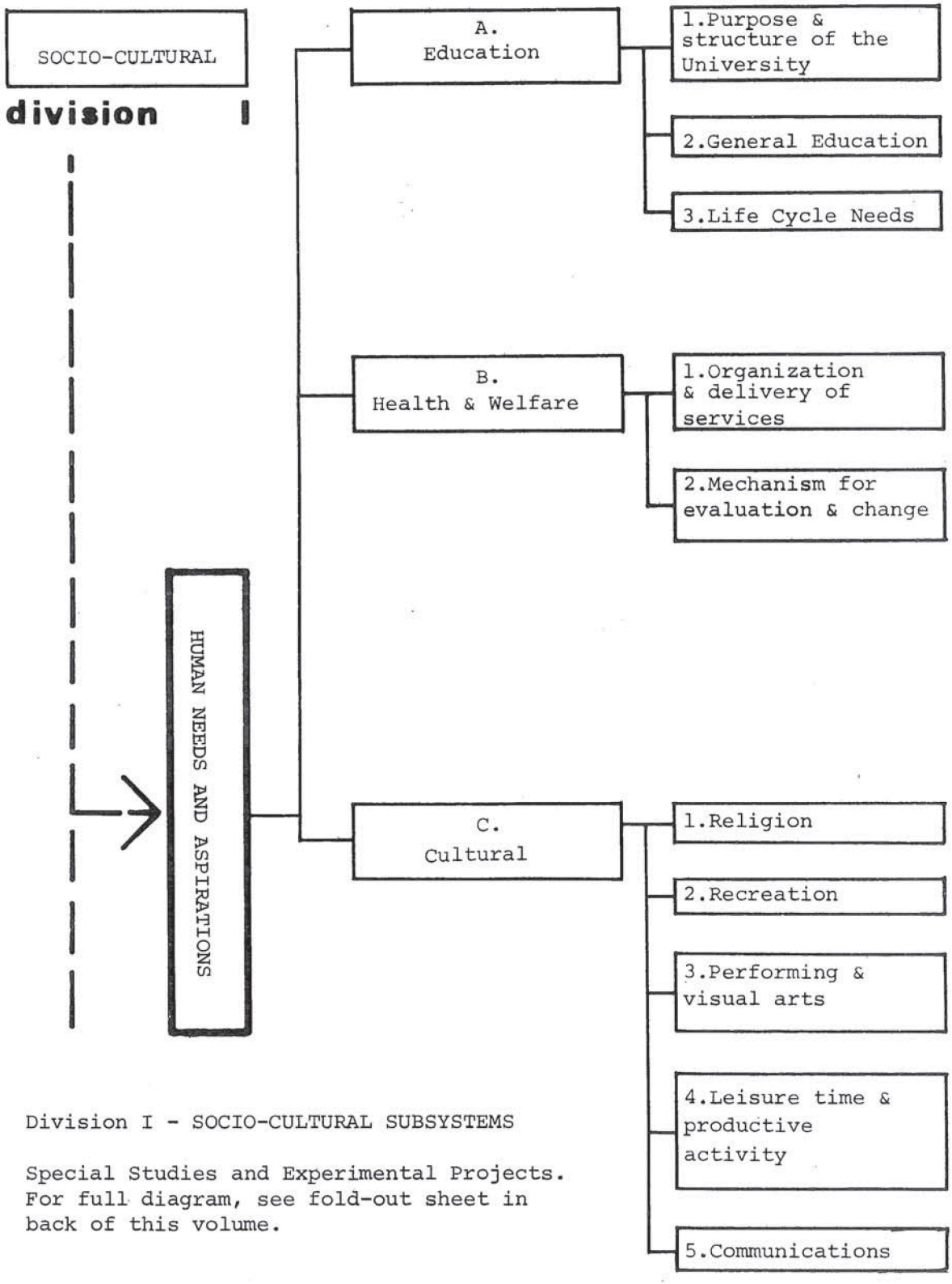


Division I - SOCIO-CULTURAL SUBSYSTEMS

Special Studies and Experimental Projects.
For full diagram, see fold-out sheet in back of this volume.

DIVISION I

SOCIO-CULTURAL SUBSYSTEM

(I.) Human Needs and Aspirations

A central premise of the Experimental City is that man can creatively mould the design of his physical environment. The purpose of this project is to draw upon and feed back data for the education, health, welfare, and cultural components of the City. The overall aim will be to develop a social design which will form the basis for ordering community structure and growth. If individuality, integrity, and choice are to be supported, social criteria are needed to guide the physical patterning of the city. These criteria, developed from human expectations and realities, must be relevant to the urban environment of the future. Both individual and collective interests will be considered.

An initial step will be to draw upon the great volume of existing literature on human development and the aging processes. An age-related continuum of human needs and aspirations will be constructed in which the following dimensions will be elaborated:

Age-specific needs common to the major stages of the life cycle.

Needs which continue throughout the life cycle.

Age-related needs which are common to and those which are unique to specific population categorizations.

Individual needs related: to the family and to living arrangements (including intergenerational family supports); to mobility; to psychological, social and physical space; and to personal expenditure of time.

Alternatives to existing residential and institutional patterns will be proposed. Finally, methodologies for testing the effects of recommended arrangements will be defined and specific projects identified which permit conclusions regarding the impact of the social design.

A. EDUCATION

(I.A.1.) Purpose and Structure of the University for a Learning Society

Our cities are both chaotic and mindless. The processes of urbanization continue as a function of multiple economic and technological pressures which are only vaguely or partially related to any organizing conception of the human end or purpose which human communities could or should serve. Thus social institutions grow, not as expressions of their purposes, but as compromises between those purposes and the need to fit into a complex set of economic and technological constraints. People live and work, not in expression of life style appropriate to freely chosen human purposes, but in ways directed by the necessity of adapting to existing economic, technological, and institutional constraints.

The promise of an experimental city is that of designing a society in which technological capability would serve to maximize rather than constrain human possibilities and in which institutions would be organized as fully expressive of these possibilities. The most attractive and available organizing principle for such a city would be the conception of a learning society. This conception proposes that man's most characteristic purpose is that of growth---growth in knowledge about himself and his environment and growth in capability for effective participation in varieties of human activity. The conception of a learning society is peculiarly appropriate to the development of an experimental city since it proposes only institutionalization of the processes by which people might discover the modes of living most fully expressive of their own necessities and purposes; it does not prejudge the forms of living which might emerge.

This investigation proposes identifying and examining the features of a radically redesigned university, a university appropriate for the learning society setting.

If one moves toward the conception of an experimental city organized as a learning society, the conceptualization of the university, or universities, appropriate to such a city is a problem of central importance. Presumably, universities serve as the central force for institutionalizing the processes of conserving, acquiring, organizing, and disseminating knowledge. Such processes are obviously central to a learning society. But it is clear that many of the institutional characteristics of contemporary universities serve as much to limit or

perplex the emergence of a learning society as to facilitate the growth of such a society.

The Problem: One cannot speak clearly and briefly about the institutional characteristics of contemporary universities since these are remarkably varied institutions. However, one can abstract certain general characteristics of present organization and conduct which limit the capacity of such institutions to serve as expressions of a learning society rather than as sources of constraint. For example: a) Universities and colleges are generally conceived as a society or societies of students and faculty whose students are engaged in preparation for subsequent involvement in work and life. They are thus a "place apart" from society, serving purposes and necessities established by processes and institutions in which they are only indirectly involved. b) Their involvement in the functions of the society outside the university is obvious and growing, but the pattern of involvement is largely that of a "servo-system," furnishing trained manpower for other institutions and providing increasingly for new knowledge sought by these institutions. c) They are indifferently and ambiguously involved in the continuing or lifetime learning purposes of their graduates and in the quality of the educational arrangements by which students qualify for admission. d) They observe the enormous decentralization of opportunities for learning which have emerged in our society but cling to degree systems related to credit hours of resident instruction and grade point averages as methods for certifying certain kinds of status. e) They create an ever-increasing number of closed subsocieties whose members qualify for admission by producing a certain kind of intellectual product, which serve as the primary or exclusive market for this product, and which engage in instruction designed to accelerate the quantity of the product and the market for persons trained in producing it.

While universities have changed and are changing rapidly in response to external social pressures and economic opportunities and to evidences of internal disaffection by students and faculty alike, the changes generally reflect efforts to ameliorate or control some locus of pressure without affecting the fundamental form of institutional organization or operation. And even the most expansive experiments in organizational reform, such as those observable in the "cluster college" conception of the University of California at Santa Cruz or the "living-learning" colleges at Michigan State, seem more designed to reclaim the image of a 19th century college rather than to look for radically new modes of organizing and conducting the human activity of learning.

One cannot view optimistically the possibility that existing universities or even new universities, founded within the constraints of existing academic, political, and social institutions, will achieve major breakthroughs on matters of institutional form or modes of operation. The current forms and modes are the function of genuine constraints and

possibilities. Radical departure from these forms and modes is possible only within the context of a human and technological ecology organized to support emergence of a learning society. In this sense, the Experimental City could provide the ecology which would free men to plan a university expressive of the purposes of a learning society and serving as an organizing force within that society. The form and modes of operation for such a university could depart radically from existing models.

Design Features: An important "next step" in planning the Experimental City should be an extended design seminar aimed at developing the design features which should characterize the form and modes of operation for such a university. These design features should be tested for their theoretical fit to the total planning, and they should specify the mechanisms by which the educational processes of the Experimental City could interface with other educational institutions in the state and nation.

The design seminar should seek assembly and analysis of existing experience in American higher education which might speak to the feasibility of certain design features and should seek pilot testing through traditional universities of design components thought to have theoretical merit.

A limited number of propositions can be stated here about possible organizing principles and design features for a university as part of a learning society. These propositions are intended to illustrate possibilities rather than visualize a total system.

1. The university should be formed as a federation of a set of decentralized teaching, research, and service communities. Each should be an aggregation of the staff and facilities needed to carry out specified missions. It should be assumed that a fully effective communication system--both electronic and transport--could support efficient governance of shared missions among these communities.

2. Current practice in defining degrees and certificates largely in terms of credit hours of instruction within specified curricular patterns should be largely abandoned. The university would specify the performance standards for certifying a variety of "degree equivalent" achievements by students; it might also specify certain categories of experience required for certain certifications. The university would mediate interface between its system and students moving from or to more traditional systems.

3. Certain of the decentralized communities forming the

university should be for residential or "living-in" study. These settings should be used for part of the experience of students seeking degree equivalent certification analogous to current undergraduate degrees and also as retreat centers for adult groups. They should emphasize those learning experiences for which periods of intensive reflection and conversation seem appropriate. It could be assumed that the student seeking, for example, an equivalent of the B.A. degree would be required to spend one or more quarters in residence at such a center, but the assumption that he start his pursuit of such a degree with an assumed four-year period of commuter or residence association with a given center would be abandoned. The university would move from the current effort to move students off-campus for given classes of experience to the assumption that study in a variety of contexts would be part of the normal pattern of search for degree equivalent status.

4. The university should serve as the central agency for storing and disseminating learning materials available to and needed by the people and institutions of the City and would be prepared to serve decentralized access points to its complete storage capability.

5. The university should maintain the communities of scholars, practitioners, and technicians capable of assembling and certifying, designing and developing, and disseminating and updating the cognitive learning systems appropriately related to the full spectrum of learning needs of young adults and adults of the City. It should support decentralized access points to such learning systems.

6. The university should establish its decentralized learning centers related to professional certification in settings also occupied by practitioners, i.e., the health professions in health service institutions; journalism in publishing and broadcasting settings; theater education in theaters; art education in galleries, etc.

7. It should support a limited number of research institutes and the communities of scholars and prospective scholars associated with such enterprise. Preference should be given to the development of institutes linked to research needs of the City not being effectively met by institutions external to the City.

Pilot Projects: The most critical immediate need for development of the university concept for an experimental city would be an extended design seminar together with an intensive effort to recover and analyze various efforts in American higher education which might speak to the feasibility of certain design features.

In addition, certain pilot projects could be undertaken by the University

of Minnesota, or other universities, to develop information on the viability of certain design possibilities. For example:

1. The University could seek (in cooperation with Marshall College) the development of an educational systems development task force to serve, from the University, some specified part of the Marshall State College instruction.

2. The University could design and test the viability of central information services from its library to one or more departments, remote colleges, or professional schools. This project would assume both hardware and personnel arrangements which would free the department or school from any need for physical access to the library.

3. The University could design and test the viability of a remote "learning center" for a specified population of undergraduate students. This option is somewhat constrained within the City of Minneapolis because of the Junior College development. It could be undertaken possibly in the new city of Jonathan, or as part of a new city development in Rosemount, or as a special development on the St. Paul campus of the University.

4. The University could design and test the viability of broad band electronic interconnection for carrying on processes of administrative and educational policy decision-making involving personnel in Minneapolis, St. Paul, Duluth, and Morris.

