Mobility And Independence: Environmental Approaches For The Wheelchaired User

BY

Charles Arnold Cofield
B. S. A. D., Mass. Inst. of Tech.
1972

Carol Leong Wooten
B. S., Univ. of Washington
1965 (psychology)

M. S., Univ. of Massachusetts
1968 (psychology)

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Authors

Department of Architecture

Certified by

Thesis Supervisor

Accepted by

Chairman, Departmental Committee on Graduate Students
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ABSTRACT

The politics, planning and physical evolution of environmental development has failed to recognize, even consider programming and planning for our physically disabled—the wheelchair users in particular. This has jeopardized their existence in environmental use and the disabled's potential as a productive and contributive force in environmental policy, i.e., design, planning, local and regional organization and politics. This prejudice has left them dependent on society for their needs, without any claim to their rights. It is observed, compounded and reflected in the attitudes of individuals, in the institutions that house disabled children and adults, in the inaccessible transportation systems we build, in the unusable supply of housing stimulated by the public and private sectors of the market, in the physical community design of streets and parks, in the social community design of services and delivery systems, even in the family unit—the home.

Approaches to an environment for mobility and independence must presuppose the environment as being a network of the ecological (relationship of individuals to their physical environment), social, psychological and biological environmental frameworks, the way they interact and function so as to provide for effective and efficient planning which promotes an optimum environment with all men as the measure.

This thesis will approach the evolution of new design standards, organizational concepts for architects and planners—a useful manual for ambitious physically disabled groups and a social process to amend the nearly irreversible damage of public, social and rehabilitative services. The concept is that as architects, through rational processes, we can approach the technical aspects of the physically disabled person's needs ranging from macro (public) to micro (individual) scales of need.
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[Diagram of a device with a wheel and a hose attached]

[Text: ZOHODF0D]
The politics, planning, and physical evolution of "Environmental Development has failed to recognize, even to consider programming and planning for our physically disabled—the wheelchair users in particular. This has jeopardized their existence in environmental use and the disabled's potential as a productive and contributive force in environmental policy, i.e., design, planning, local and regional organization and politics. This prejudice has left them outside of their own lives dependent on society for their needs, without any claim to their rights. It is observed, compounded and reflected in the attitudes of individuals, in the institutions that house disabled children and adults, in the inaccessible transportation system we build, in the unusable supply of housing stimulated by the public and private sectors of the market, in the physical community design of streets and parks, in the social community design of services and delivery systems, even in the family unit—the home. Daily life for the physically disabled is a continuing process of confrontation, discrimination and segregation.

What design and planning that is done is really implemented to alleviate or prevent physical and emotional hardship (stress), unless of course it is done in light of pregnancy, heart patients, vertigo sufferers, garbage services, or maybe the elderly; but what if you're in a wheelchair or ambulate on crutches or braces? What happens is that you become a loner, a homebody, forced into seclusion, isolated and stranded from your unaccommodating environment—be it your two step, two story townhouse, walkin second floor apartment, in the bedroom of your too-narrow door suburban residence. The logical question would be, why? The response would be performance—no consideration has been given to the environment as a performing agent. Environmental considerations have not been made to the incidence of accidents and tragedies, varieties of
body compositions and physical capacities or the aging process so that all persons can perform efficiently and effectively in the environment.

Performance can be measured in terms of energies required to negotiate fluently in the environment. The wheelchair user is constantly confronted by performance codes: in the bathroom too small to permit the wheelchair to enter; in the corridor too narrow to allow wheelchair passage; in the kitchen with cabinets too high to reach, counters too high to use, floor area too small for leg space. While the confrontation begins here in the home, it is multiplied by the implications of larger environmental strategy and structure. People climb up and down all day, everyday and think nothing of it, but for the physically disabled, the wheelchair user, this means a dramatic difference in getting around. What is implied is a look at the wholistic environmental structure.

Use of and access to this implicitly vertical world promotes an entity--irregular, costly, complicated and confusing for those in wheelchairs whose movement is inherently horizontal. The concept of "getting around" becomes dependent on "good" information as a kinetic force to shape answers to the abilities and needs of questioners and/or on luck for having previous experience of negotiation in the environment--up the curb, up the public steps, up the lobby steps to the elevators; down all again and over to the stores; up the parking lot rim, up the entrance stairs and home, up the garage steps, up the home step. Every trip becomes a task; it decreases the likelihood of independent performance of the physically disabled trip makers, as well as straining their physical and psychological energies. Architectural barriers, transportation barriers, and information barriers mean independent planning, mapping and surveying for procedural encounters for each and every trip of each and every disabled person. Thus this planning eliminates any casual or
even social trips to ones of high utility—survival activities. But overall mapping for barriers does not guarantee a successful trip completion. There are service levels to be considered and the support derived from this environmental encounter, i.e., general physical accessibility for wheelchairs, accommodating facilities for biological needs, information of destination, standards of structure and furniture. Environment must go beyond traditional proviso of environmental knowledge for environmental use, but structure, support and reinforce attitudes toward negotiation of environmental processes. This process as a communication transmittal process is a coordination of a sense of efficiency in environmental use.

These living and travel barriers have broader implications in the context of living in and at a standard of decency. Barriers in the home have the disabled person dependent on family; barriers in the community have the disabled not only dependent on persons outside their community, but stranded or isolated from his living needs—shopping, bank, church, recreation, as well as survival needs—employment, education, medical, legal, and social spheres. The mediating function between citizen participation of the wheelchair user and development process is lack of translation of means, upward and downward flow of information. Communication diverse forces demand analysis and examination of this complex organism, the function of communication, its effectiveness and responsiveness, agency plethora, advocates of public interest and city structure.

Social structuring has strategically aided the barrier concept through its continuing process in environmental design and planning by discriminating against and segregating the disabled in old back rooms, upper floor apartments, nursing homes, institutions, special schools and colonies, thus not having to consider, prepare, plan or design for their physical and social needs. While
more often than not, they prepare the disabled in these closed environments for a society that outwardly discriminates against them in the building policy, employment opportunities and living practices, and social integration practices through non-governmental action. Socially the disabled chairbound person is thus deprived of fulfilling educational goals, seeking cultural refinement and entertainment and fulfilling the need for human interaction—plagued by the misconception that an injury to the body is an injury to the mind.

People tied to wheelchairs are not satisfied with this mere compensation for disability of life in a wheelchair, but biological cure is not evident for lack of and part of this social strategy to avoid and segregate these problems as part of the discrimination policy. Thus, this segregation has been structured and interlaced such that it reinforces the relationship that promotes these environmental barriers for the physically disabled. Yet they increase the dependency factor of the physically disabled, emotionally stressing and stagnating them. The idea that they need someone to do and to carry them around schools and homes and cities is socially impeding their independence; it is psychologically exhausting, demeaning and physically strenuous.

Approaches to an environment for mobility and independence must presuppose the environment as being a network of the ecological (the relationship of individuals to their physical environment), social, psychological and biological environmental frameworks, the way they interact and function so as to provide for effective and efficient planning which promotes an optimum environment with all men as the measure. This present work will approach the evolution of new design standards, organizational concepts for architects and planners, a useful manual for ambitious physically disabled groups and a social process to amend the nearly irreversible damage of public, social and rehabilitative services. The concept is that as architects, through rational processes, we can
approach the technical aspects of the physically disabled person's needs ranging from macro (public) to micro (individual) scales of need.

In order to obtain the needed information, we incorporated the assistance of the system's users, the physically disabled, the wheelchair user, to gain the philosophical and inert knowledge of their user experience. User input is difficult to collect because of the many dissimilarities of our group and given our time, spatial and density concerns. Therefore, we approached this problem by administering a questionnaire which could promote and establish personal interaction levels of response. This cross flow of information would establish the criteria and the impetus to propose design solutions and recommendations which should lead to new environmental controls to make our environment more compatible with the physically disabled's psychological and physical capacities and limitations. The questionnaire was sent to members of Massachusetts Association of Paraplegics (MAP), a local handicap club, and to residents of three specialized housing projects. The questionnaire and results appear in Appendix A (pages 350 -385).

A word on terminology: "Handicap" is a broad term describing a wide range of disabilities which means a diminished ability to perform. The terms "wheelchair user" and "physically disabled" describe a physical state. We prefer to use these terms because they have no environmental connotations, as does the word "handicap". If our environmental obstacles are eradicated, the term "handicap" would not apply to this group of people who could then be mobile and independent.

The scope of this thesis did not include specifications because of availability of the Federal and State codes, the work of S. Goldsmith in his book, Designing for the Disabled, and its translation into American dimensions by Tom O'Connor in his thesis "performance criteria for paraplegics and quadriplegics", completed June, 1972 at Boston Architectural Center.
OVERVIEW

Ecological considerations relate man to his physical environment. This section deals with this interaction and interdependency—a link which not only has physical repercussions, but social, psychological and biological implications as well.

Our approach is to begin by an analysis of the macro or total environmental scale (wholistic systems)—information, transportation, public spaces, progressing down to the smaller or micro scales of the individual in his community, housing situation, down to the living unit itself. At each step, we will examine the existing inhibitors which hinder man from achieving his aims and goals in the world, and facilitators or aids which are needed for mobility and independence.

Part 1 analyses the information process, the role of the communication links in increasing the mobility of the physically disabled individual.

Part 2 takes a close look at public spaces and facilities, the inadequacy of present regulating codes, and descriptions of the unaccommodating built environment with discussion of needed change.

Part 3 tackles the concept of mobility through an adequate transportation system—the need for not only accessible public transit but also for more efficient, innovative vehicles which can better serve all patrons.

Part 4 discusses the goal of a community as a support system—the ways design regulation can influence the physical performance of environmental users.

Part 5 tackles the housing concept from the public housing issues of
density, site, social make-up, and design to the present efforts
toward barrier free housing, ending on a graphic dictionary of
movement patterns and space requirements within the living unit
itself.

As a measure of workability, we chose the wheelchair, as its movement pat-
terns and space requirements make it the most demanding of all physical dis-
abilities. Figures 1-4 introduce the reader to the wheelchair.
An optimum environment must reflect the discipline of, and provide for, optimal movement patterns of the wheelchair.
VERTICAL CENTER

fig. 1
Fig. 2 SPACE REQUIREMENTS
spinning in place

TVMq

basic back & forth movement pattern

Fig. 3
Minimum Clearance Distance

Circulation Flow

Fig. 1
INTRODUCTION

Much of the environment goes unused by the physically disabled simply because of ignorance of the services available. The need for communication networks seems to be a prime modal factor in increasing the mobility needs of the physically disabled. While communications alone will not solve all of the mobility problems of physical needs, it can be a method of guiding people to the delivery of goods and services.

Communication networks, which we will call "information systems", can widely affect the social, psychological, physiological and cultural latitudes of a physically disabled person. Information systems have the potentiality of operation and performance for substantially improving the environment's responsiveness to user needs by efficiency and delivery processes. An important innovative aspect of an action-oriented information system is its close relationship and coordination to the social and rehabilitative agencies, as well as to medical and technical, governmental and private groups.

Since past innovations towards design of information methods have been limited to relatively minor improvements of selected functions of the existing production and delivery process, the proposed will be a systematic effort to develop a comprehensive strategy for the development of an entire information system with a substantial perspective on user needs to develop a long range strategy which will enable responsible sources to exploit fully their potential for improving responsiveness, efficiency, and performance. One must realize that the implementing of action would include making structural and operational changes in our socio-economic-political environment to create the necessary setting for stimulating radical organizational and technological innovation.
METHODOLOGICAL APPROACH FOR GETTING INTO THE ENVIRONMENT

The tragedy of being physically disabled is that it is a dilemma. When one leaves the hospital, he returns to the same old environment with new perceptions. While familiarity and recognitions still persist, one cannot clarify his new orientation. The analytic assessibility reduces the orientation to physical phenomena. Orientation, expression of city function, diverse and responsive communication, educational values and basic structure all develop their own uniqueness, shape, and message form. The relation of the physical environment to use criterion, movement, function, reliability, specifications and orientation, is the key process which lacks understanding for most physically disabled people. Many conflicts of interest must be faced in establishing an environmental information policy. The immediate need is for cooperation between centralized and decentralized authenticity between public and private interests.

As a generic group, the physically disabled are sensitive, familiar, and aware of the attributes of good information. After many months of deliberation, we began to analyze the needs and priorities and try to decide what was viable as a process for information delivery systems. The task of deciding which criteria, process and framework are most appropriate and feasible will most naturally depend on:

1. User's criteria for:
   a set of standards
   universality
   literacy

2. Nature of environmental resource responses towards:
   symbolization and translation
   documentation of representation
   identification (uniqueness)
   penetration (measurement)
   scope (time, distance)
3. Application to decision processes in terms of:

associations
individuality
harmony and intensity

These guidelines can be used as ground working policy to establish operational criteria as a process for analyzing, planning, implementation, and as an organizational framework to develop more basic systems criteria. An environmental informat for the physically disabled can be as basic as public education—efficient and critical in orientation, aimed at achieving a sense of security.

To correctly evaluate and further refine these operational criteria into performance standards by which information planners can evaluate alternative actions, a methodological framework must be developed within which operational criteria can have a functional role. For the physically disabled, this means determining the stress points in the process of system survival. Further, we have to analyze the nature of physical disability, its strong points, its idiosyncracies, its needs in physical movement through the environmental system, its psychological aspects in terms of development and understanding of the physiological traits, and of course the many deficiencies due to the social, physical, and psychological structure of our multifaceted environmental system.

Establishing priorities to interpret and define the correlation of information analysis functionally lacked a strong framework for visibility of presentation. To mediate conflicts of interest, environmental information policy must set priorities among various types of information, provide non-overlapping channels where possible, and establish controls for the access to these channels.

Information as an informant can be most responsive since it can shape
answers to the needs and abilities of questioners as well as record their reactions and responses for future reference. The system should be adaptive, growing, and changing in direct response to issues and values defined by people who use it. Beyond this, it may be able to educate the people about culture, variety, economics, and social diversities and adversities. Relations between people and their natural environment can also be described.

Developmental processes, as stated by Ashley, et. al. in City Signs and Lights³, is the process by which environmental information can be deemed to meet the needs of all interest groups. It must be more politically accountable to public needs and less a function of conventional bureaucratic procedures. Within this context and under the controls of previous operational criterion, they developed a framework that will allow the best possible analysis of environmental perception for the physically disabled.

Development policy will coordinate a process which looks at levels of statistical interaction. It was found that the necessary functional steps can be seen in terms of:

1. people to people relationships
2. activity to activity relationships
3. people to activity relationships

Within these strata, information can be an effective media in three perceivable states—reflexive information, responsive information and experienced information.

Reflexive information is the non judgmental type which one interprets because of his awareness of his situation. It can be immediately grasped and followed, usually without the need for hesitation, thought, or concentration. Imagery and symbolization are the prime techniques in reflexive information. Its effectiveness as a media is usually displayed in a one-di-
Responsive information is more perceptive information which gives detailing for scanning and analysis. Interpretation is based on the depth one wishes to scan and the degree to which one seeks some aspect of information. Response may be in audio or visual directions, readings, instructions, posters or pictures. One- or two-dimensional representations are chiefly used to designate this kind of information.

Experienced information becomes a vital resource for the physically disabled because this information is for personal processing. It usually is used as a reference resource to improve one's understanding of issues. It is a clarification media--such as library service, movies, tapes; something that is multi-dimensional in impact and scope which can be stored, viewed, listened to or read, as well as talked about. While this kind of information is more penetrating, it is less confusing because there is no time lapse, pressure, or scheduling problems.

While these perception indices may be categorical as to formal language, they possess a harmonic quality, their disposition being the extension of the same system. This implies that environmentally and psychologically the imagery and symbolism of these should be as perceptible and understandable as their message-transfer indications. The function of mode has its implicit degree of interpretation and responsibility to the user. Needs can then be developed on a wide scale of bases and attitudes. Obviously complexity is not inherent in a system of easy and rapid transfer where the greatest impact must be made with the quickest documentation and representation. Perception limitations will be evolved by the translation of application to decision processes and analysis is in terms of associations, clarity, intensity to functional response, and individual meaning.
PEOPLE TO PEOPLE INFORMATION

Our presentation of information perception can be started with an examination of the functions of people to people relationships in two forms. The first relationship is that of the physically disabled to other physically disabled people, and the second is that of information transfer between the physically disabled and the able bodied.

The fact that one does not clearly differentiate his perceptions of the world from the world of others is partly because speech is a tool of behavior, a system of commands and signs. The commands present objects and the signals signify objects. If information of the commands is not communicated, then a disruption of the interchange of meaning occurs and it is possible to the degree that individuals have differing cognitions, wants, and attitudes. 4

Aids and barriers to communication are distinguishable by an experienced perception where the communication of wants, beliefs and attitudes are in the context of ones experience. Thus one can assuredly say that communication has become anticipated. Secondly, communication is never perceived in isolation. It is always perceived in the context of which it is a part. This together with the individual's system of related perceptions will influence his communication. 5

Communication between physically disabled people. This synopsis has led to the criteria of the needs specification of an information system for the physically disabled and for a special language. By special language we mean a language which is employed only by groups of individuals placed in special circumstances. All forms of slang are special languages. The physically disabled, students, artisans and thieves all use a language of their own.
They all have this in common; when their structure is examined, they are found to have the tendency to adapt the language to the functions of a particular group. 6

As in the case of the physically disabled, special language, like the language of the total society, is the product of the common experiences of the members of the group and reflects their distinctive concerns and problems. 7 The special language of the group facilitates communication about matters of common interest and at the same time reinforces feelings of group solidarity.

The need to transmit information between physically disabled people is a most valuable service in that the information will be concerned with the betterment of our social (living standards), physical (health standards), psychological (mental), educational (literacy) environment. The difficulty in discerning the appropriateness is only confusing because of the difficulty in the evaluation of the native state of physical disability as a language, and secondly because it is difficult to discern what form language should take so that it will respond to the needs of the literate as well as illiterate, rich as well as poor. Much of this need to transmit information is derived from the medical disposition and sense of helplessness felt by the physically disabled's new perspectives as well as all the cultural, social, and psychological media which has been established and neglects translation or even formulation of new policy to serve the physically disabled's survival needs.

The multi-specificity which exists in communication relay and information display is quite evident in these people to people type relationships. The physically disabled need to expressly be able to channel need resources into communication media as well as translate identified function mode acti-
vities as need resource perceptions. There is no coordinated system between environmental needs. We are not speaking of catalogs of items and articles, but a realization of a language such as the braille system for the blind—a language which is multi-faceted and multi-diversified. It can be projected, read, mapped, stored, transferred to other medias of information. Braille is a tool or system that allows the blind to articulate direction, identify composition and patterning, compare form from non form, measure and synthesize, and function as an index to a vast wasteland of products and services. So, just as the link between environment and sensors has been bridged by a universal system of touch perception translation for the blind, we conclude there is a need for a bridge between environment and sensors of another media of physical criteria perception—this being informat service, a symbolic language to be used between physically disabled people.

Dr. Price writes:

"The fact that ordinary words do not mean the same thing to different groups of people was demonstrated recently at Illinois State University. The University is cooperating with Accent in developing an information system. One of the major tasks confronting the developers of the information system is the writing of a dictionary of terms commonly used by handicapped people as they go about solving their everyday problems. It is essential to the project that the terms used be the ones usually used by handicapped people. Moreover, the terms must convey the same meaning to handicapped people as they do to the system developed.

"A serious problem arose when graduate students at the University, who are majoring in the field of special education, were asked to help collect terminology. The university students were put to work scanning books, magazines and other printed articles for words and terms which they thought would be useful in the development of an information system which would provide answers to the problems of handicapped individuals.

"The result was that the college students selected words and terms which were highly scientific and medically oriented, such as cerebral palsy, motivation, etc., and they neglected more common words, such as marriage, hand drive controls and
can opener, which are more directly related to real problems and situations. Needless to say, ISU is now employing handicapped persons to select terminology for the dictionary or thesaurus of terms."

If a person were to sit down and make a list of words or combinations of words that have special meaning to the physically disabled or that have something to do with rehabilitation, how many words would the list have? It might include wheelchair, make money at home, hand controls for cars, climb stairs, brace, self-help-devices, special homes. Dr. Samuel Price has been working on a system of terminology for disabled persons called "Accent on Information". His work on information in developing a thesaurus of working terms which have special meaning to disabled people has been quite revealing. Price produced a list which reached nearly 10,000 entries. The important feature of this information system is that the words are used by doctors, counselors, etc. Many professional people use words to denote disabling conditions whereas these same words are used by the handicapped to denote a handicap, with completely different connotations. A disability may be defined as a disease entity which carries with it the diminished function of a body part. Paraplegia, osteomyelitis, and mental retardation are examples of disease entities which carry this meaning for professional persons. A handicap is a diminished ability to perform a required life activity because of a disability. An inability to use a bathroom because one is in a wheelchair, is an example. Accent on Information is being developed with this viewpoint in mind. Instead of being designed for professionals, it is being designed for the physically disabled person whether he is professionally oriented or now confined to his home. All he wants to know is how to get information—to see if he can learn how to drive, for example.

Further, Price writes, that when a medical doctor uses the term "wheelchair", he is quite likely to be thinking about the range of medical disa-
bilities which would require that a wheelchair be used. When a paraplegic uses the same term, he is quite likely to be thinking of a range of activities in which he cannot participate in from a wheelchair, such as getting into the bathroom, going to a movie, getting a wheelchair into his automobile, using public transportation in his wheelchair, etc. The meaning of the word "wheelchair" from these two different viewpoints is the result of different life experiences of the individuals and the way in which they are using their knowledge. 9

As designers are concerned with mode transfer, effective, responsible and reliable information service to quickly establish the proper source of reference, we are concerned with how one may tie together the interaction between professional information and handicapped information and where the impact lies. Many of the answers will be found in a methodology for information storage and information retrieval. Information will not only be helping the physically disabled to get information, but it will also be helping counselors, doctors, therapists and special educators to easily and quickly locate the kind of information they can use to help the physically disabled which whom they are working. 10

Designing this system is hardly as complicated as the institutionalization of it. Questions arise such as mode, media, understanding, readable. It is important to understand that before we can proceed with a system, we must understand the components of the system and their functions. Relating to the personal problems of the physically disabled, it is necessary to build the components (words) into a thesaurus, and especially remember that these words are used by the physically disabled themselves--those who have the problems, and that these words are not professionally oriented.

The implications are that at sometime the physically disabled are going
to need information to communicate to someone about disability. What this system offers is the knowledge of previous education, experience and knowledge on the subject of disability. This system of information or communication is also open-ended for continual additions to be made.

**Communication between physically disabled and able bodied people.** We will briefly discuss the second type of the people to people relationship—the physically disabled's relationship to the able bodied. The difficulty with established accurate communication among individuals and groups of different living experiences and learning experiences is the problem of reducing conflicts in communication. 11

Clearly with these distinctions in mind, our design of a system's policy for communication for the physically disabled will also serve the needs of understanding for previously established groups. The system, when properly used, will allow for perspective, using the three response medias (reflexive, responsive, and experienced information). It will be an organizing framework for experience—the segmental or whole aspects of logical interpersonal connections.

**Operational aspects.** The workable system is a portfolio concept of design in many medias, such as computers (for need information), tapes (for audio information), and films (for visual information), as well as books (for symbolic knowledge). This information is to be developed, not at a specific and central distribution point, but through all present systems of technology. A network library-type system would be established. There is no specific storehouse because ideally the complete system would continually be in use and added to by hospitals, rehabilitation centers, institutions, universities, the physically disabled individuals, able bodied, professionals,
(doctors, nurses, technicians, etc.). It would be a universal tool toward humanity.

**ACTIVITY TO ACTIVITY INFORMATION**

Activity to activity information is a little less easy to define, except to say that activities and products can be classified in terms of their vitalness to supporting and continuing life. Clearly, technology has allowed man to develop nearly all the systems to maintain himself, sometimes straightforward, sometimes spinoffs. The problem of coordination and systematizing has come under the grasp of man also, but unfortunately he has failed to take advantage of his organizational abilities. While competition is part of society, the concept of "sell" has become more apparent than the ideal of availability. As an example, cataloging is usually very efficient and informative, but it is limited in scope, in what assessments it is trying to make, where one can go, who he should contact, etc. Obviously we are hinting at storing techniques--development of network theories, hierarchy channels, development channels. We need to develop a data file with ease of continuity feeding new information into the system and the ability to immediately take out information.

Implementation procedures for such a process are carried out on fields of behavior which deal with supply and demand; those agencies such as medical, social service, rehabilitative services, legal, governmental, and educational services, etc. When disability strikes, the comprehensive sense of where one begins to pick up the pieces is absolutely chaotic. The professionals are at a loss for suggestions, the information bureaus do not give comprehensive information--only departments and room numbers, while finding these leaves one concerned because there is no statement of policy available.
as to the type or kind of service or services offered. The process of trial and error is a drain on one's scanty monies as well as physiologically and psychologically a drain on health. Futility is usually the outcome of one's endeavors.

Operational Aspects. Analysis and comprehensive study of social networks reveals there is no concept of hierarchical studies in terms of these interrelated agency systems. But evidence from research does reveal the need for a "life support manual". Basically this manual would be an index of the different agencies, professional services and support activities and services. The exception being that it would be of a comprehensive nature which defines its by-laws, rules, and regulations. It can refer to institutions such as hospital, school, etc., the extra care benefits, where further assistance may be acquired and the nature of further available consultation. This sort of system would allow a disabled person to plug into the network at any level of rehabilitation and easily be directed to the level-of-service he requires. It would develop a sense of system's structuring which would eliminate bureaucratic chaos.

PEOPLE TO ACTIVITY INFORMATION

The impact of people to activity communications can be a devastating tool when developed and expressed in proper focus. Designing and developing a new communications system which allows the ordinary citizen to effectively and regularly communicate to those in power, to translate questions, act on them, and in turn receive response which can be formalized and related back to the sender.

Communications can be summarized as having to expressly signify meaning
in the form of information as follows:

1. By assembling and either graphically or factually suggesting solutions for problems of concern to the community.

2. By permitting the absorption of this complex material by the largest public in a limited time

3. By encouraging people to choose between various suggested solutions or to articulate their own personal ideas.

4. By feedback of the gathered response material to those community leaders who can effect change.

5. By identifying those individuals and groups among the public who are interested enough to work on solving problems presented.