A Final Note: A strong possibility exists that the modern university faces a long range challenge to its viability which cannot be met by successive modifications in existing practices. Some of the components of this crisis can be stipulated:

1. The university no longer monopolizes instructional and research talent, and it has never monopolized artistic or professional talent.

2. It is organized much more effectively to promote the acquisition and elaboration of knowledge than to promote assimilation, reorganization, and dissemination of knowledge.

3. The foregoing observation underlines its lack of systematic attention to the processes of teaching and learning.

4. Its faculty becomes progressively either more vague or more pious about what responsibilities are really central and distinctive for their university as a whole, and their declining sense of affiliation to a given institution is notable.

5. Its students are restive or apathetic.

Given a problem of this magnitude, the conception of an experimental city may offer the best available vantage point for fundamental inquiry into a radically restructured conception of a university. We must imagine such a city, even in its absence, as the necessary starting point for immediate innovations which have more than an ameliorative or sentimental relationship to the future of higher education.

B. HEALTH AND WELFARE

(1.B.1.) Conceptualization of a Health Component Organizational Framework

Basic to the health care component is the organizational framework within which health services, including environmental health and its related controls, are to be provided. Having an impact on health organizational considerations are such items as social goals, manpower requirements, financing methods, evaluation, technological aids, legal constraints, and policy statements both within and without the health system. Additionally, because health is unquestionably an important dimension in human resource development, the structuring of the health system will strongly influence the ordering of other social systems within the City. Consequently, cognizance must also be taken of relationships with other social systems.

To detail and predict accurately the influence of the many factors mentioned above which have a bearing on organizational structuring would take years of theoretical development and testing. In short, lack of time and resources as well as continuing social and technological change, place limits upon the construction of an organizational proposal. Recognizing those limitations, this project proposes the establishment of a health care task force which will be charged with the preparation of a blueprint for the Experimental City's health care. Data for recommendations will need to be drawn largely from currently available information and experience. A primary focus might be on the development of a "health utility" concept. Included would be basic policy statements and descriptions of appropriate planning, delivery, and control machinery, mechanisms to assure accountability and responsiveness, financing procedures, manpower requirements, relationships with other social systems, and evolving basic technical and social system concepts. Simulation models of alternative health systems may well provide a valuable aid in the decision-making process.

While the developmental projects outlined in the following section will have implications for the comprehensive proposal, it is anticipated that the task force will identify many additional ideas or programs for testing prior to the settlement of the Experimental City.

(I.B.1.) Health Manpower Deployment

Professionally trained manpower available for the Experimental City program will probably be based on present personnel ratios. An efficient utilization of that manpower is a major area of concern. The purpose of this project is to: (1) conduct a content analysis of health tasks currently performed by the physician and allied health personnel; (2) recommend an appropriate realignment to increase productivity of the physicians; and (3) identify those tasks which can be performed by new, allied occupational classifications.

The second phase of the study will be concerned with describing the distribution of health manpower for alternative service programs, including the implications posed by the promising technological aids demonstrated in the developmental projects described above.

(I.B.1.) University of Minnesota Rural Health Care Program--Demonstration Health Lab

The College of Medical Sciences at the University of Minnesota has been conducting studies designed to develop a community demonstration laboratory in which new patterns of planning and delivering comprehensive health services can be planned, demonstrated, and evaluated. It is anticipated that urban demonstration centers would be included. Presently proposed are a series of follow-up studies exploring the application of technology, including devices recently developed by NASA, for communication between the metropolitan medical center and remote locations. The proposed studies have significance beyond the technological level, however. For example, the potential for more productive health manpower combinations can be explored, and mechanisms for assuring a consumer voice on health care standards and operations can be implemented with the new communication devices. The Experimental City Project will support the College of Medical Sciences, collaborating with the Mayo Clinic's Experimental Emergency Room Project discussed below, in the planning phase of this vital project.

(I.B.1.) Central Data Bank

The establishment of a pilot project Central Health Data Bank for use by the physician and the medical researcher would provide data on its utility as a means for quick and accurate retrieval of a patient's medical history. Initial efforts would focus on the development of medical questionnaires for screening medical problems and the translation of that data to a matrix appropriate for computer bank information and which would also be of value to the physician.

A shortcut to achieving this worthwhile objective would be to build

upon the development of the matrix which has been initiated by the Mayo Clinic in its Medical Information System Project.

(I.B.1.) Experimental Emergency Room

This project visualizes the establishment of an experimental emergency room in a small community at least 20 miles distant from either the Mayo Clinic or the University Medical Center and in a setting also selected for a community demonstration laboratory. Through the use of a closed circuit television and electronic sensors, allied medical personnel would relay information to the appropriate physician at the Mayo Clinic or University Medical Center and receive treatment instructions. The project would provide data on health manpower utilization and patient transportation needs within the Experimental City by determining what patients need be moved to the physician's location. It would also measure consumer acceptance of assistance by allied health personnel in lieu of the physician and explore the legal implications in the provision of service by the non-physician.

(I.B.1.) Multi-phasic Screening

This project proposes an annual multi-phasic screening examination for a selected group of community residents. Whether data from existing demonstration projects are used or new demonstrations implemented, the objective would be to develop a cost-benefit formula through the determination of "pay-offs" resulting from such an examination as opposed to other alternatives. Thus, the demonstration would have implications for evaluative criteria, organizational structure, and manpower use.

(I.B.1.) Impact of Existing Regulations and Legislation on Innovative Health Programs

Innovative health programs in the Experimental City will undoubtedly come in conflict with the host of laws and statutes presently regulating the organization and delivery of health services. These conflicts need to be identified. The purpose of this project will be to specify the relevant legal foundations and their amendment potential in terms of their relationship to health service components. Specifically, legal precedents concerning such areas as mandatory health services, manpower licensing, facilities licensing, construction codes, financing procedures, reporting of disease, the institution of a control technology, and the relationship of the health system to other human resource systems need to be evaluated. Also to be examined are decisions potentially affecting the proposed "health utility" organizational form.

(I.B.1.) Cross-Cultural Relationships in Anti-Poverty Programs

It is realized that anti-poverty programs, particularly Model Cities, Pilot Cities, and Community Action programs, have served to bring together (often for the first time) persons of many different racial, class, and ethnic backgrounds. Since a new city of the kind being considered in Minnesota would bring into its limits many of the same populations now coming together under federal anti-poverty programs, more information about the interaction of these populations would be of importance for the staffing of the new city and for the operation of contemporary anti-poverty programs and other welfare services.

It is proposed that in-depth studies of the interaction of various racial, ethnic, and class groups be conducted in order to provide fuller information on the dynamics of initial contacts and cooperative work in the context of socially meliorative programs. Particularly, such a research program could investigate the mechanisms by which persons learn to interact with individuals of backgrounds different from their own. If the new city is to be an open city, even having within its limits persons holding citizenship in other countries, then what is learned in the context of a study of interacting minorities in present programs would have relevance to the conceptualization of a multi-national, cross-ethnic, cross-class, and cross-racial community.

(I.B.1.) Minnesota Indian Migrant Program

A significant and generally disadvantaged minority population in Minnesota consists of Indian Americans. They are a people with a unique cultural-historical heritage which often seems to place them in conflict with the norms and values of the dominant white society. Their problems of acculturation are deep and tenacious. Although their origin is rural (reservation in nature), they do migrate to the cities; there are perhaps 6,000 to 8,000 Indian Americans in the Twin Cities today, and there is evidence of continuing rural-urban Indian migration.

An experimental city which is committed to a "representative" population cannot ignore the Indian American as a special ethnic group. To do so would be to deny what is perhaps Minnesota's most perplexing problem vis-a-vis minority populations. A recent study, Indians in Minneapolis, jointly published by the Minneapolis League of Women Voters and the Training Center for Community Programs, University of Minnesota, documents well the marginality of urban life for the reservation migrant. It suggests little progress over the years in coping with the needs and problems of this special population. It reveals considerable frustration on the part of social service agency personnel who confront daily episodes concerning the adaptation of rural Indians to urban life. There is no doubt that those whose job it is to help the Indian American succeed in the city would welcome more knowledge which could lead to more effective

problem solutions. The need for new and imaginative approaches to what is by now an old problem in Minnesota is great.

Proposal: This proposal urges the development and support of a series of urban and reservation-located centers leading to further understanding of the migrant patterns of Indians in Minnesota. It is further proposed that provision be made for relevant and meaningful services to the Indian people actually involved in the two-way population flow.

Data from the Minneapolis American Indian Employment Center suggest that there is a substantial core of Indian migrants who enter and leave the Minneapolis-St. Paul area each year in response to social and economic pushes and pulls. The exact nature of these migratory paths and the relative strengths of various influencing factors are not known, yet the effects of migration may be expected to alter the educational, social, and economic lives of many Indian Americans in this region.

Not all Indians display this propensity to migrate. Data from house-to-house surveys in the Near North and Near South sides of Minneapolis, for example, suggest that there is another, more stable Indian population in the Twin Cities which is less likely to change its residence. The difference is strong enough to suggest that the two populations are quite distinctly different.

Surely an experimental city located in Minnesota would attract some Indian residents. If history is an accurate guide, such a city might anticipate facing many of the acculturation problems of this minority group. More knowledge about the phenomenon of migration and about the factors influencing stable city residence are needed.

Before meaningful social programs can be designed to meet the needs of Indian Americans, much more must be known about these migratory patterns. The provision of education for Indian children, the employability potentials of Indian adults, the eligibility of Indians for health and welfare services, and the extent to which Indians can expect to become a part of a predominantly white society depend in large part upon these cultural habits of mobility. From existing data it is evident that substantial numbers of Indian migrants come from or return to White Earth, Mille Lacs, Red Lake, and Leech Lake Reservations. What is not clear is the scope and frequency of urban-reservation, reservation-urban, and inter-and/or intra-city movement as well as the factors which induce Indians to assume relatively permanent households in urban or rural settings.

This proposal suggests a demonstration and research program designed to:

1. determine the scope and nature of Minnesota Indian migration patterns;

2. ascertain the relevant social services these migration patterns require;

3. meet the social service needs of mobile Indians;

4. attempt an assessment of the possible meaning of these migratory patterns and, to some extent, the services applicable to them, for general rural-urban population movements;

5. make specific applications of the findings of this program to such developing projects as the Minnesota Experimental City and similar efforts;

6. develop a model for comprehending and dealing with the phenomenon of Indian migration in other states and regions.

It is proposed that two major sets of contact points be established within Minnesota to monitor Indian movement and to serve Indians (or refer them for service) in the most effective manner possible;

1. at reservation community action agencies;

2. at urban Indian centers in Duluth, St. Paul, and Minneapolis.

One set of contact points would reside with the Community Action Agencies at each Minnesota Indian reservation deemed a significant point of in-or out-migration. Personnel assigned to these contact points would be charged with recording the movement of Indians with orientation services designed to make the reservation-city adjustment less difficult.

Appointments or contacts for Indians moving to the city could be made by these CAA persons with their counterparts, the personnel at the Indian centers in the Twin Cities and Duluth. In this manner the arrival of an Indian or an Indian family would be anticipated in the metropolitan areas and appropriate steps could be taken to ensure that housing, jobs and supportive services would be available. "Delegate" agencies in the metropolitan areas could be alerted in advance so that referrals from the Indian agencies in the metropolitan areas could be expedited. Basic training and orientation in city life, including employment, could be provided by such personnel located at the second set of contact points in the urban areas.

Since a high quality of service would be needed from the personnel at the urban contact points, alternative staffing possibilities need to be explored. Persons with expertise in community health and welfare resources such as United Fund Citizens' Aides might be utilized and/or University of Minnesota Indian students could be employed on a work-

study basis.

(I.B.1.) Complete Family Financial Security Program

The purpose of the project would be to investigate the feasibility of providing complete family financial security through a comprehensive insurance program. The program would bear little resemblance to conventional insurance contracts. It would offer a family a complete and flexible program of financial security which would automatically adjust to the family's financial status.

The insurance contracts would cover all causes of unexpected financial loss under one security program: premature death, disability, illness, liability claims, property damage and dishonesty.

The coverage would automatically adjust to an insured's income and to changes in the value of the dollar. In addition, unlimited coverage would be available for loss due to illness and legal liability.

The limitations on coverage would include deductibles and coinsurance clauses which would help control unwarranted claims and reduce premiums. The premiums would be subject to automatic adjustment on a class basis. The benefits under the program would be integrated with those available under government social insurance programs.

Reasons for Using an Experimental City: An experimental setting is needed for this type of project because the state's legal constraints and the conventions and conservatism of the insurance industry would otherwise render such a project impossible. Since there is no comparable experience upon which to estimate premiums, insurance companies cannot be expected to implement such a program outside of an experimental city. In addition, state laws would prohibit implementation of the complete financial security program.