These concepts come up because of the difficulty that physically disabled have in getting enough organized information to realize the serious nature of the problem, of alternative solutions to known problems, or further to choose between various courses of action. Also critical is his difficulty in making an influencing decision. In combination, these difficulties discourage the average physically disabled person from taking the initiative to participate in public affairs.

The range of information provided by the various medias is not comprehensive enough in time and subject matter to permit citizens to perceive the inter-relationships or to make constructive choices. He needs to see the following in one place at one time:

1. the main facts that mediate the existence of given criteria

2. the various interpretations of the facts that make for alternatives and even conflicting proposals.

Without the simultaneous availability of facts and analysis, the citizen's contribution in making a personal choice is outweighed by the effort of assembling and retaining the raw data for his choice making. For the individual citizen both the problems of informing himself (input) and of implementing his choice (output) are problems of time and organization which are
almost insurmountable. Information, as a center of communication methodology, can solve the mechanical problems of assembly and transmission for all who use the facility. Methods of communication can be used which present information at different levels of interest and time commitment. Information can be arranged so that facts accepted by all can be visibly distinguished from alternate sets of data. Equally important, the center can accomplish the difficult process of determining who are relevant decision makers on a given issue and can open channels of communication to these decision makers.¹⁴

Operational Aspects. While information policy may more correctly describe this last communication network, nevertheless, it is composed of the response mechanism media previously described. In analyzing how this kind of media can be an effective resource tool, one can develop measures for evaluating current or future information systems. The most effective issue to deal with is group special needs and interests, as with the physically disabled, the most critical issue was a need to know of the environment's accessibility. This infers a general understanding of what activities are amenable to their using the environment, with implications of the kinds of space needed to deal effectively in maneuvering independently. Condensation of all the biological, physical, and social, as well as aesthetic qualities would reduce stress levels in dealing with one's environs.

With these concepts in mind, it appears that cities should be represented by a major information service, not just for the physically disabled, but for the masses of urban and suburban residents. These services could be localized to sections of the city, then subdivided by points of interest and by service need. Each center could have its hierarchical values. District centers would handle civic matters, neighborhood centers would provide services (store information on historic, park facilities, neighborhood struc-
ture, changes--past and present). At each level of service, the attributes of discerning more about the environment should become more comprehensive. While serving as information centers both in appearance and attraction, the center would answer biological needs of users--snack facilities, sanitary facilities, rest needs. An information environment for the accessibility and usability for everyone must be a general criteria. While we have spoken of an information station as static, it is not conceived as such. Its designer should stimulate feedback mechanisms; its influence should be national, worldly, not just local.

Experienced information and environment with application to responsive criteria. As an example of an information system which does not respond enough to the needs of the physically disabled, a recent publication called "Wheeling through Boston" was hailed for its analysis of existing Boston structures in terms of the needs of the wheelchaired. While this catalog of shops, banks, restaurants, civic facilities, and office buildings is comprehensive in surveying the access doors, sometimes near-by parking, and occasionally a near restroom, its evaluation as a service manual for the true needs of the wheelchaired was not comprehensive enough. An instance is the description of the City Hall, which is defined as an accessible facility, yet parking is across a major street with no traffic lights, causing the user to negotiate at least two 6" curbs. While the restrooms of City Hall have wide enough doors, the dimensioning of the space-lock coupled with the exaggerated 90° turn does not permit access by a standard wheelchair, let alone one of unusual dimensions (see Fig. 14, Pg. 78). Yet, the architect has installed grab bars and proper supportive equipment in the interior restroom stall. Trip routine such as these are the needed experiences to be documented for further reference and analysis when trying to establish a
usable criteria for the wheelchaired. A second flaw of these handbooks concerning environs such as restaurants, clubs, auditoriums, etc., is their failure to mention the general atmosphere—are they small and cramped for maneuverability, what about the aisles, where are seating locations and are they separated, is variety offered, is the staff friendly towards the disabled? Small pictorials of the place would help. From these, one could usually judge a place for himself, knowing his own needs and space requirements.

Guidebooks are useful pocket tools and should be developed more on the concept of pictorial images with key issues being overlaid in signs and symbolic language. Crucial matters could be left to the written analysis of the solution. In giving an overview, we are just inferring that more of a three-dimensional picture must be developed to give a projective image of real situations.

**Reflexive and responsive information for environmental use.** The physically disabled traveler usually depends heavily on the type, kind, and availability of information posted along our city streets, than the usual sightseeing traveler, since present urban structure forces all journeys to be distinct trips of high utility. Sightseeing and pleasure seeking are seldom done, if at all thought of. Routine observation is instantly a surveillance medium in seeing the barrier-free route from parking space to doctor's office or other destinations of business. The process of structuring is a necessary consequence to the built form environs. There is a need for environmental information policy as well as a restructuring of the physical environment policy pertaining to the multi-use activity situations. When asked his impressions of the activity programming and space management that reinforces our city centers, one physically disabled man replied, "I wish things were more spatially connected and interrelated. I get tired of run-
ning out of gas trying to find that one parking space all the time."

In the chaoticatrocity of present formats for directing and informing people there is little hope of securing a relevant institution of directional symbols because of the conflict with all the other channeling devices. Before implementation of any new symbolic language, present systems would have to conform to a signing system.¹⁵

For the driver, sign language with a single interpretation should be used and the pedestrian's focus should most be aimed toward responsive information. These medias should provide basic guidance in way-finding and should avoid identifying locations in space and time. Common knowledge will not suffice. The location of flows of people, of goods, of services should be expressed with as much immediacy as possible. Beyond that, they may be used to educate people about ethnic, racial, and social interests. Responsive information systems and devices can also be programmed for explicit educational purposes.¹⁶ Setting priorities will be from an analysis of public need and demand. While these concepts and strategies demand much support we must set priorities for present day action.

The established accessible banks and channels of communication networks need to develop:

1. Information of operation within that function's framework

2. Channels to reduce environmental stress by implementation of managerial procedure to physically disabled people

3. To advertise information as a product denoted by the international wheelchair symbol
   a. telephone directories
   b. telephone assistance indication
   c. on windows or doors

4. Identification of best parking facilities in block radius with barrier movement into and out of the zone.

National action is needed to aid cities in implementing information
policy, new programs are needed to support the development of information policy systems—a program to found a system of information centers and their communication devices to aid the physically disabled citizen.

CONCLUSIONS

Analysis has indicated the tendency toward poor communications regarding delivery systems both within and without the wheelchair community. Equally important is communication between the mobile and mobility impaired society. Improvement in communications might be one of the central tasks of the achievement of mobility independence. Greater quantities of more accurate data are certainly essential as is a basic justification of traditional research and fact-gathering operations. And, effectively transmitting information is, of course, elementary and essential. However, inter-sectoral communication problems described here will not necessarily be solved by the mere existence of a central fact-gathering service. More direct measures are likely to be involved—face-to-face contacts through joint meetings, social service agencies could meet with representatives in workshops, seminars, in round table discussions, in conferences and other types of gatherings. As an illustration, meetings might be organized in a sub-regional basis, involving from 3 to 10 contiguous communities. The substance of such meetings might be clinics or the act of forming comprehensive information networks, or better yet, working sessions designed to develop policy.

The skill to conceive, design, schedule, finance, and set in motion programs to deal with tasks of this nature is extremely difficult to acquire even in the most sophisticated environment. Such skill is at one and the same time technical, managerial, and political. This implies assistance programs to reinforce the previous connections in communication.
As pointed out in the analysis, three significant features make a concerted broadened information planning function difficult to achieve. One is high concentration of personnel concerned with the planning process, another is the voluntary nature of concerned groups, and last, the committee forming tendency causing splits in the planning function into autonomous groups, thus uncertainties of forces beyond group control.

This is not to say that it cannot service an unstable environment. But if it is to be viewed as something more than a regulatory function, then it becomes more complex and demanding and consequently requires continuity of both attention and skill. It means a clean distinction between policy and administration, more of a commitment to the art of professionalism and a stronger commitment to centralized, politically responsive information. This is suggested as last in priority because it implies major adjustments to traditional ways of thinking and some significant structural alterations.

But perhaps the most elusive matter in these proposals is that of objectives. They, too, are very general in scope—unclear and therefore vague, often emerging from a narrow base of interest, with implications for the plan that are seldom carried through with any precision. The employment of models will soon enable planning to handle many of these problems at a more appropriate level of complexity. It is hoped that goal formulation decision theory and the whole breadth of environmental problems can be introduced in this planning process. Though doubtless incomplete, their list can serve as a framework for discussion into which other goals can be introduced when applicable.
PRIORITIES

1. Establishment of a National Clearinghouse of Information Services
   Central organization
   Federally funded
   Percentage of matched funds by state agencies

2. State and local centers (libraries)

3. Research grants to study and record
   Rehabilitation and its functions
   physical therapy
   occupational therapy
   Delivery system of
   medical after-care services (supplies)
   social services (housing, employment, vocation)

4. Funding assistance from insurance agencies, MRC, private firms (Xerox, IBM, etc.)
   Funding through foundations (Ford, etc.)
   Funding through research agencies (RANN Assoc., NIH, NIMH)

5. Development processes could be in terms of educational research (theses)
   Media response would allow
   tape, film, slides, drawings, movies
   demonstration teams

6. Cooperative effort between all major agencies
footnotes


2. Ibid.

3. Ibid.


10. Ibid.


14. Ibid.

15. Ashley, Myer, and Smith, *op cit.*

16. Ibid.
INTRODUCTION

There can be no question of the fact that the man-made environment has been designed for the young and healthy. By using the ideal human body as a model for the design of built form, architects have excluded many real people—the short, tall, elderly, those with ambulatory impairments (the wheelchair user, those needing crutches, canes, leg braces), respiratory ailments, etc., from making full use of their environment. In the case of wheelchair users, the exclusion is much more serious, as this group of people are kept from leading what could be a normal life of activity and independence.

An architectural barrier is defined as any man-made or natural obstacle that prevents people from leading normal, active lives. A physically disabled person only becomes physically "handicapped" when he cannot function in our environment because of architectural barriers. Architects and planners have long been unaware and negligent with regard to the large numbers of the physically disabled population and their needs. They have and are continuing to build into their structures elements which have partially, and in many cases, totally barred use of their buildings by those needing to use them. Architectural barriers are not only flights of stairs or too narrow doorways. Curbs, uneven sidewalks, narrow passageways, too heavy doors, out of reach telephones or drinking fountains also fall into this category.

How widespread is the awareness of this problem? In a report by the National Commission on Architectural Barriers to Rehabilitation of the Handicapped, a public opinion poll revealed that 64% of the American people had not thought enough about how the physically disabled manage to get around in their communities to realize that a serious problem even exists. They were also unaware that the greatest single obstacle to employment for the physically
Fig. 1. Julius Adams Stratton Building (student union), Massachusetts Institute of Technology.
disabled is the physical design of the buildings and facilities they must use. Besides being barred from earning a living, the non ambulatory are excluded from educational facilities, government buildings, commercial activities and so forth. Not many realize that one out of ten persons has some disability which prevents him from using buildings and facilities designed only for the physically fit, and when one adds to this number those who are temporarily confined to a wheelchair or use of crutches due to a fall or skiing accident, it brings the number up to almost everyone having this problem at one time in his life. Even those who are fortunate enough to escape disabling illnesses, will ultimately be caught up to the aging process with accompanying stiffened joints, failing strength, and perhaps respiratory or heart ailments. The elderly are constantly faced with many of the same architectural barriers encountered by the young non ambulatory.

If the disabled population had enough money, they could surmount the architectural barrier problem by having a home, furnishings, and car especially designed to meet their individual needs. However, the vast majority of the disabled are poor. Over half of the families of employable but disabled adults have incomes of less than $4000 a year which is well under the national average. The medical expenses are astronomical, and because the environment and society, in many cases, does not allow a disabled person to hold a job which reflects the individual's educational or intellectual capacities, life becomes a vicious circle. He needs money for the elimination of architectural barriers and resulting mobility; needs a job for money; cannot get a job because barriers make him immobile in the environment.

One point which we feel needs emphasis: everyone will benefit from an elimination of architectural barriers. No one enjoys climbing a flight of stairs, opening heavy doors, tripping up curbs. There is no one who cannot
SLOPING WALKS cause drift towards steps.

Uneven walks cause wheelies, hydroplaning, loss of traction, and general instability.
use a ramp or any other feature which is especially designed for wheelchair use. Wider aisles and larger spaces are enjoyed by all.

THE OUTDOOR SPACES

Curbs. At every street intersection or crosswalk one can be sure to encounter a curb. To the "average" man this is taken for granted and rarely given a thought except when he trips over it. However, to the wheelchair user a curb is an insurmountable obstacle. For people with crutches, leg braces, a cane or the blind, it is a difficulty and is often hazardous. Even able bodied people, if they are pushing a baby carriage, grocery cart or laden with packages, find the curb an inconvenience. A ramped out curb not only allows passage of wheeled vehicles, but is helpful to the blind also informing them of the location of crosswalks.

Once the curbs at crosswalks have been ramped, crossing the road poses a different problem. Disabled people are at a disadvantage because they move very slowly (See Figs. 3 and 4). In particular wheelchair users are at a disadvantage because they are at a low level and are obscured from the view of a driver or parked car. (See Fig. below)

![Diagram of a car with a ramped curb and a person in a wheelchair]

Signs with the wheelchair symbol to indicate where curb cuts have been made would be a helpful cue to drivers and should increase their watchfulness.
Movement Required

fig. 3
There are no federal government standards which require ramped curbs at this time, although a few cities and towns have ramped theirs and some have a regulation which requires that ramped curbs be made at the time of street repairs or widenings. Some ramped curbs, although they do allow passage of wheelchairs, are narrow and sharply cornered. After a rain, they are often the time of large puddles of water. Attention must be paid to both rounded or tapered edges and proper drainage. Let's do it right!