An extension of this project would involve the use of complete personal financial service centers. These centers would market and service the complete family security program and also provide other financial servicing including banking and estate planning.

In a sense the financial security program is merely an extension of a trend which the insurance industry has been following. Insurance policies are now commonly available in a multiple-peril package policy form. Only life insurance and disability income coverages are separated from the policy package. Twenty years ago this package policy concept was practically unknown and thirty years ago insurance was sold on an expensive single-peril basis with the possibility of many gaps and overlaps in coverage. As the industry has gained experience and legal constraints have been relaxed, insurance coverage has broadened and is approaching an all loss type of program.

The advantages of the financial security program include the following: complete financial protection, low cost per unit of protection, little adverse selection, good spread of risk, and lower selling and administrative expenses.

Characteristics of the Experimental City: In order to implement this project the City should have both business and family exposures to risks. An organization to administer this program and a vehicle to finance the program would be necessary. The insurance industry may be willing to provide the manpower to administer the program and carry the financial burden through some pooling device or in conjunction with government support. Legal barriers would have to be removed and loss experience carefully developed as a basis for the financial structure of the program.

(I.B.2.) Development of Health Evaluative Criteria

Criteria are desperately needed for measuring the quality of health care and the efficiency of its organization and delivery. The School of Public Health (University of Minnesota) has recently developed a health care reporting system now in use by 57 children and youth organizations throughout the country. Their work might well translate to a reporting system from which evaluation could proceed.

In addition to the reporting system, this project will develop measures and appropriate data-gathering tools for assessing program impact upon the health of the residents. If the health care system within the Experimental City is to meet its objectives, mechanisms for monitoring on-going program effects must be built into the system. Utilization of the measures within the health system may suggest new and changed interventions, provide data for cost-benefit analyses, and aid in the determination of the pay-offs of a specific intervention over alternatives. This project might well be closely related to the proposed Central Health Data Bank experiment.

C. CULTURAL

(I.C.4.) Amenities for the Disadvantaged

What kind of pleasurable pastimes do poor people enjoy or have available to them? In inner-city and rural areas, poor people engage in modes of entertainment and relaxation qualitatively different from those enjoyed by persons in different walks of rural and urban life.

An impression one gets from visiting inner-city residential enclaves is that of the absence of amenities common to less depressed metropolitan areas or suburban areas. Yet, it is understood that persons living in areas of the city where amenities are scarce or absent have developed

forms of relaxation and play that appear to compensate for the absence of traditional amenities. It is assumed that, without these compensating amenities, poor people would be even less satisfied with their environments than they are now.

It is proposed that a study be conducted of the various amenity preferences typical of major population types living in specified parts of the city and in depressed rural areas, and that these preferences be related to the actual amenity offerings in those parts of the city and county area. It is proposed that related pilot amenity demonstration programs be established, whereby, on an experimental basis, deficiencies in amenity provisions could be met and tested in the populations where these amenities are desired but absent. Non-standard amenities could be studied for their possible application to non-poverty populations. The knowledge gained from this kind of study and demonstration approach would be of use to many rural and urban settings, but could also be employed in the development of amenity provisions for a new city which would contain in its population many, if not most, of the same types of populations that would be under study and involved in demonstration projects of this nature.

(I.C.4.) Manpower Behavior in a Leisure Society

The development of a leisure-oriented society has been forecast widely. Already we can observe this in six-month vacations for steelworkers, six-hour days for office workers, and a movement of business firms to suburban areas influenced by recreational considerations. These developments have been ad hoc and involve gradual rather than abrupt changes. Looking to a combination of these developments, intriguing questions concerning manpower resources arise. One purpose of this study is to seek data on these questions:

What shifts in employment will develop in a leisure society as people alter their patterns of life and consumption?

What incentives will serve to attract, allocate, and motivate manpower in a leisure society?

A second objective is to define the features of a leisure-oriented society appropriate for application in the Experimental City. We can suggest several characteristics now:

Design of geographic layout and facilities to facilitate recreation.

Scheduling of employment to facilitate recreation and leisure activities.

Provision of economic security in some form like a guaranteed income to permit development of leisure interest.

The establishment of a leisure society in the Experimental City promises to yield information on a number of issues which will face our larger society in the next fifteen years. For example, it would require the development of constraints upon business policies and practices, geographic layout, educational programs and the like. The implications of a leisure society for a manpower program which cannot be studied fully in any existing situation, would be revealed. Design of a leisure-oriented Experimental City, leisure-oriented in all respects, is vital to learning more about urban and employment problems of the future.

(I.C.5.) Man-Machine Interface in a Wideband Communication Installation

One form of experimental/developmental work of potential application to the Experimental City is being proposed at the University of Minnesota. The proposal would undertake an operational analysis and evaluation program directed toward establishing an overall plan of implementations for an experimental wideband communication network. The wideband network would serve a variety of information communication functions relating to academic, administrative, cultural and entertainment activities associated with the University.

The information system must provide the human user with useful information in a form that is understandable and acceptable to him. To arrive at an acceptable information system requires the consideration of a number of factors dealing with man-machine interface, technical practicality, programming, operation, maintenance, and economics, to mention a few.

This planning phase will draw upon the specialized talents of various departments in the University to coordinate in performing the operationa analysis and establishing the hardware, software, and operational specifications.

The detailed program activity will be composed of two major parts: (1) identifying, analyzing, and defining those information functions to be evaluated; and (2) establishing the operational, technical, and support specifications for the implementation and testing phase.

A cursory investigation by a faculty planning committee has identified four major areas which seem most promising as candidate applications:

a. Tele-facsimile between the Minneapolis campus library and the St. Paul library.

b. Remote consultation of a central card catalog.

c. Two-way audio/video communications for conferences, class discussion, etc.

d. Wideband data link between computer, classroom, laboratory facilities, and student carrels for CAI.

If the results of the wideband communications demonstration are favorable, a number of possibilities for the Experimental City open up.

(I.C.5.) A "Situation Room"

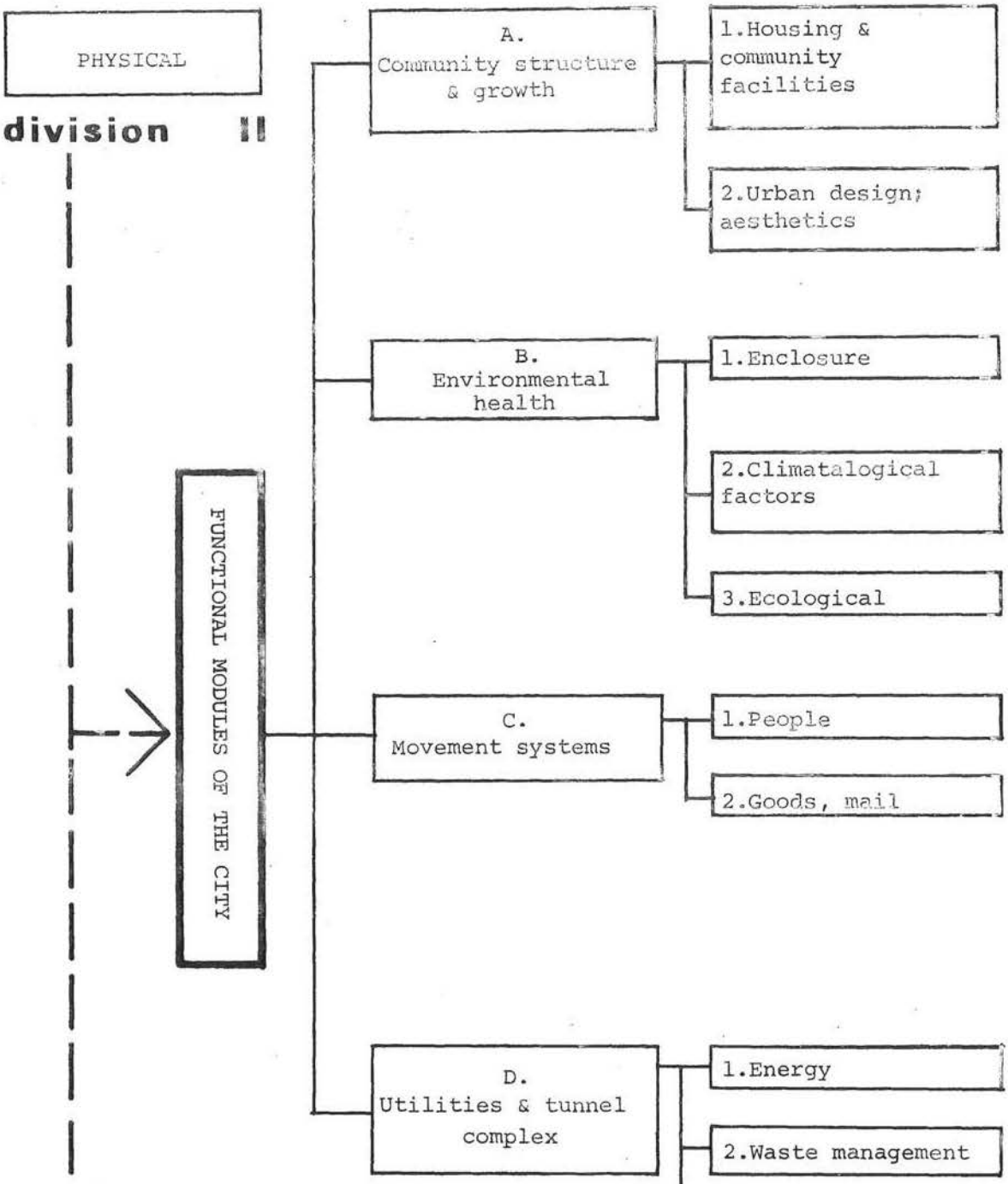
One communications opportunity will arise in connection with bringing together in one central display area the outputs of a variety of sensors and computers so the functioning of the city's subsystems can be monitored. This investigation will examine feasibility questions surrounding the creation of a centralized monitoring facility.

In addition to orienting a large public to civic services and feedback potentials, the situation room would be of great advantage in decision-making and control. For example, the mayor of New York now has an "issue mapping room" where information on important city problems is systematically collected and charted as an aid in executive decision-making. Major areas where monitoring could be centralized include traffic control, fire and police functions, water, and sewerage.

(I.C.5.) A Living Museum

It is at least a fascinating speculation as to whether a museum could be devised which would in fact try to symbolize the whole spectrum of knowledge by some kind of systematic sample display. This project proposes a study of the museum as a vigorous learning component in the community.

There is a wide horizon of technological advancement in front of the museum, not only in the use of the ear as well as the eye for the development of participant exhibits or the applications of programmed learning, but indeed in the whole concept of the museum as a three-dimensional, constantly available learning facility. If this opportunity is to be seized, however, it requires a breakdown of the present isolation of the museum subculture. It involves getting a large part of the scientific community interested in the problem of the rapid spread of developed images. We have seen the enormous impact when an important segment of the scientific community gets interested in schools, as in the recent revolution in the teaching of mathematics and the natural sciences. A similar revolution in the museum is by no means impossible.



Division II - PHYSICAL SUBSYSTEMS

Special Studies and Experimental Projects.
For full diagram, see fold-out sheet in back of this volume.

DIVISION II

PHYSICAL SUBSYSTEM

(II.) Functional Modules for the City

Our present notions about community structure and our base for micro-community planning are largely nineteenth century in origin. While urban problems have mounted and urban crises in the 60's have heightened, we have clung to the concepts of the neighborhood and the small town, and the pastoral nineteenth century life which we attributed to them. As a consequence, a social order has been defined and physically supported which focuses on promotion of close interpersonal relationships through mutual interests--the neighborhood with its own school, church, recreation field, and social and civic organizations. Or we have sought a homogeneous middle-class residential suburbia remote from the nitty-gritty problems of the city.

Yet the urbanization process suggests that man may have been seeking something other than the sheltered existence and the growth opportunities of the small town by the very fact that he left that setting. Despite a growing literature which decries the small town social order as a model for the city, few alternatives have been delineated. The colonization which it fosters seems universally accepted in the belief that it represents man's preference. Further, our efforts at remedial action have brought about only the most meager change.

This proposal has as its objective the development of a concept of functional modules as alternatives to circumscribed neighborhood, commercial, and industrial park theories for ordering individual and institutional functioning. Exploration of the concept involves defining the needs and aspirations of individuals (see Division I, p. 2 of this volume) and developing the mutual relationships between needs and aspirations and institutional arrangements. The study would have strong implications for the total physical subsystem. An overall

objective would be to provide the planner with a new planning handle making possible the fusion of micro-level and macro-level community dimensions into a related whole.

If individuality, integrity, and choice are to be supported, social criteria developed from human expectations and realities must be relevant to the urban environment of the future. A coordinated social and physical design would take into account the environmental systems, particularly those which might suggest innovations contributing to the improvement of the physical environment for urban living. Development of such a coordinated design could be of an enormous importance to the entire planning field, not just to the Experimental City alone.