Road texture or ground surfaces. Surfacing is another area where information would be helpful to designers and engineers who specify materials. The ground surface should be both smooth and yet be non-slip. This is vitally important to both wheelchair users and ambulant disabled people. A wheelchair bumps up and down unpleasantly on rough surfaces, and the smallest unexpected bump can jar the wheelchair to the extent that the occupant is dumped out due to the inability to hold himself in the chair or an involuntary muscular spasm. Ambulant disabled people are equally vulnerable. Some have difficulty in maintaining balance and can be tipped over or tripped by the slightest irregularities of ground surface. All sudden slight changes of gradient, unexpected steps and obstacles on the ground must be eliminated. They are dangerous to all, and unnecessary. While brick sidewalks are quaint and picturesque, they cause difficult maneuverability to the wheelchair user and disabled and can cause twisted ankles and falls among the able bodied pedestrian. No material specifications are written into codes, but they do indicate that surfaces be nonslip. Concrete or blacktop without too much texture or gravel (hence friction) work acceptably for out of door surfacing. An aggregate surface is far to frictionous to provide effortless continuous movement.
Rest stops and shelters. Pedestrian distances is yet another necessary area of study when planning an outdoor environment. Wheelchair users who push themselves can not be expected to accept pedestrian distances designed for the able bodied, and the same holds true for the elderly and other ambulant disabled people. It is extremely difficult to lay down specific standards, as there is much individuality involved in one’s ability, desire, and energy levels. Many can cover as much ground as an able bodied person, the only difference being the time taken to get between two points and the physical effort involved. Others can barely walk at all and tire very quickly. Goldsmith conducted a survey in Norwich, England and found that 50 yards would be an acceptable distance of travel. When longer distances are unavoidable, people may be helped by resting places positioned at 50 yd, intervals, although this must be followed with flexibility as the distance per se is inseparately linked with the environmental conditions along the route (e.g. whether the ground is level or hilly; the smoothness and straightness of the route, how crowded with other people it is, hence more obstacles, etc.). Designers and planners must be made aware that consideration of outdoor furniture and resting places must be given at a very early stage in the design process. A study of the predictable pathways between parking, transport drop off areas, nearby housing to the center of activity, the entrance of a building, etc. must be made in the planning stage. Good judgment and sensitivity are required in making these decisions.

One may ask, what kind of "street furniture" should be designed? Presently, the average designer has shown that he totally lacks any imaginative methods of setting such resting places off. Sometimes a minimal concrete slab bench (no arm rests) is merely put a few feet back from the busy street; other times they are set off by placement at a few feet above or below street
level where access is by steps, of course. Quite often the seating at malls is too low for the convenience of some ambulant disabled people. Any number of well designed resting areas can be designed with consideration and sensitivity on the part of the designer. The ambulant disabled need arm rests or handrails for support when the go from a standing to sitting position and vice versa. The wheelchair user demands that there be no steps to get into a rest area and adequate room once inside to place the wheelchair so that the passage of others is not impaired. These areas should be well lit, as should all footpaths, an important factor in mobility for people who are uncertain of their step. It must be kept in mind that obstacles such as lamp posts should never be placed in the center of pavement so that there is insufficient space on either side of the obstacle to allow a wheelchair to pass. With these few requirements and some ingenuity on the part of the designer, any number of comfortable, pleasant, colorful and safe shelters should be built.

Another important consideration when speaking of the outdoor environment is the subject of protection from the weather. Exposure to cold, snow, wind, or rain is detrimental to the able bodied, and much more so in the case of disabled people. When snow is on the ground, wheelchair movement is almost impossible. When icy conditions exist, an exposed ramp and steps are a serious barrier. Exposure to wind and/or wet pavements in large open spaces is another danger for those who have unsure footing. Protection from the elements must be provided whenever possible especially over ramps, walkways, resting areas, bus stops. This is yet another example where designing for physically impaired would be welcomed by everyone. No one likes to be out in the open in nasty weather.

Parking. Closely related to the subject of shelter is the subject of parking. Covered parking with level entrance or elevator entrance into a
building is essential, especially for the wheelchair user. There should be
special reserved parking spaces near the entrance for the physically disabled,
the width of each space being the minimum of 12′ to allow for egress from
the car. In older buildings where the construction of underground parking
is now impossible, there should be special reserved parking in front of the
building for the disabled. Many of the physically impaired drive their own
cars and need assistance, when alone, in getting out of the car and in some
cases getting into the building where architectural barriers exist. Therefore
in at least government buildings (city halls, town halls, etc.) there should
be a signal button in the area of the reserved parking which would indicate
that someone needs assistance.

Where parking is parallel to the curbing surface, special provision
should be provided for the access of wheelchairs between cars onto the curbed
surface. This is especially needed where on street parking is the only source
of providing vehicle space. Perhaps restricted areas could be provided for
persons displaying the "handicapped person" licence plate.

Parks, Plazas. Disability does not mean the end of athletic prowess or
enjoyment of outdoor life. But, the average disabled person in the average
community finds that he is still expected to sit quietly at home and be con-
tent with a book or television program. Thoughtlessness rather than cost is
the main reason; designers and operators of both public and private recrea-
tional facilities do not plan for the elderly and disabled.⁶

On the federal level, the situation has just begun to open up. The Na-
tional Park Service has begun to reduce barriers where ramps are replacing
steps, some camp-sites and restrooms have been planned to accommodate wheel-
chairs and parking areas have been made safe and convenient for disabled vi-
itors. It is just beginning, and although Yellowstone, the Everglades and
Yosemite are now accessible, much more still needs to be done.

Picnic and camp sites, when constructed with the needs of the disabled in mind, are often so popular that it is hard to keep them reserved for people who really need them. These include such features as ramped curb parking lots, accessible restrooms within 300 feet, level surface around the table, nearby drinking fountains and a raised fireplace. It is important that these areas be included in the opening up of recreational opportunities. When one member of a family becomes physically disabled there is bound to be some disruption within the family. However, if they can still maintain their outdoor recreation times together, the situation is greatly eased and family relations and ties are under much less stress. Public beaches is another area where changes need to be made. A board or paved walk on the beach is welcomed by not only those who are disabled, but by many who do not want to tramp through soft, hot sand to get to the water. There should be this option.

The recreation areas such as tennis courts, basketball courts could be made more accessible by eliminating unnecessary entrance barriers to the courts. New advancement in athletic-field surfacing such as some of the new synthetic surfaces could provide wheelchair users with the maneuverability and field use required to participate at their level of accomplishment, while providing the entire community with an adequate and safe surfacing. Using the materials flexibly provides not only a wide range of options for its use such as golf, tennis, baseball, football, basketball, but it permits a flexible response for user participation.

The major area of inaction is the opening up of accessible parks at the State and local level. Let us take for an example the City of Boston. On the "plus" side, is the Boston Common and adjoining Public Gardens. Many of the paved pathways are accessible for the wheelchair user, although they
Provide water polo
all weather swimming
standard of recreational amenity

fig. 7
are rough and uneven, with effort they can be used. There are many park
benches and areas to stop, watch, enjoy. Boston Common is a beautiful, large
park and it is one place to go. However, this is a park at a large city scale.
It is not easy for the physically disabled to thrive in the nearby downtown
area. The park itself is surrounded by curbs, the stores are inaccessible
to the wheelchair because of frequent curbs. Most of the office buildings
have stair accessibility only. What is needed is accessible parks at the
community or neighborhood scale. Few of these now exist. And even if the
park itself is accessible, as in the case of the Commons, getting to the park
is a whole other story.

Boston is a city packed with history. The Freedom Trail is a path which
everyone should walk at one time in his life. Yet, some of the local popula-
tion as well as many visitors to the area are denied this treat merely be-
cause the city has not felt the need to ramp the curbs. In some areas the
streets are cobblestone, brick or poorly paved. Difficulty in walking,
twisted ankles and falls often occur even among the able bodied at such
places.

Although the above examples are specific to Boston, similarities can be
found in almost every city. If the outdoor environment is designed with the
ideas put forth above on curbs, shelters, parks, etc. we will be well on the
way toward an accessible world for the disabled and elderly, and a better
world for people in general. Awareness and sensitivity toward the people who
will be using the environment must characterize the designs by planners and
architects.

Playgrounds for Children. Children play. Who would ever dispute this
fact? Recently, however this question is beginning to be investigated be-
cause there are countless children who are denied this activity because of
physical disabilities. Normally, a child's knowledge of himself and his surroundings begins with the exploration of his own body. A physically disabled child will encounter barriers to his exploration that impair perception of his body and environment from the very beginning. If he cannot control the movement of his hands and feet, he will be unable to reach the common levels of motor development and his motor perception may show deficiencies due to lack of experience.

There is a need to design playgrounds for these children which will be an environment which motivates play, where all children can function freely regardless of their disabilities—a place where they can play and investigate on their own as all able bodied children are apt to. Learning depends on perception; if the flow of sensory experience is blocked or slowed because of an impaired motor system, then mental development also cannot proceed at the normal rate. The physically impaired child thus is doubly handicapped—handicapped experimentally as well as by his primary disability. What has usually been provided for these children is physical therapy in clinical, fluorescent-lighted, sterile rooms with a maze of objects and contraptions where the child is forced to go through hours of discomfort, happy to get back into his wheelchair or braces until the next dreaded session.

Now that we know that we do not want to continue such "exercise" rooms, we can ask: what should characterize a playground with physically impaired children in mind? All children learn by doing, touching, personal exploration: modified and adapted environments that facilitate the effectiveness of disabled youngsters are essential. Some guidelines for play areas by Leland Shaw and Ronnie Gordon are:

1. It should be an attractive, colorful, exciting environment which stimulates the child's imagination and makes him want to participate in it. This should include areas which emphasize:
a. Body Awareness - self awareness of body and body parts awareness, weight of body, awareness of right and left hands to climb.

b. Directionality - movements in many directions from various planes of the body.

c. Relationships of Objects in Space - going around, over, under, through different objects.

d. Linearity - following lines out in space, knowledge of remote spaces.

e. Depth Perception - accessibility of objects up and down in space.

f. Special Relationships - how much space he occupies.

h. Kinesthetic Awareness - The feel of joints and muscle movement.

i. Concepts about Space - the experience and knowledge gained should bring about increased understanding of the abstracts of formal learning.

2. Surface configurations must allow movement of wheelchairs; curves substituted for right angles, pathways allowing for viewing of different structures or landmarks from several perspectives. Although most areas should be level, a gentle grassed hill can be an exciting experience for a child to explore or crawl up.

3. Areas of grass, shrubs, flowers and trees should be introduced with a variety of textures and odors.

4. The surfacing material for the winding pathways which connect all areas should be sufficiently hard to allow for movement of wheelchairs and resilient enough to be safe and non abrasive if new walkers or crutch walkers should fall. Gordon recommends a composite of rubber and acrylic "elasaturf".

With the above general guidelines in mind, any number of safe, stimulating playgrounds can be designed with a little ingenuity and imagination.

Ronnie Gordon of the Institute of Rehabilitative Medicine, New York University Medical Center has worked out a micro-environment. It includes: (see Fig. 8)

1. The Bridged Treehouses: These structures offer an assortment of increasingly more difficult approaches and exits, accessible to children with varying abilities and rates of locomotion. Spatial relationships, heights, perspective, concepts of below, under, over, high, and low can be explored with the teacher at the child's level of understanding--in concrete terms of individual usage (see Figs. 9 and 10).
Fig. 9.
Details - The Bridged Treehouses (From Gordon)
2. **Foam and Sand Pits:** For those children whose disability has so restricted their movement that they are unable to walk or to sit alone without support, there is a specific area—a foam mattress, where the child can be prone but still experience the sensation of open space, can see a sky instead of a ceiling, can become aware of clouds and of a tree responding to winds, can observe the play of other children as they interact with each other and different pieces of activity equipment (see Fig. 11). Adjacent to the foam pit is a large sand pit, at ground level, with handrails along the perimeter to help youngsters maintain balance as they get into and out of the area independently.

3. **Sand and Water Tables:** Sand and water are most intriguing to young children. These materials are beyond the restricted reach of children in wheelchairs or of hands that control crutches and are not free to touch, to feel, to make contact. How can these basic materials be presented so they are accessible to disabled children who can't experience these—or the myriad of other sensations of a normal environment? At graded heights and allowing for insertion underneath of standardized wheelchairs of 3 different sizes (fitted to children on individualized measurements), water tables are fed by an artificial waterfall—a water sluice—that serves as a diagonal overhead bridge under which both wheelchair-bound and ambulatory children can pass. Sand trays, similarly graded in height, are available for wheelchair bound children.