While it is acknowledged that an in-depth coordinated social and physical research project might require from five to seven years, it is believed that promising early returns might be provided by drawing upon existing socio-cultural data relating to human needs and aspirations throughout the life cycle. From this and related constructs, one might hope to achieve new insights which would suggest guidelines for new social policies and their physical counterparts. Joint social and physical research might produce alternatives to the present stultifying social and economic colonizations which are prevalent in our cities today. For example, such planning could deal, not just with homogeneity and heterogeneity or with segregation and integration, but with appropriate intermixes of the populations and with desirable intensities of pockets or enclaves. The range of flexibility and choice which we say man requires could then be considered.

Through such coordinated social and physical research and planning one might open up new understandings of individual and institutional functioning which would define appropriate functional modules of a community. Out of this would come some new and firmer bases for the physical patterning of the City. No areas for study and experimentation were identified for this aspect of the physical subsystem.

B. ENVIRONMENTAL HEALTH

(II.B.1.) Enclosure At City Scale

One intriguing possibility which has been advanced for a high-technology city is that of a full enclosure, or umbrella. Such enclosure would create the potential for a totally new environment in terms of the physical dimensions and in terms of the patterns of living and working and playing it would support. As with similar heroic proposals, the full range of potentials and outcomes would not become immediately clear but would unfold over time. A variety of investigative,

experimental, and developmental projects would be needed to mount the task of enclosing the city. These will range from engineering considerations through a broad spectrum of social and economic implications, and ecological and climatological impacts.

A dome enclosure with a diameter of the order of one mile has been suggested as relevant to the Experimental City proposal--taking into consideration the Minnesota location, timing, and available technology. To achieve this end objective of a one-mile diameter enclosure, it has been suggested that two intermediate stages may be necessary because of the magnitude of the undertaking.

Test Model: A test model of suitable dimension should be constructed to deal with as many of the anticipated engineering problems as practicable. Such a model would be used for studying feasible structural techniques, materials requirements, and interacting systems, particularly those related to climatological factors. (An eight-foot diameter model was found to be satisfactory for most of such investigations in connection with the 200-foot diameter U. S. Expo '67 structure at Montreal.)

Enclosure for a Microcosm Balanced Community: Building upon the test results of the above model, it is suggested that a 1/4-mile diameter enclosure be constructed over a microcosm balanced community. Such an intermediate model might be constructed as a part of the Experimental City or as a permanent installation in another location. This full-scale test would provide reliable insights into man's reaction to living in the enclosed space; it would permit projections of likely socio-cultural impacts; it would serve as a proving ground for interacting environmental systems similar to those to be developed for the one-mile diameter city enclosure.

(II.B.1.) Scaling Factor Study

It is not certain that the present state-of-the-art will be adequate to allow design of an air conditioning system for an enclosure having a diameter of the order of one mile without some additional experimental information. Adherence to proper scaling factors and similar parameters is required when extrapolating model tests or small-scale tests to full-scale conditions. For scaling based on diameter, the ratio of the diameter of the Experimental City to the diameter of the Houston Astrodome is of the order of ten. In most cases the extrapolation of model tests to full-scale conditions having a diameter scaling factor of this size can be carried out successfully. However, data on a full-range of scaling factors will be necessary before the actual air conditioning system for the Experimental City is designed.

(II.B.1.) Clustered Dome Concept

A possible configuration for an enclosed experimental city would be a grouping of interconnected separate domes, each having diameters of the order of 1/4 mile. One efficient configuration for these domes would be a "bunch of grapes" arrangement, each connected to a long enclosed corridor. This corridor could house the transportation system and allow ready access to the domes spaced along its length. The potentials of this modular concept need examination. For example, domes of various sizes could be constructed as they are needed and dismantled when they no longer serve a useful purpose; separate domes could be built for containing various climatic environments such as tropical, cold, and temperate.

(II.B.2.) Climate Management

Aside from climatic aspects of enclosure, research is necessary to insure the capability of the City to protect itself against the excessive interference of elements which intrude upon the normal life of city inhabitants. One would need weigh whether mechanical control or whether learning "to live with" such elements is the appropriate choice.

There are, of course, many technological solutions which have been proposed and are in use relative to control of some of these elements: automatic defrosting systems for icy bridge decks and critical roadway areas, timed-light signals, automatic warning lights and the like. Certainly these will need to be investigated as part of the services and utilities system.

(II.B.2.) Air Quality Studies

An investigation is needed to determine the relative merits of using fresh makeup air as compared to carbon treatment. Existing structures such as the Houston Astrodome could be studied to obtain some of the required information. The relative merits of makeup air addition and carbon treatment would have to be considered with respect to the outside environment and whether air cooling or air heating is required. Economic studies could be made to determine the capital investments required for alternative systems along with anticipated operating costs.

C. MOVEMENT SYSTEMS

(II.C) Transportation Studies

It is quite certain the public transportation system that will be used in the Experimental City will be one of those now under development or a modified version of one of these systems. The operational

characteristics of many of these systems are now known. The purpose of this study is to choose the most promising of the available candidate systems (or combinations of systems) for use in the Experimental City based on available data. Parameters to be considered include noise, speed, passenger-handling capability, size of right-of-way required, economic viability, etc.

The study would also consider the interactions between this transportation system and the other systems to be built in the complex.

(II.C.) Development of Transportation Simulation Model Techniques

A number of models exist for transportation systems in current day cities. This investigation proposes to generate a series of simulation studies in which movement of people and goods and the unique conditions of the Experimental City are added to available models. Using the more refined models, the studies might well suggest transportation remedies for existing cities.

(II.C.1.) Movement Systems, Mode Separation

Because present commitments, social as well as economic, seem to preclude the installation of suitable transportation systems in the city, (particularly new transportation systems), top priority should be given to the development of a transportation system in the Minnesota Experimental City with a separation of modes and the capacity to adapt to and fulfill the functions demanded of it. Although there is not general agreement as to the desirability of complete separation of pedestrian and vehicular traffic, there is support for separation of certain levels and kinds of traffic as absolutely necessary for the ease of living. This study has as its purpose the collection and analysis of data for mode separation decisions. Some of the factors of particular concern: mode interchange and point of interface; integration of horizontal and vertical motion within a single system; security; locational relationships of such items as airports, sports centers, job centers, and places of residence.

(II.C.2.) Central Terminal(s) for Receiving, Handling, and Transport of Goods, Including Mail; Study of Selected Goods Movement Through the Utility Services Tunnel

While a great deal of thought has been given to the movement of people, almost none has been given to the movement of goods. The annual costs for delayed handling and routing of material are staggering. A fruitful approach is to examine the feasibility of accomplishing efficiencies at the broad scale of the City. This study proposes an exploration of

a centralized terminal warehousing and distribution system with particular attention to such items as handling of goods coming into the City, sorting and delivery mechanisms, and impacts of a centralized facility on warehousing and industrial clustering.

(II.C.2.) City Form Implied by Selected New Transportation Systems

Most transportation systems, from the exotic to the mundane, have been examined in the context of their application to existing cities. Seldom has there been concerted study as to the kind of city in which a given transportation system might work best. This proposal would examine selected systems in terms of the city form implied for the effective and efficient operation of the system.

In this connection, including the exploration of an airport as a determinant of city plans is also proposed. New airports of the last two to three decades have been outstripped by technology before becoming fully operational. This study would examine the technology of air transport and travel in the case of (1) a regional or a national air transport center (including S.S.T. and other craft), and (2) an airport for a new city of a quarter-million population--including in-city as well as inter-city transportation. The implications for city form will be examined.

D. UTILITIES AND TUNNEL COMPLEX

(II.D.) Feasibilities and Potentials of the the Tunnel Complex

Early considerations suggested that a tunnel complex to house physical infrastructure could make an important contribution to the ease and efficiency of living, especially in its potentials for coordinated use by movement systems and utilities. Investigation is needed to define the potentials and explore the feasibility questions surrounding a tunnel complex.

One principle should be examined with regard to tunnel economics; that of multiple-shared uses--new uses as well as combined uses. Thus, study of the use of the underground structure might well explore the inclusion of a simple pattern of automobile circulation such as an underground street with parking along either side, underground garages hundreds of feet long but 40 feet wide. What promise might this have for low residential densities?

Multiple-sharing also raises questions of compatability, and these questions should be viewed in terms of coordinated developmental work which will be needed. An integral part of this work must be knowledge of required individual and organizational interaction which will assure coordination.

Infrastructure as a building foundation might well be one of the multiple uses. While it seems most natural to speak of infrastructure as a grid of services buried in our streets, it may be that greater efficiency could be derived were service tunnel complexes beneath the structures and functions they serve. This might lead to radically different ways of conceiving the central city and its form. In addition to its service functions, the tunnel-complex grid might become the "foundations" of city structures, three-dimensional space could be leased or sold to private developers, and "plug-in" services might become immediately available.

(II.D.) Compatability Studies

Consideration of the separate areas of solid and liquid waste management, environmental control, communication and information, energy distribution, and the like have raised many questions requiring investigation. This study focuses on the development of compatibility between the services to be accommodated, the way in which these might be wed so that a coordinated system will result.

This study proposes to examine such questions as: Could savings be achieved through a closer working relationship between the several systems? Are combinations likely which would make possible new services or simplify the administration or the delivery of existing ones? What special concern should there be for personal security or for vandalism in a common distribution system?

(II.D.1.) Population Knowledge and Attitudes Regarding Nuclear Powered Generating Plants and a Plan For Related Education

It is anticipated that a nuclear power plant may provide the most economical means of generating the electricity needed by the Minnesota Experimental City. At present, however, there seems to be a bias on the part of the general public against nuclear power plants, particularly when they are located in urban centers. It is not clear to what extent these objections stem from inadequate knowledge or from specific beliefs concerning such plants. Differences in attitudes may exist among various socioeconomic groups, but this possibility has not been investigated systematically. Further, it is not known what educational techniques would be most effective in promoting general acceptance of nuclear plants. It is obvious, however, that widespread opposition among the population of the Experimental City might provide an impelling argument against the installation of a nuclear power plant within the confines of the City. This study will examine those questions of social concern which may have a major impact on design and location of energy-power systems.

(II.D.1.) Energy Management

The advanced city will utilize in order of magnitude more power per citizen than conventional cities of today. Widespread applications of total energy, radiant heating of outdoor areas, snow melting application, completely comfort-conditioned homes, and new transportation concepts--all will come about as our technology advances.

The City As A System: The high-technology city is a total system composed of innumerable overlapping subsystems which can be grouped by various sociological and physical criteria. The techniques and mathematical tools of systems analysis will be used to study and determine the interaction between various subsystems and the effects of the interaction on the total system. The energy system and the management of this system are two of the most important subsystems which will be analyzed in this manner. An energy balance is essential to the study of the energy system and, in this context, energy and material will be examined in both quasi-steady state and transient conditions.

Computer Control: Efficient management of the complicated energy distribution system that will be required for the city will necessitate the use of an automated system controlled by a high-speed computer. An important part of the research program will be to study the degree of computer control that will be necessary for this purpose. The results of the analytical studies of the energy and material flows will be used to prepare various component subroutines that can be stored in the computer and used to predict energy requirements and control distribution in the city when it becomes a reality.

(II.D.1.) Energy Distribution In A High-Technology City

Preliminary studies for the Minnesota Experimental City have shown direct relation between energy utilization and the level of technology. Logically, the objectives for a high-technology city point toward the consideration of nuclear energy. To be used effectively in terms of its total energy (thermal, as well as electricity), the nuclear generating plant should be placed near the city itself. The two other proposed studies treat the advantages of central location in terms of energy management and the feasibility of central location in terms of public acceptance. In this phase of the total program, the distribution problems of the electric utility within the high-technology city will be considered.

The study will not be the design of a power distribution system but will constitute a review of design problems and thus attempt to determine the developmental areas required prior to design of such a city. The purpose of the study will be to perform a systematic, detailed analysis of the distribution problem.

The study will consist of (1) a data acquisition phase to obtain base-line documentation for both the proposed city and the utility distribution; (2) a formulation of the utility model for the city by determination of population, load density, future load forecast, and the other significant parameters; and (3) a review of potential designs and design techniques without doing the detailed design. The proposed study will result in a clear definition of development problems, the developments required, and will serve to indicate the relative trade-offs of the distribution system. In addition to the technical aspects of power distribution, the program will include a study of federal and state controls as well as national and local codes and standards with reference to high-technology cities. The study will conclude with a recommendation and summary phase to define the development areas necessary to achieve the desired aesthetics, pollution control, noise abatement, reliability, quality, and economy for an advanced city.

Essential to the planning of an experimental city is the development and deployment of the basic utilities. Fundamental to the development is a well-conceived plan to evaluate the various parameters and features of the utility.

Reliability, Quality, and Economics: The preceeding paragraphs have discussed various aspects of the distribution problem. Although many technical approaches are distinctly feasible, all promising solutions must be considered with respect to their inherent reliability, quality of service, and cost. In this way, all distribution techniques will be traded against these three primary measures of performance.

(II.D.1.) Application of The Fuel Cell

With pollution control requirements that are now becoming more stringent, and especially for the high-technology city, the possibilities of use of the fuel cell for mode of power appear very attractive. This is especially important for fuel-cell-powered delivery trucks, fork lift trucks, and similar vehicles that could be operated for two or three working shifts without the necessity of charging a reverse stock of batteries that adds to the down-time of the vehicles. In the high-technology city, many uses could be visualized such as portable power packs for lights, tools, radios, and TV receivers, and emergency standby power for hospitals and schools.

By 1982, it is quite likely that fuel cells could be economically used in the high-technology city. If the power requirements of a substantial portion of the city were satisfied by fuel cells, this would serve as an impetus to enchance the market possibilities of this device.

Specific problem areas that need investigation include the following:

Anticipated new fuel cell developments
Safety considerations
Economic analysis
Interface of fuel cells with other energy sources
Use of direct current for various applications

(II.D.1.) The Total Energy Concept

The high-technology city presents a unique opportunity for the evaluation and comparison of the total energy concept with alternative means or combinations of energy supply.

Several possible total energy system configurations should be considered and analyzed. Two systems which might be considered to lie at the outer bounds, and within which all others would lie, are: (1) a single centralized engine energy source, and (2) natural gas-fueled total energy systems in each building and residence in the city. These are the two extremes of a single energy generator versus multiple energy systems equal to the number of buildings in the high-technology city. Several compromise systems are possible within these two extremes, and, undoubtedly, the final system will lie within these two. The overall energy system could be comprised of several total energy systems located throughout the city and sized to serve specific areas such as an industrial park, a shopping center, an apartment complex, or a residential neighborhood. These individual systems would be tied together in a power supply network with a centralized computer monitoring and balancing the demands of the various individual systems. The energy systems at this scale of operation could be engine (or turbine) generator sets, along with heating and cooling systems.

(II.D.1.) New Gas Distribution Concepts

Recent developments in fuel-cell technology indicate implications for gas distribution. Since a single installation or grouping of installations of fuel cells can eventually serve the purpose of central power generation, the impact of fuel-cell technology on a gas distribution system needs examination. If a central power system operating on fuel cells is developed, gas distribution systems will not be needed, and the city itself can be considered as a gigantic total energy system. However, if individual dwellings, apartment complexes, shopping centers, and industrial groupings are to have their own fuel cell systems, it will be necessary to consider gas distribution.

(II.D.1.) New Gas Fuel Applications

New gas fuel applications are an important area of research for the Experimental City Project. Many possible applications should be

studied, including water purification, waste management, microclimate control, oxygen enrichment, and prevention of snow and ice accumulation.

(II.D.2.) Waste Water Final Disposal Research

One of the problems dealing with specifying liquid waste treatment is that the ultimate use of water will determine the quality required in the effluent. It may be feasible to treat the water partially at one stage and use it in a second, beneficial use and then complete the treatment later before final discharge. This would be a departure from normal waste treatment practice where the objective is to concentrate the treatment in one major facility. However, there are significant precedents for the concept of the sale of partially treated waste water; these should be documented and the information prepared for analysis.

(II.D.2.) Solid Waste Research

A possible research project would be to build a pilot solid-waste handling system to permit field trials of the principle of total maceration of all solid wastes produced in the home, followed by water carriage of macerated solids to the waste water treatment plant.

This program would be designed to test the effectiveness and acceptability of the proposed motorized maceration equipment in a sufficiently large number of cases to give statistical validity to the findings. Duration of running time between servicings would be recorded and the following characteristics evaluated by the users:

Ease of use
Noise level in operation
Safety of use by children and the aged
Power consumption

From the community's standpoint, evaluations would be made of the added burden on liquid-solid separation equipment at the waste water treatment plant and added burden on sludge disposal methods.

The overriding objective of this project would be to make the disposal of solid wastes by the householder as simple and aesthetically satisfactory as possible, no more "taking out the garbage," no more trash burning, and no more unsightly barrels or cans in the back yard.

(II.D.3.) Selective Treatment of Water For Various Uses

Residential use of water includes a variety of purposes, and each use has its optimum characteristics of temperature, dissolved mineral content, organoleptic qualities, and pressure. (It is presumed that all the water distributed for public use will be safe from the standpoint of bacterial, viral, and radioactive content.) Relatively little is being done to provide for modulation of these characteristics in today's home.

This study proposes to examine the characteristics of water in relation to its four principal uses:

Potable uses
Sanitation uses
Irrigation uses
Air temperature change uses

An objective would be to provide water suitably tailored for the specific intended end use.

(II.D.4.) Computer Utility

The concept of access to a central, large-scale computer by a multiplicity of users has recently been advanced. The ownership of the computer would reside in either a private firm or some firm akin to the traditional utilities such as telephone, electric, and gas services. Each user would then pay only for the amount of use he makes of the computer.

So far there has not been investigation of making a computer available to private individuals in homes as well as industries. This proposed project goes beyond the computer utility concept to investigate an information utility concept in which, not only would computational capabilities be accessible to industry, government, and private individuals, but all forms of information and communication would be distributed via such a system.

This research would involve investigation of such areas as: (1) news dissemination via cathod ray display or similar devices; (2) education through programmed learning devices; (3) home access to centralized library files; (4) home shopping via cathod ray display and two way communication; (5) computer computation as an assist to home management; (6) decentralization of industrial work and managerial activity to the home; and (7) medical diagnosis at home via devices integrated into the system.

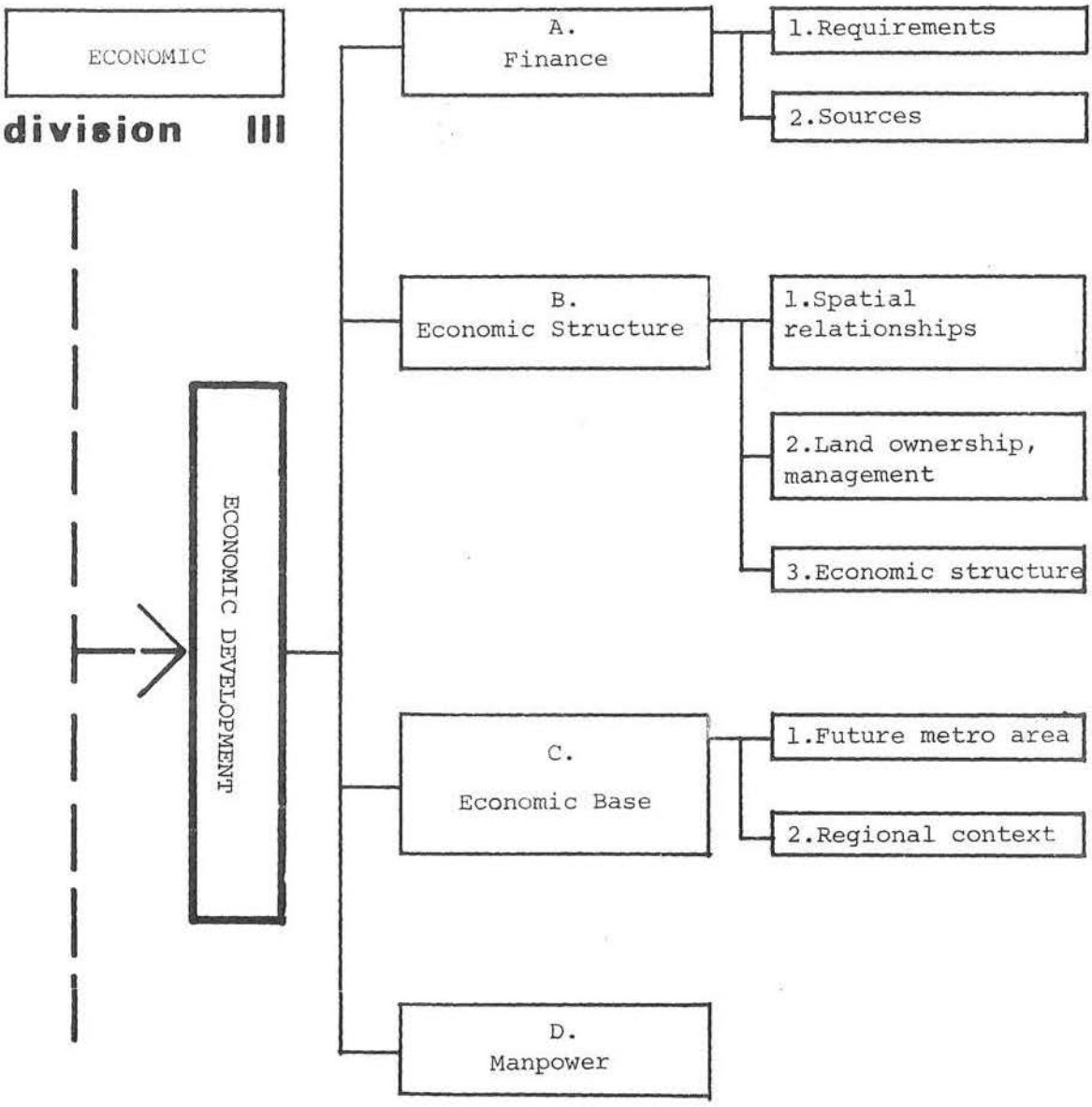
None of these areas could be effectively studied in an existing urban setting. The cost of installing such communication lines in parallel with existing communication lines would be prohibitive. However, at a reasonable incremental cost, lines capable of transmitting signals for this information system could also be used for

the necessary and traditional communication and service lines in the Experimental City. This project would obviously interact with a number of other possible projects in terms of the sociological, the economic, the political, and the technological impact of such a system on the people and industry of the Experimental City.

(II.D.4.) FCC Regulations

Repeatedly the point was made that alterations in present FCC policies are required by a high-technology city if overleap is to be achieved. This project proposes an investigation of alterations which may be required by the MXC. The study would have significance for future FCC national policy as advanced technologies become more widespread in the nation.

For example, pricing policies might be liberalized to serve an experimental purpose. If Minnesota firms were permitted to provide new services without charge for a limited introductory period, demand for these services on a permanent basis would likely be enhanced and the dissemination of technology accelerated. An early presentation of the Minnesota Experimental City to the FCC would seem desirable in order to focus attention on the objectives of the City and to discuss the appropriateness of regulatory changes.



Division III - ECONOMIC SUBSYSTEMS

Special Studies and Experimental Projects.
For full diagram, see fold-out sheet in
back of this volume.

DIVISION III

ECONOMIC SUBSYSTEM

A. FINANCE

(III.A.1.) MXC Household Costs

In order to determine the required investment for building a new, experimental city, per household estimates of cost will need to be derived. Household costs might be assembled from data on cost of infrastructure, cost of business and industry, and cost of housing. Costs might be further broken down according to "fixed" and "variable"; above ground and below ground; and according to time during development period when incurred.

(III.A.2.) Modeling New City Financing

The project scale of the Experimental City suggests the need for the development and testing of a finance model. Potential sources of new city revenues, both traditional and innovative, would be considered during model runs. These might include:

1. A public offering of new city shares of stock to supply capital funds. This might involve creation of a public-private development corporation modeled after COMSAT.

2. Issuance of tax exempt bonds to finance some of infrastructure costs. It would be important to determine early the finance limitations of this method.

3. Sources arising out of changes in national tax policy. Here tax policy could be treated as a variable.

4. Public land ownership as a source of revenue. The increment to land value which would accrue through development might be sufficient to pay part of public infrastructure costs.

B. ECONOMIC STRUCTURE

(III.B.1.) Land Market Simulation

A land market simulation model needs to be developed so that the implications of alternative land uses can be assessed. Because of the rapid development that is envisaged, the feasibility of developmental guarantees should be investigated as part of the land market study.

This study would be particularly useful for optimal land allocation if public land ownership prevailed, as the normal market land distributer would not be functioning. As part of the study, feasible ways should be investigated of reserving land for social purposes (parks or golf courses) which became apparent only years after the city is built.

(III.B.1.) Spatial Efficiencies

A new city presents an opportunity to achieve economies through the spatial arrangement of activities. Experiments are needed to demonstrate the extent to which economics can be achieved through spatial juxtaposition and to identify which spatial efficiencies might be built into a new city. An early determination of efficiencies not found in existing cities might well have a favorable impact on the rate of the city's development. Part of the study should be concerned with the type of flexibility needed to maintain the economies through the city's later years.

(III.B.1.) Land Value Increment

Assuming some form of public land ownership for the new city, information is needed on the way in which land appreciates in value according to different city forms. In particular, the influence of various transportation, communication, and utilities layouts on land values needs examination. The end objective of the study would be to pinpoint methods for enlarging total land value increment arising from the city as an aid to financing.