4. **The Hill and Hill Circle:** A grass hill, surrounding a tree, is graded gently for crawlers as well as for climbers to ascend to a plateaud summit, roll down on grass or slide down on a protected enclosing fiberglass slide. The hill circle, surrounding the base of the tree, provides a quiet nook for children with a circular bench on which to sit in a shaded area for individual play, for group interaction and socialization (see Fig. 12).
Fig. 11. Details - The Foam and Sand Pits (From Gordon)
Fig. 12. Details - The Grass Hill and the Hill Circle (FROM GORDON)
THE ENCLOSED ENVIRONMENT

Aside from the outdoor hazards which one constantly encounters, disabled persons tend to stay at home because they are unable to use most stores, offices, churches, and other public buildings. There are certain barriers which are common to most public buildings. These are somewhat regulated by Federal and State codes with respect to new buildings and will be discussed first. Table 1 compares the code requirements of the American National Standards,\textsuperscript{12} Dept. of Public Safety (Mass.),\textsuperscript{13} House Bill #3537 (Mass.),\textsuperscript{14} Building Code of Rochester, N. Y.,\textsuperscript{15} National Building Code of Canada,\textsuperscript{16} and the British Standards Code.\textsuperscript{17} When talking about building accessibility, it will simplify the problem to take the most demanding case, that of the wheelchair user. Because of its size and unique movement patterns, the wheelchair user has special requirements, needs larger space to maneuver. If the maneuverability of the wheelchair is accounted for, the building will work for all other users.

Building Entrances. The most frequent obstacle to accessible buildings occurs right at the entrance itself. This may take the form of steps, revolving doors, doors too narrow to get through or too heavy to move, high thresholds or slippery floors. The elimination of all of the above would be a boon to all building users. Although the able bodied are "able" to struggle through the above obstacles, the wheelchair user cannot. He must go through the demoralizing process of calling for help and then be carried up the stairs, have door hinges removed, or cancel the trip entirely, having to depend on family or friends to complete his business.

Most codes now call for at least one main or principal entrance to be provided which is accessible. This applies to all new buildings and facili-
most physical planning for the disabled is essentially negative! an attempt to accommodate the disabled in buildings designed for non-disabled use deals!
### Scope of Application

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>All bldgs. and facilities used by the public.</td>
<td>All bldgs. (public) hereafter reconstructed, altered, or remodeled.</td>
<td>Bldgs. and facilities constructed with state, county, or municipal funds.</td>
<td>The following types of new bldgs. and structures: public bldgs., institutional bldgs., transportation terminals, places of assembly exceeding 150 persons, business bldgs. exceeding 2 stories ht., employing more than 40 persons, hotels, motels, dorms or such complexes, restrooms in shopping centers, funeral home public areas.</td>
<td>All bldgs. and facilities used by the public.</td>
<td>Bldgs., which disabled people might wish to use for purposes of employment, commerce, business, transport, health, &amp; welfare services, refreshment, entertainment, worship, education or cultural activities, communal areas of multi-dwelling units</td>
<td></td>
</tr>
</tbody>
</table>

### Wheelchair Specifications

<table>
<thead>
<tr>
<th>Length</th>
<th>Width</th>
<th>Ht. of seat from floor</th>
<th>Ht. of armrest from floor</th>
<th>Ht. of pusher handles from floor</th>
</tr>
</thead>
<tbody>
<tr>
<td>42&quot;</td>
<td>25&quot;</td>
<td>19½&quot;</td>
<td>29&quot;</td>
<td>36&quot;</td>
</tr>
<tr>
<td>48&quot;</td>
<td>26½&quot;</td>
<td>19½&quot;</td>
<td>29&quot;</td>
<td>36&quot;</td>
</tr>
</tbody>
</table>

*Table 1. Standard code comparisons.*

*Range*:
- 38½-41½"
- 24-27 3/4"
- 19½-20½"
- 28-30"
- 35-37½"
<table>
<thead>
<tr>
<th>Width, when collapsed</th>
<th>American Stand</th>
<th>D.P.S. (Mass.)</th>
<th>House Bill (Mass)</th>
<th>Rochester, N.Y.</th>
<th>Canada</th>
<th>British</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed turning radius, wheel to wheel</td>
<td>11&quot;</td>
<td>12 3/4&quot;</td>
<td>Same as Amer.</td>
<td>11&quot;</td>
<td>9-12&quot;</td>
<td>Not given</td>
<td>9-12&quot;</td>
</tr>
<tr>
<td>Ave. turning space (180°)</td>
<td>18&quot;</td>
<td>18&quot;</td>
<td>Same as Amer.</td>
<td>Not given</td>
<td>18&quot;</td>
<td>31.5&quot;</td>
<td>Not given</td>
</tr>
<tr>
<td>Fixed turning radius, front struc. to rear</td>
<td>31.5&quot;</td>
<td>31.5&quot;</td>
<td>Same as Amer.</td>
<td>31.5&quot;</td>
<td>31.5&quot;</td>
<td>Not given</td>
<td>31.5&quot;</td>
</tr>
<tr>
<td>Min. width for 2 WC to pass</td>
<td>60 X 60&quot; or 63 X 56&quot;</td>
<td>60 X 60&quot;</td>
<td>60&quot;</td>
<td>60 X 60&quot;</td>
<td>60 X 60&quot;</td>
<td>60 X 56-60&quot;</td>
<td>60&quot;</td>
</tr>
<tr>
<td>Turning space for 360° turn between walls</td>
<td>60&quot;</td>
<td>60&quot;</td>
<td>Not given</td>
<td>Not given</td>
<td>54&quot;</td>
<td>54&quot;</td>
<td>54&quot;</td>
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</tbody>
</table>

**Functioning in a WC**

| Unilateral vertical reach | Ave. 60", range 54-78" | Ave. 60", range 28.5-33.2" | Ave. 60", range 54-71" | Ave. 60", range 28.5-33.2" | Ave. 18" beyond front of working surface | Not given | 54-78" |
| Horizontal working (table reach) | Ave. 30.8", range 28.5-33.2" | Same as Amer. | Same as Amer. | Average 31" | Average 60" | Same as Amer. |
| Bilateral horizontal reach, both arms extended to each side | Ave. 64.5", range 54-71" | Same as Amer. | Same as Amer. | Not given | Same as Amer. | Not given |
| Diagonal reach | 48" | Same | Same | Same | Same |

**Public Walks**

<table>
<thead>
<tr>
<th>Width</th>
<th>Amer. Stand</th>
<th>D.P.S. (Mass.)</th>
<th>House Bill (Mass)</th>
<th>Rochester, N.Y.</th>
<th>Canada</th>
<th>British</th>
<th>Range</th>
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</thead>
<tbody>
<tr>
<td>Gradient</td>
<td>48&quot;</td>
<td>60&quot;</td>
<td>Same as Amer.</td>
<td>Same as Amer.</td>
<td>Average 60&quot;</td>
<td>Same as Amer.</td>
<td>48&quot;</td>
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<tr>
<td>5% (1 in 20)</td>
<td>Same as Amer.</td>
<td>Same as Amer.</td>
<td>Same as Amer.</td>
<td>Same as Amer.</td>
<td>54-71&quot;</td>
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<tr>
<td>5' X 5'</td>
<td>5' X 4'</td>
<td>5' X 4'</td>
<td>5' X 4'</td>
<td>5' X 4'</td>
<td>5' X 5'</td>
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<tr>
<td>5' X 3'</td>
<td>Non slip</td>
<td>Non slip</td>
<td>Non slip</td>
<td>Non slip</td>
<td>Non slip</td>
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</table>

**Level platform at top of stairs; door out; door swings in; Surfacing**

<table>
<thead>
<tr>
<th>Parking Lot Space</th>
<th>Width</th>
<th>Amer. Stand</th>
<th>D.P.S. (Mass.)</th>
<th>House Bill (Mass)</th>
<th>Rochester, N.Y.</th>
<th>Canada</th>
<th>British</th>
<th>Range</th>
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<tbody>
<tr>
<td>Width</td>
<td>12'</td>
<td>Same as Amer.</td>
<td>Same as Amer.</td>
<td>Same as Amer.</td>
<td>12'</td>
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<td>12'</td>
<td>12'</td>
<td>12'</td>
<td>Not given</td>
<td>12'</td>
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<table>
<thead>
<tr>
<th>Exterior Building Ramps</th>
<th>American Stand.</th>
<th>D.P.S. (Mass.)</th>
<th>House Bill (Mass)</th>
<th>Rochester, N.Y.</th>
<th>Canada</th>
<th>British</th>
<th>Range</th>
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</thead>
<tbody>
<tr>
<td><strong>Slope</strong></td>
<td>40°, 1 in 12</td>
<td>1 in 10</td>
<td>1 in 12 (8.33%)</td>
<td>1 in 12</td>
<td>1 in 12</td>
<td>1 in 12</td>
<td>1 in 10-12</td>
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<tr>
<td><strong>Width</strong></td>
<td>not given</td>
<td>not given</td>
<td>not given</td>
<td>36&quot;</td>
<td>36&quot;</td>
<td>48&quot;</td>
<td>32-48&quot;</td>
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<tr>
<td><strong>Handrails: frequency</strong></td>
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<td><strong>midrail ht.</strong></td>
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<td><strong>distance apart</strong></td>
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<td><strong>diameter</strong></td>
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<tr>
<td><strong>Platform top, with</strong></td>
<td>5' x 5'</td>
<td>same as Amer.</td>
<td>same as Amer.</td>
<td>25 sq. ft.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>door opening out</strong></td>
<td>5' x 3'</td>
<td>5' x 4'</td>
<td>6'</td>
<td>4'</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>door opening in</strong></td>
<td>@ 30' intervals</td>
<td>30'</td>
<td></td>
<td>6'</td>
<td></td>
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<tr>
<td><strong>Platform bottom length</strong></td>
<td></td>
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<tr>
<td><strong>Occurrence of level</strong></td>
<td></td>
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<tr>
<td><strong>platforms</strong></td>
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<tr>
<td><strong>Building Entrance</strong></td>
<td></td>
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</tr>
<tr>
<td><strong>Frequency</strong></td>
<td>at least 1 acces.</td>
<td>1 accessible</td>
<td>@ least 1</td>
<td>@ least 1 acces.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Doors: type</strong></td>
<td>single effort</td>
<td>2 leaf, each 3'</td>
<td>single effort</td>
<td>2 leaf, each 30&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Width</strong></td>
<td>clear 32&quot;</td>
<td>36&quot;</td>
<td>36&quot;</td>
<td>30&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Effort</strong></td>
<td>not given</td>
<td></td>
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<tr>
<td><strong>Handles</strong></td>
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</tr>
<tr>
<td><strong>Floor inside and/or</strong></td>
<td>level 5', 1' ex-</td>
<td>same as Amer.</td>
<td>same as Amer.</td>
<td>4'-6&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>outside (foyer)</strong></td>
<td>tension on side</td>
<td></td>
<td></td>
<td>X 5'-6&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Thresholds: exterior</strong></td>
<td>no &quot;musts&quot;</td>
<td>½&quot; high</td>
<td>no &quot;musts&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>interior</strong></td>
<td>non slip</td>
<td>flush w/ floor</td>
<td>whenever practi-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Floors</strong></td>
<td></td>
<td></td>
<td>cable, nonlip</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Toilet Rooms (access.)</strong></td>
<td>@ least 1 spec.</td>
<td>1 spec. for each sex</td>
<td>@ least 1 spec.</td>
<td>1 spec. for each sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Frequency</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Stall size</strong></td>
<td>3' wide, 4'-8&quot;de.</td>
<td>3' wide, 4'-8&quot; de</td>
<td>3' wide, 4'-8&quot; de</td>
<td>4'-6&quot; X 5'-9&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Door requirements</strong></td>
<td>32&quot; wide</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Range

- 15-20 sq.ft
- 30-36"
<table>
<thead>
<tr>
<th>Handrails:where</th>
<th>American Stand (Mass.)</th>
<th>D.P.S. (Mass.)</th>
<th>House Bill (Mass)</th>
<th>Rochester, N.Y.</th>
<th>Canada</th>
<th>Britain</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>same as Amer.</td>
<td>same as Amer.</td>
<td>same as Amer.</td>
<td>same as Amer.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>33&quot; high</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>31-33&quot;</td>
<td>31-33&quot;</td>
</tr>
<tr>
<td>Clearance betw. wall &amp; rail</td>
<td>1(\frac{1}{2}) &quot; outside dia.</td>
<td>1(\frac{1}{2}) &quot; inside dia.</td>
<td>not given</td>
<td>not given</td>
<td>1&quot;, (\frac{3}{4}) diam.</td>
<td>1&quot;-1(\frac{1}{2}) &quot;</td>
<td></td>
</tr>
<tr>
<td>W.C.: seat height</td>
<td>20&quot;</td>
<td>3'-6&quot; from center fixt. to wall same as Amer.</td>
<td>not given</td>
<td>not given</td>
<td>2'-8&quot; cent. of fixt. to wall same as Amer.</td>
<td>not given</td>
<td></td>
</tr>
<tr>
<td>Wall mounted urinals</td>
<td>opening 19&quot; high not given</td>
<td>same as Amer.</td>
<td>same as Amer.</td>
<td>same as Amer.</td>
<td>2'-8&quot; X 4'-10&quot;</td>
<td>2'-8&quot; X 3'-6&quot;</td>
<td></td>
</tr>
<tr>
<td>Wash basins</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>60&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mirror ht.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>40&quot;</td>
<td></td>
<td>40&quot;</td>
</tr>
<tr>
<td>Towel rack height</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>40&quot;</td>
<td></td>
<td>40-48&quot;</td>
</tr>
<tr>
<td>Water Fountains</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>48&quot;</td>
<td></td>
<td>36-48&quot;</td>
</tr>
<tr>
<td>Controls &amp; spouts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>36&quot;, 48&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ht. for wall mounted</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>18&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public Telephones</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>36&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ht. from floor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>36&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controls: switches:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>42&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>outlets</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>18&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elevators: occurrence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>36&quot;, 48&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>opening dimensions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>33&quot; clear</td>
<td>33&quot; clear</td>
<td></td>
</tr>
<tr>
<td>size (minimum)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5'-0&quot; X 5'-6&quot;</td>
<td>4'-5&quot; X 3'-8&quot;</td>
<td></td>
</tr>
<tr>
<td>control height</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>60&quot;</td>
<td></td>
<td>60&quot;</td>
</tr>
<tr>
<td>handrail</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>63&quot;</td>
<td></td>
<td>36-63&quot;</td>
</tr>
</tbody>
</table>

Note: The table provides specifications for various fixtures and their dimensions in different locations.
ties to be used by the public and constructed with government funds. The scope of this law needs to be broadened. As it stands now, there are no regulations requiring accessibility in restaurants, stores, churches, medical centers, airports, museums and all other privately or quasi-publicly owned buildings. So, although this code regulation was a first step, it is by no means adequate to the needs of the physically impaired.