(III.B.2.) Public Land Ownership

In Northern Minnesota, 65% of the land is under some form of public ownership. This suggests the possibility of conducting experiments in land development under conditions of mixed public-private ownership. Experiments would be devised to provide better understanding of:

1. The effect public land ownership might have on the new City's development, i.e., whether or not removing speculative incentives would retard the City's growth. If it would, how, and which industries would be most affected? Would some industries benefit? How might individual residents respond?

2. The consequences of public land ownership on land controls. Would better controls be possible and would they be used? How long would leases have to be to provide sufficient security for individual and business tenants?

3. The relationship between land value appreciation and development under government ownership.

(III.B.3.) Social Cost Pricing

An area for investigation is that of implementing a system of social cost pricing in which firms and industries pay the full social and economic costs of actions they take. A system of user and penalty fees might be developed for this purpose. A number of questions are suggested. What would be the effect of such a system on the City's growth prospects? Which industries would be least likely and which most likely to come to the City as a result of such a policy? How could the public be assured, under this system, that the City would increase the capacity of overutilized facilities rather than just increase the user charges to raise revenues?

(III.B.3.) Non-Price Competition

This project would be designed to assess the desirability of price competition as opposed to other sorts of competition, as viewed by consumers. One economic enterprise (or a series of them) would adopt the following policies: line of goods, depending on costs (thus sacrificing variety); no gimmick; no credit; few service or sales facilities; low prices. The other units would operate more normally, emphasizing sales promotion, brand names, service, credit, and variety.

Study could then be made of: (1) the importance to consumers of price competition versus other types of competition; (2) the characteristics of consumers preferring one type over the other; (3) the patterns of preference in wealthy versus poor neighborhoods; (4) the effect of

these differences in emphasis on patterns of consumer spending. The implications of such a project would be immense in terms of potential improvements in the allocation of national resources, increase in the access of small business to the markets, elimination of the observed price differentials between wealthy (lower price) and poor (higher price) districts.

(III.B.3.) Automation Considerations in an Experimental City

Although automation has been studied extensively and much can be done in this field without an experimental city, it would seem desirable to incorporate a study of the impact of totally automated operations which will be a part of the Experimental City Project. It may be desirable to build fully automated industries; to provide, in effect, dummy industries to convert outputs from one sector of the city's economy into inputs for another sector. This approach would also facilitate a high degree of flexibility for experimental designs. These automated industries would enhance experiments in other areas such as transportation, economics, politics, sociology, etc.

(III.B.3.) An Experimental Business Organization

This is a proposal to set up a company ostensibly operating to make a profit and having all of the major functioning sub-units found in most business organizations (such as sales, production, finance, personnel, accounting, etc.). The physical construction of this organization would be amenable to observation and experimental manipulation--having one-way vision partitions and microphones throughout. With such an organization, it would be possible to test experimentally many of the correlational findings about behavior related to motivation, compensation, organizational structure, intra-organizational conflict, communication, power, and authority. That is, one could change any of these variables and observe the results. These experiments could be performed within the various restraints imposed by varying conditions outside the organizational boundaries. For example, the medium of exchange for goods and services might be modified with a resulting effect upon these variables mentioned above. Or, a guaranteed annual wage and/or guaranteed life services for all in the community might be introduced.

If we are to progress beyond the correlational phase of research on problems of importance to business organizations, experimental studies must be carried out. In a setting such as the Experimental City, it would be possible to control more precisely the environmental variables as well as variables within the organization. At the present time, the influence of the external variables upon those inside the boundaries of organizations can only be approximated.

C. ECONOMIC BASE

(III.C.) Economic Base

Firm commitment on the part of business and industry to generate economic activities and employment opportunities is an essential precondition to breaking ground for the MXC. A study is needed to establish the variation in plausible alternative industrial bases for alternative city locations.

Basic locational factors have traditionally influenced the decisions of business and public agencies in determining where and when to make investments. This study proposes an investigation of locational trends in manufacturing industries, office functions, and research centers and the characteristics of the regions in which they grow. Factors to be examined include: general orientation of the industry, i.e., to markets or resources; the role of the cost of major inputs such as transportation, labor, power and raw materials; and characteristics of the region's business climate. The study would produce a priority ranking of locational factors by industry type. It would suggest which industries would be suited to a Minnesota location and would also point to what characteristics should be built into the City to enhance industrial investment.

In addition to examining the role of locational influences on which data are available, the study proposes systematic investigation of the locational value of the unique characteristics envisioned for the MXC. For example, the testing and evaluation setting, the opportunity to participate in overall city and regional planning and development, and the advanced social and physical environment.

(III.C.1.) Inter-Industry Linkages

Separate studies should be conducted of private service requirements (both personal and business) and their relation to alternative mixes of firms and households that might be expected to reside in the Experimental City. Scale studies of these services should be related to possible bottlenecks in the development of the private sector.

(III.C.1.) Attracting Industry

A study is needed to anticipate the difficulty of bringing industry to the new City. This should include an examination of other cities of 250,000 to assess the nature and extent of agglomeration economies, inter-industry linkages, and successful aspects of the public infrastructure.

A quantative measure of the mix of jobs by sector needed to assure economic viability should be determined.

(III.C.1.) Capturing Retail Market

One potential to be explored for accelerating the development of a new city is the possibility of capturing a greater than average share of the residents' retail trade. This would tend to help the City's balance of payments. This study proposes an investigation of consumer buying patterns and preferences related to local, regional, and national markets, followed by an analysis of items appropriate for local retail markets.

(III.C.2.) In-Depth Study of Distressed Counties

Unemployment, underemployment, out-migration, and general economic depression distinctly characterize several counties in Minnesota. The causes for these conditions are not now known with any degree of sophistication.

It is proposed that several counties in Minnesota be identified as the most depressed according to the indices mentioned above and other relevant factors. These counties would then be subjected to in-depth analysis by teams of trained social scientists whose aim would be to pinpoint the crucial social correlates of depression and to suggest remedies for the counties in question. Such findings could have great relevance for the new City, particularly if it is located in the same general area as the counties under study. The major aim of the research project would be to do in-depth studies of representative families and individuals whose life styles seem to be related to major economic trends of the counties under study. The study could concern itself with (in addition to the factors mentioned above) questions of relocation to areas where work is available, the relationship between education and employment, the tendency of rural populations to move to towns within the area, the intra-city mobility of, particularly, poor people, the problems of transportation to available work in these towns, the determination of effects from potential in-coming industry, and other questions.

Perhaps the most insightful data that could be gleaned from studies of depressed counties would be in-depth material associated with individual and family life styles. Subjective variables no doubt play a factor in the behavior patterns of persons living in depressed Northern Minnesota counties. The relationships between the subjective variables of individuals and families and the more quantifiable variables in the categories listed above would provide a clearer picture of the associations between economic depression and social and

psychological variables. The new understandings gleaned from this kind of study could feed immediately into problem areas of depressed counties, particularly to the problem of out-migration to towns and to metropolitan areas.

The findings of this study and the development of appropriate planning schemes and community development practices would in-put to the conception and initial populating of a new city in many ways.

(III.C.2.) Interregional Input-Output Table

An interregional input-output table giving inter-industry technological and interregional trade coefficients would be extremely useful. Such a table would supply information about trade relationships in the region and thus a better idea of the City's impact might be gleaned. The table would also help determine the character of the City's economic base under alternative assumptions about its major industry or industries and the need for certain types of industry based on the existing regional economy. Construction of such a table would be a significant pioneering effort.

(III.C.2.) Localizing Services

The success of the overall development strategy will, in part, depend on the existing potential for regionalizing public and private services. Specific sectoral studies (e.g., education, medical services, wholesale trade) should be conducted to focus on this potential. The center-periphery structure of these services in several rapidly growing, free-standing communities of comparable size would provide useful insights for the organization of the services in the Experimental City and their impact on hinterland communities and larger cities.

(III.C.2.) Depressed Areas and City Impact

This study proposes: (1) an identification of variables important to understanding the impact of the employment circumstances in depressed areas on the creation of a new city in those depressed areas; (2) an investigation of the variables to determine the potential of the MXC to aid depressed areas.

Information is needed from sample areas in the state on the amount of slack time in the labor force, especially in the rural areas and small towns; disguised unemployment; skills in the existing labor force. The relationship between skills existing in the rural hinterland and proposed employment opportunities within the new city; the willingness of the unemployed and underemployed to commute to employment, both in the new city and to other locations. The relationship between willingness to commute and distance from place of employment.

(III.C.2.) City's Role as Central Place and Growth Node

Investigations are needed to define the role of the Experimental City in the central place hierarchy of the region. Questions needing exploration include: What functions might the new city take over from the smaller cities and the rural areas? What is to be the relationship between the city's municipal government and the rural interests of the county government? For what functions might the city depend on the Twin Cities?

Conceptual models might be developed for the more explicit assessment of the City's potential as a growth node. The models would include the impacts of the new urban community as a central place on other cities within its economic sphere of influence.

D. MANPOWER

(III.D.) Manpower Recruitment

To populate the MXC will require a major recruitment effort. Studies should be made of past efforts at recruiting manpower on the massive scale envisioned as necessary for the Experimental City.

Much can be learned about manpower planning from past experiences. Areas which might prove especially fruitful would be the historical development of manpower needs and sources as they have evolved over time in selected, rapidly growing cities, manpower recruitment efforts of new towns both here and abroad, and the experiences of large corporations which have located in relatively unpopulated areas. An analysis of corporate recruiting techniques in general should yield information enabling selection of methods which can be most successfully utilized in the new city.

(III.D.) "Second-Class" Employment

A substantial amount of employment available for the disadvantaged is considered "second-class" employment since it combines low pay with other undesirable aspects. The turnover rate is high, and those who do hold such jobs are unable to develop skills or an appreciation of work as a way of life. Many employers offering such jobs have little incentive to restructure or improve them because of the low quality of the labor force available for the jobs. A consequence is a vicious circle of jobs downgrading workers and workers downgrading jobs.

This project proposes an investigation of the problems surrounding "second-class" employment, including the implications of the advanced technology proposed for MXC for low-grade jobs.

(III.D.) Migration Motivation

Studies made of factors motivating rural inhabitants to move to urban areas should be examined with the purpose of determining the extent to which the provision of jobs nearby, i.e., in a new city, would stem the flow to distant urban locations.

Analysis of data on the following questions would be especially helpful: How far might rural residents be willing to commute to new urban opportunities? Under what circumstances would they relocate in the vicinity of employment? To what extent is the lack of suitable transportation a cause for unemployment and underemployment in distressed counties of Minnesota?

(III.D.) Out-migrants Characteristics

Studies should be made of out-migrants from the Upper Midwest Region--their talents, demographic characteristics, and reasons for migrating. If the Experimental City expects to draw population from this group, it must identify both the attitudes and skills it would be importing. The studies would have special significance for job training and individual and family resource development programs.

(III.D.) Employment Opportunities

The problem of providing a wide variety of consumption and occupational choices for the residents of the Experimental City should be studied. Factors which will influence the kinds and range of choice include size of city, productivity of economic specialization, and de-centralization of technology. These should be explored for their projected impact on employment opportunities.

(III.D.) Training Hard Core Unemployed

Recently several University of Michigan professors formed EDCO (Employment Enterprises Development Corporation), a non-profit organization originally designed as a vehicle for returning the "hard core" unemployed to the labor market. By creating several non-profit businesses in which the previously unemployed are closely supervised (usually for a surprisingly short period of time until they are able to enter the labor force normally) EDCO has had outstanding success, at incredibly low costs, not only in retraining unemployed workers who did not even qualify for Manpower Development Training Act aid, but also in assisting some of the estimated quarter million inmates in mental hospitals whose chief problem seems lack of access to or lack of success in their work.

The combination of the management expertise available in the School of Business Administration and the unique features available in an experimental city would appear to present a special opportunity to develop a plan for a similar program--a program which among other things would include:

1. Rational and comprehensive planning of selected private enterprises as a preliminary training ground for the uneducated, the unmotivated, and the indifferent;

2. Rational and systematic planning of selected governmental activities to include room for such potential workers;

3. Methods for cooperation between government and private enterprise to implement and sustain the program.

(III.D.) Analysis of Labor Markets and Public Policy

This study proposes exploration of methods for providing a setting in which experimentation with labor market practices and public policy can occur.

Labor market practices and behavior in the United States are quite constrained by public policy. Public policy regulates minimum wages, employment of women and children, unionization and collective bargaining, layoff and unemployment, retirement, and related areas. Much of this public policy developed historically in response to existing social and economic problems. Many would argue today that much of this policy is unnecessary and even hinders desirable developments in manpower utilization. For example, some observers suggest that labor unions no longer serve a necessary function in industrial relations. At any rate, much of public policy constrains experimentation outside the framework of existing regulations.

An experimental city could provide an ideal setting for the experimentation with innovative labor market practices and for the analysis of labor market problems emerging in a highly developed economy. If some means could be found for the suspension of existing federal and state labor market policy in the Experimental City, we would have an ideal facility for research. For example, studies of appropriate private-public sharing of labor market control can be studied best in such a setting.

(III.D.) Experimental Manipulation of Rewards

Despite a rich background of theory, there has been little research

into the motivational-behavioral consequences of manipulating the economic reward system. Organizations have experimented in the manipulation of rewards to influence manpower recruitment, motivation, and retention. Laboratory experimentation with college students has developed a number of relevant findings which can now be validated in field experimentations.

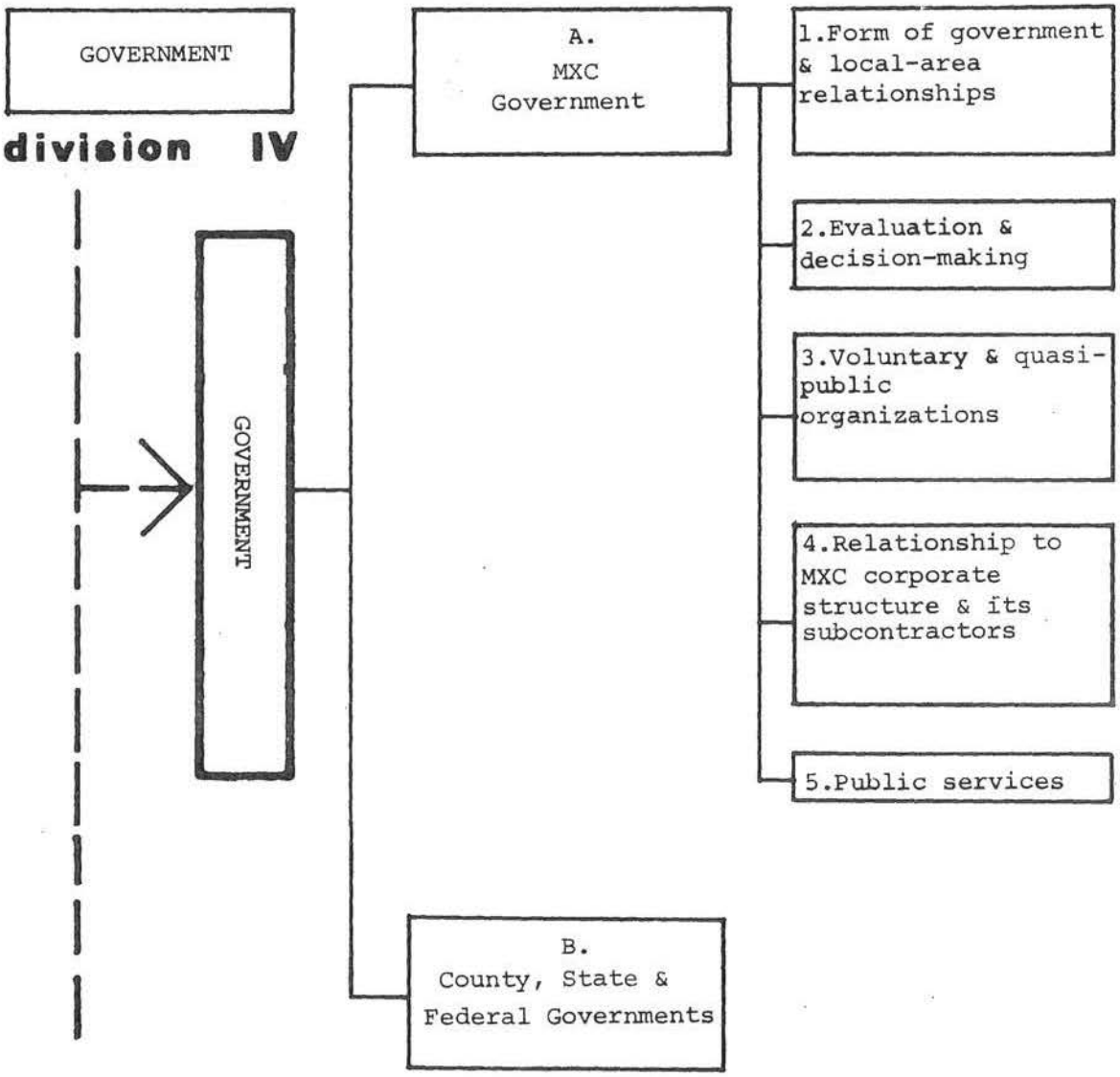
An experimental city could provide the field laboratory for the needed research. This might be accomplished in the business community by providing economic guarantees to business firms experimenting with reward systems. The findings would have significance beyond the field laboratory.

(III.D.) Effect of Automation

An important area for investigation for a new city in which technological overleap is proposed is the effect of automation on manpower requirements and skills. Considerable study has already been done on the impact of automation. This investigation proposes an analysis performed against the background defined by the unique characteristics of the Experimental City.

(III.D.) Population Service Programs

Information is needed from household surveys in central city and rural sampling areas to plan for the network of services desired by disadvantaged persons and families who move to the Experimental City. The survey should provide data on such areas as economic opportunities and incentives and job training, social and educational services. A primary objective of the study would be the development of program outlines for this population group which can be integrated with the City's overall development plan.



Division IV - GOVERNMENT SUBSYSTEMS

Special Studies and Experimental Projects.
For full diagram, see fold-out sheet in
back of this volume.

DIVISION IV

GOVERNMENT SUBSYSTEM

A. MXC GOVERNMENT

(IV.A.) Organizational Model For The MXC Government

A new city, removed from present urban concentrations and, therefore, from many existing jurisdictions, offers the possibility of more freedom of choice in the governmental structure for the City. Study should be made of the relative merits of various organization models including:

a. running the city on a corporate model with the citizens as stockholders;

b. the established mayor-council-professional administrator model;

c. a popularly elected policy-making body contracting for individual municipal services;

d. some combination of b. and c. whereby some services would be provided by the City government directly and others would be contracted out.

The study should examine the models from the standpoint of completely unitary organization as well as decentralization of county, municipal, and school district units. It should also explore the relationship between government for the MXC and other governmental units--local, state, federal, and special district.

(IV.A.1.) Government Transition

A major area for research regarding government for the Minnesota Experimental City is that of the transition from the initial operating force, presumably a development corporation, to a fully citizen-controlled local government on some model. This study would endeavor to determine whether that transition should be accomplished at a single moment or in a series of phases. As soon as construction is started there will be a crew of workers, the nucleus of a labor force, which will require some governance. The study would explore how long they can be denied the right of local self government which our political philosophy has taught them is their rightful heritage and the extent to which being without the opportunity to participate for a long period of time would affect their interest in and preparation for involvement at a later date.

On the other hand, if government is early turned over to the initial citizens, ways should be found to assure that the City would develop as planned--fully integrated, inter-racial, offering opportunity for a better life to all its residents. Experience in some new communities indicates that an early take-over of government may result in inequalities of opportunities for persons entering the city later. Study might be made of the feasibility of some "rheostat" whereby authority could be transferred to the citizens in proportion to the percent of the projected total population which they represent at any given time.

(IV.A.1.) Control of Periphery

This project would examine mechanisms whereby control might be exercised over the development of areas peripheral to the City in order that the development of those areas not be detrimental to the development planned for the City itself.

(IV.A.2.) Decision-Making Structure

This project would study arrangements that might exist in a new city for the allocation of values. How should decisions be made regarding who gets what in the new city? What should the participation mechanisms be, and how could people be encouraged to participate in the decision-making structure?

The study should include the potential use of new communications techniques to disseminate more information to citizens and to register their response, together with the effect the use might have in the decision-making process.

(IV.A.2.) Citizen Involvement

The success of new governmental programs usually is dependent upon the strong support of community organizations and interest groups. This project would examine the probable impact of these groups in the context of a new, high technology city where local self-government probably will be delayed.

(IV.A.5.) Public Employees

There is need for a thorough study of the role of public employees in the Experimental City. If services are contracted for rather than provided directly by the government, should there be some back-up public service? Assuming some civil service, how can that service be set up to be more flexible, more capable of modern management, and less prone to inertia than civil service has become in existing governments.

The increasing unionization of public employees can be expected to continue in MXC, but will the union role and leverage be significantly altered in a high technology city?

(IV.A.5.) Services--Provision and Payment

Study should be made of the possibility of introducing an element of competition in the provision of traditional public services, for example tuition slips for education, franchising two companies to provide a given service, etc.

A concomitant of provision of services is pricing of services. The study should include the feasibility of a user payment system with income maintenance in lieu of tax-supported services.

(IV.A.5.) Human Affairs Officer

This project would examine the altered role of the police function in MXC as the emphasis moves from punishment to prevention through the building of community and personal responsibility. Can the concept of the Human Affairs Officer bridge the gap between existing areas of professional competency and the problems of the human being who is not so neatly compartmentalized?

(IV.A.5.) Regional Tax Authority

The feasibility of a regional tax authority for financing public services should be studied to include the effects of area equalization

of the burden of existent and new taxes and tax structures for internalizing area externalities.

B. COUNTY, STATE, AND FEDERAL GOVERNMENTS

(IV.B.) Policy Analysis

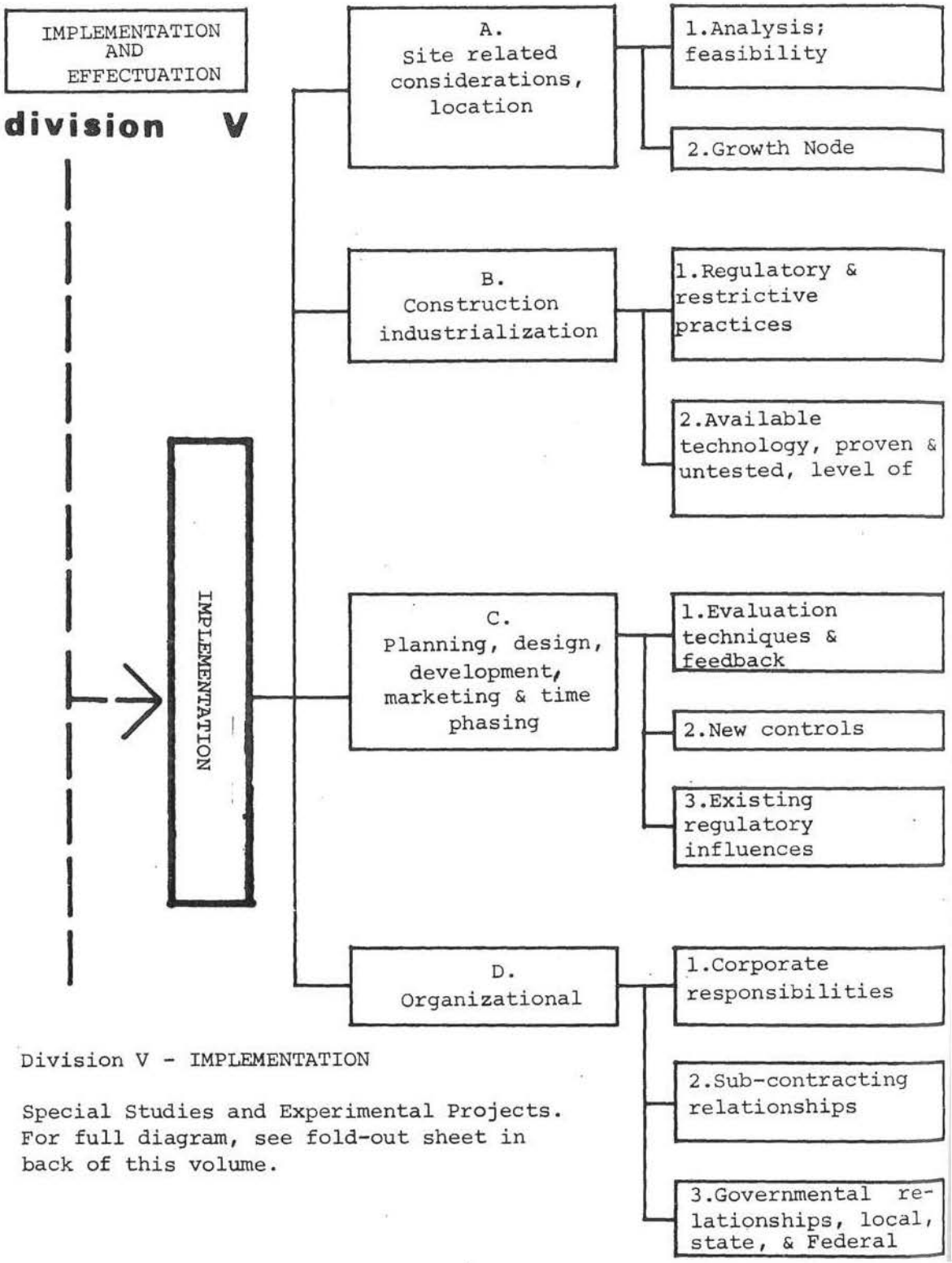
This project proposes examination of county and state legislative policies applicable to the particular sites chosen for investigation as possible MXC locations. Included might be provisions for: creation, consolidation, and dissolution of local governments; boundary changes; the public highway system; joint powers; distribution of state aids; etc.