Doors. An extremely important factor in accessibility to a building is the type of door at the entrance. The codes specify that it must be operable by single effort. This can include revolving doors, double leaf doors--the former being a physical impossibility for a wheelchair user, and the double leaf door a serious difficulty to work and in some cases, impossible. The width requirement as specified by the codes ranges from 30" to 36" clear. A 30" door is a tight squeeze for the wheelchair which may be up to 27 3/4" wide, resulting in scraped knuckles, arms, or elbows. An entrance/exit door should allow for quick passage, especially allowing for possible emergency situations. We therefore recommend that the entrance door have a clear opening of at least 32"; a 36" clear opening would be ideal.

While the positioning of doors is extremely important, a serious impedent in operation could be encountered if the door is not considerate to opening procedures. Doors should usually swing: when towards a person, such that there's clear and ample space to approach the door from the side opposite the radius of swing; and when opening away, the door should swing such that clearance may be obtained without being pinned in by an opposing structure such as a wall.

Most codes do not give any specification of effort needed to work the door or on the type of handles which the door should contain. Where the "effort" is given (Mass. Dept. of Public Safety, and Bldg. Code of Rochester,
1. Sliding or swingling electric or automatic doors at ground level

   Easy accessibility for all

2. Elevator at ground level

   Easy accessibility for all
   Building security problems

3. 36" clear opening, lever operated door at ground level

   Accessible by all

4. (below) Ramp entrance

   Accessible for able bodied and effort exerting physically impaired

5. (below) Staired entrance

   Accessible for the strong, willing, able, and determined

Fig. 13. Entrance options.
Table 1), not greater than 10 pounds is specified. In our opinion, 10 pounds is a very great weight for someone who is infirm on his feet or may have lessened control or use of his arms. Goldsmith\textsuperscript{18} gives the preferred maximum pressure needed to pull or push a door as not greater than 5 pounds, a much more reasonable amount of energy to exert.

As for door handles, we recommend that lever handles be used. Knob door handles do not provide adequate grip and should be avoided. A moulded lever handle which fits the hand comfortably and can be gripped is good. Preferable opening handle devices are of the grab-bar type which allow functionality by hands as well as forearm or wrist or even elbow. Door handles should not be higher than 3'-6". If children are building users, the handles should be at a height between 3'-0" and 3'-3".\textsuperscript{19}

Now that we have spent some time talking specifications and codes, we do not want to leave you with the idea that the entrance should have an inflexible 36" clear opening, be operable by 5 pounds pressure and should have a lever handle. There are many design options, some better than the minimum specification door. Figure 13 looks at some of these options.

Floors. Codes universally specify that floors be non slip. This is open to various interpretations and questions. Goldsmith\textsuperscript{20} has prepared a chart which is helpful in sorting out the various characteristics of floor coverings (see Table 2). Not only should floors be non slip, but there are other important characteristics which it should contain. It should be resilient; for ambulants and semi-ambulants a comfortable floor is of primary importance. Falls sometimes occur among those who are infirm on their feet, hence undue injury on a hard floor might be avoided with resilient flooring. Floor finishes with felt or sponge backing work the best. For wheelchair users, the floor surface should be resistant to residual indentations, and
Table 2. Comparative Analysis of Floor Surfaces (From Goldsmith).

<table>
<thead>
<tr>
<th>Non slip characteristics</th>
<th>Clay tiles (including quarry tiles)</th>
<th>Cork</th>
<th>Granolithic</th>
<th>Linoleum</th>
<th>PVC sheet and tile</th>
<th>Rubber sheet and tile</th>
<th>Terrazzo</th>
<th>Thermomoplastic</th>
<th>Vinyl asbestos</th>
<th>Soft wood</th>
<th>Hard wood</th>
<th>Carpet</th>
</tr>
</thead>
<tbody>
<tr>
<td>dry</td>
<td>G - VG</td>
<td>VG</td>
<td>G - VG</td>
<td>G</td>
<td>G - VG</td>
<td>VG</td>
<td>VP</td>
<td>G - VG</td>
<td>G</td>
<td>VG</td>
<td>VG</td>
<td>VG</td>
</tr>
<tr>
<td>wet</td>
<td>F</td>
<td>F - G</td>
<td>G</td>
<td>P</td>
<td>P - F</td>
<td>P - F</td>
<td>VP</td>
<td>G - VG</td>
<td>G</td>
<td>F - G</td>
<td>P - F</td>
<td>VP - P</td>
</tr>
<tr>
<td>polished</td>
<td>---</td>
<td>F - G</td>
<td>---</td>
<td>F</td>
<td>F - G</td>
<td>F - G</td>
<td>G</td>
<td>G - VG</td>
<td>G - VG</td>
<td>F - G</td>
<td>P - F</td>
<td>F - G</td>
</tr>
<tr>
<td>Resilience (comfort)</td>
<td>VP</td>
<td>VG</td>
<td>VP</td>
<td>VP</td>
<td>VP</td>
<td>F</td>
<td>G</td>
<td>VP</td>
<td>G</td>
<td>VG</td>
<td>VG</td>
<td>VG</td>
</tr>
<tr>
<td>Ease of Cleaning</td>
<td>G</td>
<td>F</td>
<td>G</td>
<td>G</td>
<td>F - G</td>
<td>F - G</td>
<td>F</td>
<td>P - F</td>
<td>F - G</td>
<td>P - F</td>
<td>F - G</td>
<td>P - F</td>
</tr>
<tr>
<td>Resistance to Wear</td>
<td>G - VG</td>
<td>F</td>
<td>VG</td>
<td>VG</td>
<td>G - VG</td>
<td>VG</td>
<td>F</td>
<td>VG</td>
<td>VG</td>
<td>G</td>
<td>G</td>
<td>VG</td>
</tr>
<tr>
<td>Resistance to Indenta.</td>
<td>VG</td>
<td>P</td>
<td>VG</td>
<td>VG</td>
<td>VG</td>
<td>G</td>
<td>G</td>
<td>VG</td>
<td>VG</td>
<td>P</td>
<td>P - F</td>
<td>VG</td>
</tr>
<tr>
<td>Resistance to Marks</td>
<td>F - G</td>
<td>G</td>
<td>VP</td>
<td>VP</td>
<td>P - F</td>
<td>P - F</td>
<td>F</td>
<td>P - F</td>
<td>P - F</td>
<td>G</td>
<td>G</td>
<td>VG</td>
</tr>
</tbody>
</table>

VG = very good, G = good, F = fair, P = poor, Vp = very poor
since rubber tires often leave marks, it should be patterned or a dark color or a material which has good resistance to marks. Carpeting is not recommended in any case as it causes unnecessary difficulty among wheelchair users requiring a large amount of physical effort of overcoming the friction between the pile of the carpet and rubber tires of the wheelchair. Carpet thickness may also cause insecurity of footing for those using canes and crutches as well as giving a "sand pit" reaction to the journey of wheelchair travelers. If more reasons for not using carpet is needed, Table 2 shows that it is also hard to clean and has poor resistance to wear.

Walls. There are no code regulations on the subject of wall finishes. However, we feel that this is an area which is certainly worth mentioning. Naturally, walls should allow for easy cleaning and maintenance. Modern architecture "a la Paul Rudolph" encourages textured concrete surfaces. Aesthetically, this is fine, but the wall surface at levels where one has contact with the wall should not be rough or abrasive (area 11' above floor base to floor). Wheelchair users often scrape walls with their knuckles or elbow, a rough concrete scrape is painful and unnecessary. Therefore we recommend that plaster or other smooth finishes be used—no roughly textured concrete or concrete block walls should be left exposed at contact levels. In addition, if the walls are painted, it should be a high quality paint which does not scrape off easily. There should be no sharp corners on hardware around doors, on walls or fixtures on the walls. Rounded edges are helpful to everyone, as each of us has experienced clumsy moments of bumping into obstacles.

Elevators. Ground floor elevators are a must in multistory buildings. There is much variation in codes as to the size the elevator should be to accommodate the building's traffic. American National Standards gives no speci-
Specifications. Massachusetts specifies a minimum of 4' X 4', while New York requires a minimum of 5' X 5'-6". To show what these elevators would feel like when a wheelchair is inside, the following illustration is enclosed.

![RIDICULOUS! TIGHT UNLESS RIDING ALONE!](image)

Fig. 14. Minimum sized elevators prescribed by code. (a) Massachusetts (b) New York

Since other people besides one wheelchair user are apt to use the elevator at the same time, the elevator must be planned to accommodate various combinations of people groupings. All elevators should be so adjusted that the floor of the elevators, when stopped, will conform exactly to building floor levels. In addition, the doors should have a safety edge plus a sensing device to prevent closing while entering or exiting. Despite the range of control height given by the various codes in Table 1 (31"-63"), a safe reachable maximum is 48" high. Handrails on all three sides of the elevator is a good aid and safety precaution. The doors of the elevator should operate such that persons of slower locomotion will have ample time to board and unboard safely. Where the elevator is a central facility the concept of variable loading entrances should be considered, such as two sided openings on public floors and single depository on private levels.

Sanitary Facilities. A survey of 3,000 buildings in Washington, D.C. revealed that just 23 restrooms were usable by people with wheelchairs. The
ELEVATOR

What about Public Buildings?

fig. 15
Enter elevator one side on residential floors, and exit opposite side on public floors.

Ambulatory passenger area

No turning required here

Move straight out

fig. 16
tally in Boston is not much different. A look through the Easter Seals Society publication, "Wheeling through Boston" lists the "most" accessible buildings in Boston, but very few actually have restrooms which are large enough or built to accommodate a wheelchair user. Even some hospitals do not have adequate facilities. Lack of usable toilet facilities is probably the greatest single reason why many well qualified people with impairments are unable to accept employment.

Public toilet facilities as a whole are not frequently available to anyone outside in the environment. A person must know which buildings have restrooms and on what floor it is located. There are none connected with our public transportation facilities; there are none accessible from an outside entrance. For the wheelchaired, the problem is thus doubled. They must first have accessibility into a building, then find an accessible bathroom. The odds of chancing upon such a situation are almost nil. This is where the role of architects and planners comes in. All buildings must be designed with awareness of the space requirements needed by wheelchairs in toilet facilities and of the frequency or number needed. Each restroom must contain at least one special stall, and in a well used building there should be at least one special stall for each sex on each floor. The need, as mentioned previously does not only exist inside buildings, but in parks, downtown areas, gas stations, and other widely traveled paths.

For the particular specifications of an accessible toilet stall, lavatory, etc., refer to Table 1. We do not feel it necessary to further discuss these dimensions as they are readily available in most revised building codes. One precaution which should be kept in mind, however is a warning against double doorway (foyer) entrances to the restroom. The wheelchair needs a certain amount of room to make a turn and also requires a larger door
opening when approaching the door from an angle. Some restrooms may well have accessible stall within, but the double door system does not allow entrance into the room itself. If the movement characteristics of wheelchairs had been studied, this kind of costly mistake would not be made.

Fig. 14. Inaccessible entrance (example, Boston City Hall).

USING THE BUILT ENVIRONMENT

Up to now discussion has mostly been limited to discussion of the physical inhibitors and facilitors to mobility. The study of public buildings must also involve ways to enhance the perceptual-sensory enjoyment of the environment. This can be accomplished through a richness of color and texture designed in conjunction with a clear, preferably graphic information system. Using the environment should not be a trial and error experience where constant guesswork is necessary to get where you want to go. One should not need to search for an entrance door, elevators or restrooms. Through good graphics, he would be able to know where he is and where he is going at all times without asking for assistance or making unnecessary guesses or effort exerting trys. This concept, needless to say is absolutely necessary in the case of those with ambulatory impairments as a mistake is doubly costly in time and effort.

During the course of the present project, it has not been possible to make a systematic study of every type of building used by the public. Such
a study would also have borne much repetition in analyzing their problems--i.e., inaccessibility due to stairs, narrow doorways, etc. Despite this, we feel that a federal analysis of groups of buildings serving like functions are worth a look at. Therefore, we have divided building types into 8 categories:

1. Civic, administrative, public buildings
2. Places of large employment numbers
3. Commercial buildings
4. Health buildings
5. Refreshment, entertainment, recreation buildings
6. Places of worship
7. Educational, scientific, cultural
8. Transport and travel related buildings

Civic, Administrative, Public Buildings. All citizens must be able to carry out his daily or special business without harrassment or undue effort. Whether the business at hand is payment of taxes or bills, picking up of checks, getting licenses, mailing a letter, seeking information or reporting to one's own job, easy accessibility to government or civic buildings is essential. Most of these buildings are presently inaccessible because they were built long before the building codes requiring accessibility went into effect. These buildings must not be ignored. They must be renovated to meet the needs of the whole population.

PRIORITIES

<table>
<thead>
<tr>
<th>City Hall</th>
<th>1. Level approach to principal public entrances.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Town Halls</td>
<td></td>
</tr>
<tr>
<td>Civic Centers</td>
<td>2. Elevator accessibility to all floors.</td>
</tr>
<tr>
<td>Post Office</td>
<td></td>
</tr>
<tr>
<td>Social Security Office</td>
<td>3. Allowance for wheelchair visitors and wheel-</td>
</tr>
<tr>
<td>Courthouse</td>
<td>chair staff.</td>
</tr>
<tr>
<td>Police Stations</td>
<td>4. Accessible restrooms for wheelchair, reach-</td>
</tr>
</tbody>
</table>

ONE PERSON BETWEEN 2 WALLS  

2 PEOPLE PASSING  

fig. 18
Welfare Office
Employment Offices

Places employing large numbers of people. Employment is the big key to independence for the physically disabled. Their minds are as alert as the "man on the street" and their desire to be self-supporting is equally, if not more, strong. The disabled are willing and anxious to exert the added physical effort necessary to hold a full-time job, making use of their education and training to capacity. The existing architectural barriers must be eliminated, and this select group of people be given their mobility, hence independence.

PRIORITIES

Office Buildings
1. Access for wheelchair visitors and employees.

Factories
2. Accessible restrooms for wheelchair users on each floor used.
3. Elevator transport to all levels.
4. Cafeteria which can accommodate all wheelchair employees allowing selection and collection of one's own food and tables which they can fit their chairs up to.

Commercial Buildings. Everyone needs to buy food and clothing. To some, shopping is a fun, enjoyable experience. To others, it is a task which must be done, and is therefore accomplished as quickly and infrequently as possible. But, to the physically disabled, they have no such choice. Commercial activities involve constant frustration—the can of beans which cannot be reached, the aisle too narrow to maneuver, a checkout counter which cannot be approached, the bank teller window too high, the beauty saloon on a mezzanine, reachable only by stairs. These obstacles are people-produced and can be avoided if some forethought and consideration is put into the layout of stores. Reaching and bending is hard on many people, crowded, narrow aisles hamper
movement by all. If a store is designed with the most demanding disability in mind, it will work for all others, and most likely be a pleasanter, more efficient place from the consumer's viewpoint.

<table>
<thead>
<tr>
<th>Department stores</th>
<th>1. Level approach to all public areas.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Downtown shopping</td>
<td>2. Allowance for wheelchair customers</td>
</tr>
<tr>
<td>Small shops and specialty stores</td>
<td>a. Elevators to all floors</td>
</tr>
<tr>
<td>Hair dressing salons</td>
<td>b. Aisles with enough space to allow passage of a wheelchair and walking person.</td>
</tr>
<tr>
<td>Barber shops</td>
<td>c. Displaying of goods within eyesight and reach of those in wheelchairs.</td>
</tr>
<tr>
<td>Tobacco shops</td>
<td>d. Adequate space at checkout counters for a wheelchair user.</td>
</tr>
<tr>
<td>Laundermats</td>
<td>3. Automatic entrance doors.</td>
</tr>
<tr>
<td>Cleaners</td>
<td>4. Special reserved parking for physically impaired near entrance with all surrounding curbs ramped.</td>
</tr>
<tr>
<td>Drugstores</td>
<td>5. Accessible restrooms, reachable water fountains and pay phones.</td>
</tr>
<tr>
<td>Gift shops</td>
<td>6. Allowances for wheelchair staff; accessible staff cafeterias and lounges.</td>
</tr>
<tr>
<td>Supermarkets</td>
<td></td>
</tr>
<tr>
<td>Grocery stores</td>
<td></td>
</tr>
<tr>
<td>Banks</td>
<td></td>
</tr>
</tbody>
</table>

**Health Buildings.** It is hard to believe that many of our hospital facilities are inadequate to handle the medical needs of the physically impaired, especially in the case of the wheelchair user. There are only particular doors in hospitals which are accessible, and many examination rooms which are not. The physically impaired population has frequent need for these facilities, but visits become negative, demeaning experiences of being carried around, no privacy when dressing because the changing room is too small to get in to, inaccessible toilet areas, etc. Here above all places, total accessibility is expected and must be demanded.
A point-of-sale displays designed for self-service from a wheelchair

Fig. 19
Hospitals
Clinics
Health centers
Doctors' office
Dentists' office

PRIORITIES

1. Level approach to administrative departments, wards, therapy departments, outpatient departments, lounges.

2. Allowance for wheelchair patients with
   a. adequate hallway passage for two wheelchairs to pass,
   b. accessible restrooms
   c. dressing rooms large enough for a wheelchair user to undress and dress in privacy.
   d. large enough examination rooms for a wheelchair user to get into the room and transfer to the examination table or dentist's chair.

3. Allowance for wheelchair staff in administrative departments, laboratories, etc.

4. Large elevators to all floors which can carry at least two wheelchairs at a time in hospitals.

Refreshment, Entertainment, Recreation Buildings. Everyone has the need at some time to relax, watch, enjoy. In most large cities, like Boston, the entertainment and spectator sport opportunities are plentiful. As can be seen in the pamphlet "Wheeling through Boston" there is a real scarcity of restaurants which do not have front entrance stairs. Some are accessible through a back door or service entrance (past the garbage in the alley, then through the kitchen), and others are willing to help carry the wheelchair user up or down the stairs if advance notice is given. Then one is still faced with having people stand up to let the wheelchair pass, and when there is not an adequately high table, sitting out in the aisle to eat. A wheelchair user can never have a quiet meal free from starring eyes in most large restaurants, much less, a neighborhood one.

As far as an evening of entertainment with family or friends, that becomes yet another obstacle course. Where the building is accessible, the wheelchair users are often tripped over in the aisle of theaters or sporting halls, or placed in front or back of all other people unable to be next or
fig. 20

PASSING A SEATED PERSON
near to those he came with. Common, too is the placement of the wheelchair user only on the main floor in orchestra section seats, hence the most expensively priced tickets must be bought. In some theaters there is no extra space at all for placement of a wheelchair, and seating in the aisle area would be a fire code violation. In these cases, wheelchairs are banned from the premises.

1. Eating places: Restaurants and nightclubs
   a. Front door accessibility
   b. Adequate room to circulate a wheelchair between tables
   c. Non-booth tables at least 30" high to allow a wheelchair to pull up close to it
   d. Restrooms which can accommodate a wheelchair

2. Eating places: cafeterias
   a. All of the above
   b. Allowance for passage of wheelchair through food service lanes and visibility of food choices

Places of assembly and spectator sports:
1. Front door accessibility with level approach
2. Elevators to balconies
3. Wide aisles to allow movement of the wheelchair
4. Clear spaces on main floor and balcony levels with wide enough aisles to allow chairs to be placed as well as park a wheelchair or several wheelchairs; with good visibility for wheelchair users.

Places of Worship. Everyone has the right to worship in the church of his choice. Need anymore be said?

Cathedrals
Churches
Chapels
Church halls
Synagogues

1. Level approach; elevator or ramp access to buildings where level approach is not possible.
2. Wide aisles; clear spaces set aside for wheelchair users.
3. Accessible restrooms and cloakrooms
Educational, Scientific and Cultural Buildings. If physically disabled children are able to attend regular public schools at an early age, adjustment to their particular disability occurs naturally and smoothly. However, if forced to attend a special private school, the child may be put unnecessarily in an over protected environment at large monetary expense to the parents who can ill afford it coupled with ongoing needed medical expense; there is also emotional expense to the child. Public schools must be built or renovated to accommodate all children.

In the case of the high school or college student where mobility needs are increased with hourly changing of classrooms, and increased student activity demands, the need for total mobility within each building and between buildings increases. Can you imagine the frustration which occurs when you cannot participate in a chemistry or physics laboratory because the work tables are too high and the sinks, out of reach; or when you cannot fit up to a desk and have to write with books and paper balanced on your lap; or not being able to take any gym courses because the gym or locker room has entry steps or does not provide the adequate facilities necessary to change clothing and store them?

The above are just a few examples of the problems met daily by wheelchair students seeking to complete their educations. They are also often short changed out of libraries, student unions and dormitory living. Much learning and enjoyment comes out of visiting museums. These too must be able to accommodate all people, including children with physical disabilities. Where there are displays or demonstrations, these must be at a level where no one has difficulty seeing; where there are mechanized displays which require the pushing of buttons or picking up a telephone receiver, these devices must be reachable by a child in a wheelchair.
Libraries pose yet other problems. The space between shelves as a rule is too narrow to allow passage of a wheelchair, thereby depriving all wheel-chaired people the luxury of browsing. Books are often out of reach, and carrels do not allow use by wheelchairs. These problems only arise, of course, after the wheelchair user has gotten into the building. Of the 13 Boston Public Library Branches surveyed in "Wheeling through Boston", only 3 have no step barriers at the entrance. Then they have other problems such as no accessible rest rooms, no elevator or ramps to the second floor, no special parking or drop off areas. The main Boston Public Library, with the new addition has a street level entrance with elevators and bridges connecting all floors to floors of the original building. Of course one must find adequate parking in the area first.

**PRIORITIES**

| Kindergarten | 1. Accessible entrance to all buildings; level approach to all public areas. |
| Primary Schools |  | |
| Secondary Schools |  | |
| Colleges, Universities |  | |
| Art, technical, Commercial Colleges |  | |
| Training Schools |  | |
| Research Laboratories |  | |
| Art Museums |  | |
| Science Museums |  | |
| Public Libraries |  | |
| Zoos |  | |

2. Allowances for wheelchair staff and students:
   a. Restrooms
   b. Wide doorways
   c. Hallways
   d. Water fountains, phones
   e. Cloakrooms

3. Elevators to all used floors.

4. Clear space to accommodate wheelchairs in lecture halls; some tables and desks of at least 30" height in libraries, classrooms, lecture halls; special flexible furniture for children in public schools.

5. At least one fully accessible dormitory on each college campus near main study halls.

6. Wide aisles in library for wheelchair circulation; help available for obtaining books which must be placed at high height levels.

7. Visible display of all exhibits in museums at wheelchair heights.

8. Wide and smooth enough paths and paving at
zoos; ground floor entrance to special buildings.

9. Special parking reserved for physically disabled persons.

10. Accessible restaurants and cafeterias when these premises are located within the building.

Transport and Travel Related Buildings. Most wheelchair users are forced to travel by car because of inaccessible railway terminals, bus stations and airports. Where this problem does not exist, the carrier itself may be an obstacle because of steps, lack of clear space inside to sit in a wheelchair, or aisles too narrow to get to possible seating areas. Changes in both terminal and carrier design must take place concurrently. They both must enable the independent mobility of the passenger and not involve the wheelchair user being carried up stairs or on board the vehicle. The needs of the wheelchair user must be considered in every area of transportation.

Although, as mentioned above, most wheelchair users are forced to travel by car, this mode of travel is not free of architectural barrier problems either. There is an absence along travel routes of accessible restaurants, restrooms and especially lodging. Most motels and hotels are not equipped to accommodate a wheelchair. In the cases where one can actually get to his room, use of the bathroom is an insurmountable problem. The first difficulty encountered is the doorway to the bathroom itself. Most often it is too narrow to admit a wheelchair. In some cases, the door can be taken from the hinges to allow admittance. In other cases, even removal of the door will not help. If the wheelchair user should somehow manage to get into the bathroom, most likely there would not be enough room to move, let alone turn around. What unnecessary and demeaning harassment!

Barrier free travel is an area which demands that many changes be made.
Travel should be an enjoyable, comfortable experience, not continual annoyances, denial and discomfort which is the situation now faced by not only the disabled, but to some extent all who travel.

Priorities

| Railway stations | 1. Level approach to principal public areas—lobbies, waiting rooms, ticket counters. |
| Bus Terminals    | 2. Allowance for wheelchair travelers with a. Adequate restrooms |
| Airports         | b. Reachable telephones and water fountains |
| Hotels           | c. Accessible restaurants, snack counters, bars. |
| Gas Stations     | 3. Level loading onto bus, train or plane. |

3. Level loading onto bus, train or plane.

4. Elevators to all levels of the building.

5. Reserved parking near the entrance for the physically impaired.

Recommendations

Because priorities have already been listed beside each category of building, the following recommendations are of a more general nature.

1. Inform the Community. An important aspect in the elimination of architectural barriers is informing the surrounding community and channeling their interest into action. Without public outcry to stir up action, government legislators are slow to act, especially when the group affected is a small percentage of their electorate and not very visible people at that. They have low visibility in the public eye because under most circumstances architectural barriers force them into a life of inactivity.