The search should be conducted with an eye to proposed technological innovations and governmental arrangements and recommendations for permissive legislation where indicated.

(IV.B.) Constitutional Restraints

Study should be undertaken to determine the extent to which the Constitution of the State of Minnesota might have an impact upon the creation and development of the MXC including such factors as: public ownership and leasing of land; contracting of public debt; public vote requirement for moving county boundaries; public schools; etc.

The study should be undertaken with an eye to proposed technological innovations and governmental arrangements. Such a systematic investigation would have implications beyond the reaches of the Experimental City as existing cities consider innovations within their own counties.



Division V - IMPLEMENTATION

Special Studies and Experimental Projects.
For full diagram, see fold-out sheet in back of this volume.

DIVISION V

IMPLEMENTATION AND EFFECTUATION

A. SITE RELATED CONSIDERATIONS, LOCATION

(V.A.1.) Site Location Analysis

The important question of site location justifies a thorough and comprehensive analysis. Choosing a location for the City is recognized as one of the most important decisions which will be made regarding the whole project. It will play a large role in determining the ultimate success of the City.

This study proposes that additional site location criteria be developed and that sites in Minnesota which satisfy these criteria be identified and investigated. Potential sites would be screened in terms of their implications and feasibilities with the most favorable one receiving the most attention. On the basis of this evaluation, a few sites would be recommended for possible location of the City. Among the factors to be considered are the availability and price of land marketability and desirable amenities such as accessibility, buildable soil conditions and interesting natural features.

B. CONSTRUCTION INDUSTRIALIZATION

(V.B.2.) Obsolescence and Replacement

An important aspect of growth and change is the matter of obsolescence and replacement, not only in terms of hardware, but also in relation to software. This study proposes the development of criteria for defining the physical, economic, and social dimensions of obsolescence and replacement. Both public and private concerns would be included in the conceptualization. An overall aim would

be to develop new concepts of obsolescence and replacement which relate to what constitutes long-term viability so that activities and plants which have proven uneconomic need not be continued.

(V.B.2.) Construction Technology

In the Minnesota Experimental City, the volume of construction, the concentration of that volume in a specific area, and the short time periods allocated for construction work would not only support but demand extensive use of industrialization. An early research-developmental task would be the investigation of industrial techniques proposed during the past five-ten years to determine whether these might be suitable for use in the case of the Experimental City. For example, what are the operational levels at which their use becomes economic; what time constraints might be attached; what institutional constraints would be likely to prevail?

A second task at this early stage of the work would be to canvass major industries to determine what it is that industry has already developed or is in the process of developing which might be relevant to the Experimental City. Such developments should be measured in terms of their economic levels of utilization and the extent to which these might be applicable to the City. This study should include an examination of industrialized techniques abroad as well as in the United States.

C. PLANNING, DESIGN, DEVELOPMENT, MARKETING AND TIME PHASING

(V.C.) Spin-off Factor Analysis

This study would focus on those social and physical technological innovations of the MXC that would appear to have particular promise for export to existing cities. Yearly examination of potential spin-off benefits from MXC to the rest of the nation should be made. Ways of disseminating the information thus gained should be explored.

(V.C.) New Town Experience

A program of study should be undertaken to abstract from new town experience those ideas, points of conflict, and major concepts which might have particular applicability to MXC. The study should include new towns in Europe as well as in America to insure that all possibilities for transferability are explored.

(V.C.) Development Phasing

To construct an effective set of plans for phasing the City's development over a ten-year period, data in a number of areas must be examined and analyzed including changes in base lines anticipated with the passage of time. Manpower, housing, service and industrial requirements must be assembled. Scheduling for public infrastructure, including deriving the most profitable investment formula for public and private investment, must be accomplished. Marginal return for public investment in schools, roads, and other public services must be calculated. Additionally, the plans must include provision for feedback and evaluation and the capability to change if on-going development experience merits that change.

(V.C.) Decision-Making

This study proposes an investigation of methodologies for identifying planning issues on which benchmark decisions will be made. Decisions regarding city form or utility complexes, for example, will be difficult to revise, will have a great impact on the on-going life of the City, and will thus have a huge multiplier effect. Experiences of other new towns will be helpful. A second phase of the study proposes determination of the benchmark areas for special consideration in the planning stages of the MXC project.

(V.C.1.) Study of New Town of Jonathan, Minnesota

This project proposes an investigation of the planning and implementation experience in the newly developing suburban town of Jonathan, Minnesota, located 25 miles southwest of Minneapolis. An interdisciplinary team would concentrate on such matters as "start up' problems, issues in governmental and institutional relationships, and the potentials realized in technological and construction innovations which are incorporated in Jonathan. The investigation would be expected to yield, in advance of the implementation of the MXC, firm data which would be directly applicable to the new City.

(V.C.1.) Housing Sub-Markets

This study proposes to examine the housing demand and supply preferred by various population groups. This study would seek to provide guides on the range of housing types required for a city settled by groups as diverse as, for example, the very old and the very young, or the large family and the single head of household over the development period.

(V.C.1.) Development Program

A specific development program is needed to schedule the interrelated activities involved in the complex process of planning a city. For this purpose it is proposed that a PERT type program be formulated which would explicitly state the nature of the problem and the probable interrelationships.

(V.C.1.) Changing Economic Base Requirements

A development model should be constructed emphasizing the impacts of alternative technologies on the age-employment-occupational composition of the Experimental City's population. The model should be capable of relating these impacts to the problems of comprehensive planning and the feasibility of specified objectives.

(V.C.1.) Revolutionary vs. Evolutionary Innovations

A study is needed to define the nature of the advanced technologies being considered for the Experimental City in terms of those representing revolutionary departures from and evolutionary changes in present technologies. The investigation would scale the proposed advance on physical, social, and economic dimensions. Such an investigation would have significance for choices to be made for the Experimental City as well as furnish guidelines for innovations in existing cities.

(V.C.1.) Core Model

An important early task for the implementation-effectuation process is the development of a core model into which on-going findings can be fed and analyzed.

In laying the foundations for this model, some deviations from standard planning practice will be required. Unlike previous uses of econometric and land use planning models in which the ultimate objective is a determination of the effect of marginal increments or changes on an existing urban system, the development of a model for the MXC should recognize that few of the major parameters are fixed.

In the early stages, it may prove easier to define the economic, social, and political elements of the MXC in terms of what they are not, rather than by what they are. This could be done by establishing upper and lower bounds of feasible behavior, performance, resource supply, etc., within which the planner should work. Such upper and lower bounds would arise from the range of acceptable policy alternatives which the Federal

government and private corporate interveners in MXC accept for the project. These might be supplemented, for example, by the range of socio-cultural profiles which typify employees in the participant forms.

Progress from the negative to the positive definition of the elements of MXC and their relative configurations could then be developed in terms of the core model. The various subsystems could be related to the core model through the establishment of definitional consensus on variables at the interfaces of the subsystems. In this manner, work by groups of experts can proceed autonomously and be related back at intervals to determine implications for the total system.

The core model here would serve as a major analytical and predictive mechanism for the MXC environmental system and might well provide simulation capability in socio-cultural, economic, and physical areas. More than mere feasibility of individual items, the core model would deal with the total city by integrating non-economic variables with those propsed for the economic model.

(V.C.1.) Performance

Much attention should be given to the necessity for formulating criteria to evaluate performance. This is particularly crucial in light of the stated testing and evaluation objectives of the City and its proposed innovational features which might entail radical departures from current evaluative frameworks of investment and benefit-cost analysis. The tentative social objectives of the City also point up the need for the development of a social accounting system by which evaluations can be made.

(V.C.2.) New Controls

Innovation will obviously require the relaxation or waiving of many existing codes, ordinances, and buildings trades requirements. The deviations from customary practices suggest that other evaluative techniques must be developed which will encourage innovation for the public good; techniques and procedures for measurement and standard setting which will guide the many decision makers in the variety of choices which they are faced.

This project proposes coordinated study involving the several levels of government, labor, and industry to define appropriate relaxations of existing regulations and to develop new performance standards and appropriate responsibilities.

D. ORGANIZATIONAL

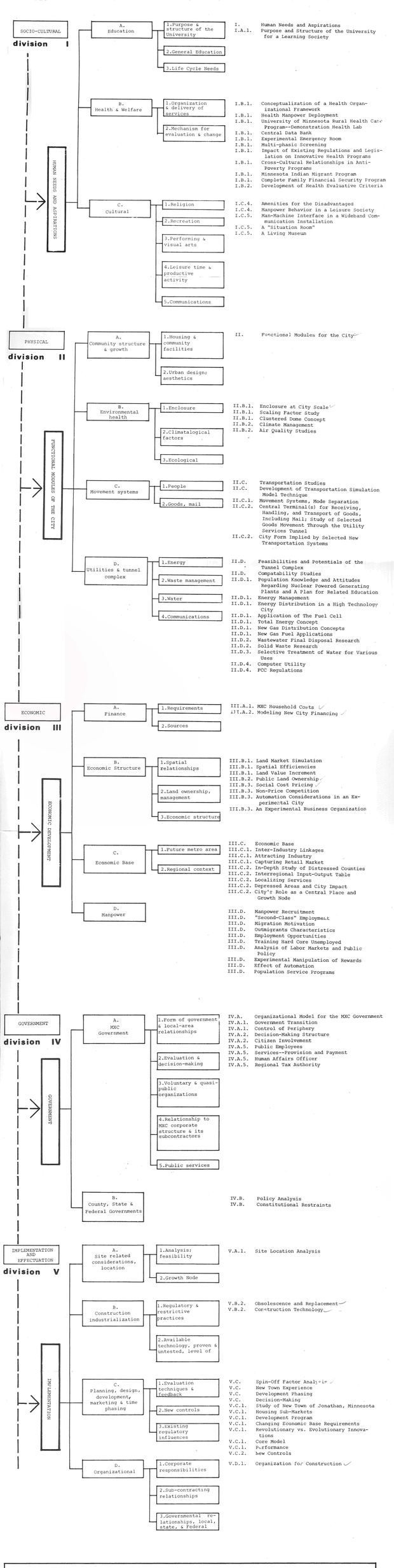
(V.D.1.) Organization for Construction

An enormous task is the organization of all the elements and procedures needed to bring about the MXC. The following paragraphs suggest study areas relating to a coordinated construction effort.

There are real problems about how to involve the city-building industries, and how they can work with the development-management corporation. A corps of people who could write performance specifications, coordinate pre-testing and tooling up, and reference the process needs to be established. Needed also are procedures different from those we now use. Here obviously lies one of the areas of desirable overleap; changing the rules of the game and the patterns of activity and responsibility in order to achieve a set of results within a specified period of time.

Attractiveness of investment in city-building has long been observed as a particular problem in the industry. It will be no less critical in the case of the Experimental City. One encounters from time to time the observation that the "market" is not large enough to justify tooling-up or development of industrialization. How big and of what duration does the market have to be for industry to justify industrial innovation of scale? What potential might there be in 80,000 dwelling units in the Minnesota Experimental City spread over a ten-year period? Assuming some innovation in housing types and also a reasonable variety of types and situations, what would be the range of dwelling unit and/or component development feasibility? Needed is some solid information on market size and characteristics.

Investigation is needed on lead times leading to the development of a PERT-like system with critical path scheduling which interrelates all the various phases of the project, not just construction alone. This system should, among other things, include time-phasing of the research-development effort, of planning, and of constructing the City. Logistics for the overall undertaking are needed up to the time of populating the City, transferring it to its newly formed government, and beyond.



MXC SPECIAL STUDIES AND EXPERIMENTAL PROJECTS
AN UNABRIDGED LIST

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EXPERIMENTAL CITY PROJECT
110 ARCHITECTURE BUILDING
UNIVERSITY OF MINNESOTA
MINNEAPOLIS, MINNESOTA 55455

Project Director: Walter K. Vivrett

Research Associates

Mark S. Barchas, Economist/Planner
Roger Clemence, Urban Designer
David F. Darwent, Economist/Geographer
George Donohue, Sociologist
Edward Gross, Sociologist
John T. Hanley, Civil Engineer
Hosni Iskander, Planner
Frank L. Kratky, Architect
Alan D. Robinette, Architect/ Landscape Architect
R. Michael Schneider, Architect
Janet M. Sigford, Political Scientist/Administration
Athelstan Spilhaus, Scientist
Mary L. Wylie, Social Planner

Project Secretaries

Carol Batsell
Donna Chupurdia
Nancy Larsen
Janet Olson
Sandra Wayne

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