There are several groups which can initiate such action leading to a constant exchange of information and ideas. Local groups intimately involved with the problems such as MAP (Mass. Assoc. for Paraplegics), local chapters of PVA (Paralyzed Veterans of Amer.) and handicapped clubs should be activated, if they are not already. Other groups such as members of the board of educa-
tion, teachers and other community leaders will be helpful, as they often make decisions on the design of new school buildings, libraries, and other educational facilities. These groups, especially if all are activated can be quite effective in informing and spreading awareness throughout the community through contact with public officials and fully tapping the resources of the media--newspapers, television, radio and popular magazines.

2. **Passage of Adequate Laws.** We have looked at many state and national laws regarding public buildings. Are these laws or codes adequate? In most cases, they serve just as a beginning of improvement and most do little more than indicate sympathetic concern with the problem. Most state laws only apply to new, government owned buildings and are vague in requirements. Equally important, they fail to provide for clear-cut enforcement provisions which will guarantee accessibility. None of the four major National Building Codes which serve as models for most local codes contains the USA Standards Institute specifications.

If official requirements are to be improved, many issues arise in connection with such improvements. For example:

1. Is it feasible and desirable to require private owners to meet accessibility standards?
2. If so, to whom should such requirements apply?--home owners?
3. Should requirements apply only to new constructions? to remodeling? to all existing facilities?
4. Should there also be laws applying to transportation, recreation, streets and other outdoor or public places?

In the past, the answer to these questions has been left to the discretion and conscience of the individual owner. Result--inaction. Admittedly, laws are not the final answer because without public support they become quite meaningless. What we need is a combination of a fully sensitized public with
adequate laws to support them. Then, much can be accomplished. If laws are found to be necessary in making all buildings used by the public accessible, then we opt for that. If it is necessary for an unofficial enforcer to go from site to site seeing that codes are carried out, we opt for that also. Lauder tells of

"A paraplegic in New Hampshire loads his hand-controlled car with copies of the State's architectural law, goes to construction sites and says to the foreman: 'show me the wheelchair entrance.' When he finds none, he pulls out a marked copy of the law. Single handedly, he has been responsible for the building of many ramps. Often, however, he has found that the contractors have obtained waivers, indicating that much educational work needs to be done both with the State authorities and with the contractors."

We would like to believe that public conscience and responsibility is all that is necessary to achieve independence for all, but since this has not proven true in the past, we can only hope that the combination of increased awareness among the population and the passage of as many laws as needed will soon be able to provide for an accessible environment in all respects.

3. **Educate the Building Industry - Architects, Clients, Manufacturers, and Suppliers.** Accessibility standards have been available for many years--time enough for one to be able to observe a drastic change in the construction and renovation of buildings. This has not occurred; the standards are more often ignored than followed. A poll of architects showed that only 28% use the accessibility Standard issued by the U. S. A. Standards Institute when they design buildings. Queries to manufacturers and suppliers of building materials and to building code groups also indicated little knowledge or use of the data on environmental barriers.

So, the solution hinges on the education of architects. Schools of architecture must begin to give design assignments which require that the design be barrier-free. This should be accomplished by the student finding out the
real meaning of barriers by first hand experience—trying to cope with typical architectural barriers in a wheelchair. When architects become convinced of the need for total accessibility, they in turn are in a position to "put the screws" on the manufacturers and suppliers of building materials by refusing to buy anything that is not operable by all people. The architect is also in a position to educate the client, and if the client refuses to accept plans which are completely barrier-free, the architect can refuse to work for him. If course, this concept can work two ways. After a successful awareness campaign in the community, hopefully, the client will be in a position to reject any building designed by an architect which is not barrier free. Money should not be a point of distension, in any case. If accessibility is designed for in the planning stages, it can be built in at no additional cost.
footnotes


4. Ibid.

5. Ibid.


7. Ibid.


9. Ibid.

10. Ibid.

11. Gordon, R. The Design of a Pre-school Therapeutic Playground: An Outdoor "Learning Laboratory". Institute of Rehabilitation Medicine, New York Medical Center.


19. Ibid.

20. Ibid.


22. Lauder, op cit.

23. Ibid.

24. Ibid.
PART 3

TRANSPORTATION

TO HELL WITH THE HANDICAPPED
INTRODUCTION

We will speak of what the concept of mobility seems to be doing to one of our pretended values--liberty. Any variated truism about liberty can be knocked into a cocked hat when we conceive of our technology and that sector of society which is least mobile--the physically disabled. This chapter will deal with some evidence of the facts about the mobility of the physically disabled and their liberty, and some speculation on why their mobility especially with all our technology has become so lethal to liberty, and finally some thoughts about what environmental specialists, technologists and behavioral scientists might do about the crisis.

One such objective is related to the mobility options of these persons whose essential transportation needs are met only by public transportation. National tradition views opportunity for freedom as one of the inalienable rights of a citizen. Inequity exists where citizens are denied mobility because they are unable to claim it. This category of trip makers has been labeled "captive". They must use what is at hand regardless of cost of service, type of service provided (quantities of modes) and quality of service. They are also limited to the sectors of the city or environment where this service is provided and at the specific hours of scheduling.¹

Transportation, in general, is a very complex good. In economic terms it is a nearly infinite collection of highly interrelated services. Its value to use is not inherent in the service, but rather is derived from the values of the spatially separated activities which the service connects.² A methodological approach to transportation planning with the urban environment as a focal point, is largely concerned with relating forecasts of travel needs under a variety of transportation and land use alternatives--the development
of relationships for travel demand based on socio-economic characteristics and transportation parameters has become highly useful for estimating movement on a corridor or sector basis. Methodology based upon this approach has proven to be successful in evaluating large scale transportation systems.

These techniques or efforts to investigate the problem from a function-oriented viewpoint, have been conceived, but constitute vague guesses at the nature of latent demand.

"In general almost no data exists that shows how persons of different life styles living at different urban densities and income levels, solve their personal transportation problems. Moreover, there is no hard information to demonstrate the existence of large and unfulfilled latent demands for alternative forms of transportation. Information on such matters is crucial for designing programs to improve the mobility of the physically disabled, the poor, and for evaluating the benefits of such programs against their cost. Yet to date, the information has not been gathered."

Physical accessibility is a necessary condition for realizing latent opportunities. These groups who are totally dependent upon others for transportation include:

1. the elderly who choose to, or cannot drive
2. the young
3. the secondary worker
4. the physically disabled
5. the handicapped

The present day transit is a compromise between the needs of people and the economics of the urban transportation market as viewed by systems operators. The balance is presently weighted toward the operators. Ideally a system of transportation should approach the comfort and convenience of the automobile at a cheaper or lower cost.

No simple statement of the problem and its causes is possible, but there are several key factors which can be identified. The objectives of this study will be to: 1) analyse in an exploratory level some of the much needed information as to the extent to which public transportation is inaccessible to the physically disabled, 2) to define the behavioral aspects of mobi-
lity needs, 3) to assess the mobility requirements of these households which go unanswered by the existing system of public transportation. The intent is not to measure trip making behavior; it is to examine whether there exists a significant difference between observed travel behavior and that activity which is required to maintain a suitable living standard for certain economic groups and to understand the social, economic and critical needs of persons deprived of complete mobility and to relate these needs to their latent demand for urban personal transportation. 7

We all formulate transportation requirements for the physically disabled to provide a rational method for selecting the best of alternative responses for need, and to assess the national impact of those solutions selected for implementation. Our concern for methodology is to:

1. Establish design and operating guidelines--criteria, method--suitable for use by transportation planners and operators and new system designers in evaluating and meeting the needs of the physically disabled. 8

2. Assess the extent of and nature of the economic, social, and psychological impacts which would be likely to occur as a result of adapting guidelines.

The assumption which will underlie the treatment of this problem is that mobility, education, and utilities is a public good and as such should be amply provided to all of the citizens within a given municipality. 9 Our major objective of urban design is to minimize the amount of effort, cost, and time associated with moving about in urban composite systems.

Although the rate, intensity and direction of urban growth cannot be completely controlled by transportation changes, transportation can structure a cohesion between the many agglomerated units that compose our environment. Activity agglomeration, whether by business firms or residential households, necessarily precludes the use of such areas for alternative uses. The resulting configuration of our cities is a large scale, locationally
segregated urban system. The segregation phenomenon affects three types of linkages: (1) people to people, (2) activities to activities, (3) people to activities. The implication of large scale national segregation is an increasing spatial separation between people and activities and, in many cases, a resulting decrease in activity accessibility.10

Such planning, of course, tends to defeat the major advantage of our urban environment—readily accessible opportunities thus reducing the quality of the environment. Transportation investment is a tool which can intensify the high quality of urban environments and counteract any opportunity imbalances. Given the spatial separation of urban activities and the comprehensive nature of a family's activity options, there is an enlarged domain of public responsibility to increase or improve the overall level of urban mobility. In order to sustain this quality of urban environments, access to activities must be provided to a much greater degree than the minimum required to meet essential needs. To the individual, urban mobility is not measured in distance per unit of time. Rather, the value of mobility is measured in terms of activity opportunity per unit of time by degree of accessibility. Maximizing frequency, reducing friction and opting variety should therefore be a prime rationale in transportation investment. It appears, however, that increasingly large numbers of society find themselves isolated and removed from the range of potentially available urban opportunities.

MOBILITY NEEDS

Mobility, then, for the purpose of this study, will be represented by the opportunity of a group of people to move about with respect of both volume and spatial distribution.11 Clearly not all benefits derived from improved transportation are economic. The social benefits of enabling many
physically disabled individuals to work, study and participate in recreational activities are equally compelling. These benefits also include the reduced burden on friends and relatives and one's mental and physical self. Contributive benefits are gained from the physically disabled in education, community policy, and social roles which alleviate federal relief. Thus the physically disabled citizen benefits psychologically. Opportunity gives him a chance to be a fuller person, achieve greater performances, enhance his self-concept and rehabilitate society's self concept of disability. One of the many factors that are hard to secure are quality of life factors. But it is not hard to assume that transportation in its functionally ideal state will upgrade the life of all citizens, especially the physically disabled.

Assuming the "users"—the physically disabled—performance of public transit is measured by overall indices of the disadvantaged, facilities and vehicles which are inaccessible, inadequate, unavailable shall be considered as requiring high utility trips. A high utility trip is one whose effect upon living standard is most pronounced, such as household survival activities:

1. Work
2. Necessary shopping (food and clothes)
3. Child care arrangements
4. Medical
5. Social service availability
6. Educational resources

Consequently, the act of forgoing a given trip would reflect a decision both conscious and unconscious that the usefulness of the trip did not outweigh the utility and therefore does not justify the associated expenditure of time, money, and energy or resources.

If the nature of trip making which is adequate for actual travel needs (high utility trips) is denoted by the term "required mobility", then the following defines demand: demand is represented by the potential for trip making volume which would be necessary to raise mobility to some ideal level.
of trip making.

The discrepancy between mobility and demand may be explained by a variety of environmental and behavioral factors. Hoel has suggested four specific components of latent demand:

1. Trips which are not made due to the fact that adequate transportation is unavailable.

2. Trips which are not made due to limited awareness of available transportation systems options.

3. Trips which are not made because the trip ends are beyond the socio-economic sphere of normal household activity.

4. Trips which are not made because trip ends are priced beyond the financial capabilities of households.

It is clearly expressive that only one of these explanatory components deals with the physical aspects and operations of transportation systems itself. We shall tie the implicit need of the physically disabled to the explanatory components of demand.

Transportation studies have not concerned intensive analysis of the actual travel needs, nor is attention given to investigating the difference in the travel behavior by physical dependency categories with respect to the satisfaction of needs. Latent demand for mobility as a concept must be viewed as a function of absolute need rather than a comparison of travel capacity between various interest groups. Herr and Fleisher introduce the concept of a mobility deficit to describe the unsatisfied mobility required by any urban population group. For this process, the population is stratified by need—in our case physical criteria for the physically disabled is weighed against that criteria cited as a norm.

This procedure allows one to compare criteria of need by physical response to that need. A mobility deficit which is defined can show an indication of the disparity between groups and the extent to which physical travel
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This procedure allows one to compare criteria of need by physical response to that need. A mobility deficit which is defined can show an indication of the disparity between groups and the extent to which physical travel
needs of the groups can be met. Therefore, the measurement of demand for mobility must be based upon the fulfillment of certain assumed absolute needs for the physically disenfranchised—the absolute need is physical criteria—an index of unsatisfied mobility needs. It must be recognized that when mobility deficits are derived of other than the direct user needs, response is neither adequate or appropriate for comparison.

**LEVEL OF SERVICE**

Essentially, our urban environments have a strong vertical component which most people easily adapt to. For the physically disabled, the wheelchair user in particular, the desired environment is horizontal. Subway and elevated systems, as well as buses, trains or cars, do not provide easy access for the physically disabled. The steep vertical entrances to buses and trains require mounting and dismounting. Subways must be negotiated by steps, and at best escalators which require precision mounting. Employment sites and residences usually do not have ground entrances. Man's technological achievements for safe, sanitary, and healthful climates have physically and subconsciously imprisoned a large minority sector of our population. It has left this group without recourse to survival tactics; many are denied the chance, let alone the opportunity for employment, recreational opportunities, commercial options, or choice of residence.

While it is a quantitative appraisal of the system in general we are discussing, it is a qualitative approach that must strike systems designers and planners. The physically disabled's desire to be productive and self-reliant and meet challenges with dignity, given the opportunity. Because the physically disabled lack sufficient muscular control, design alternatives are nothing more than technological consistencies in design and planning. These
technological changes will represent a qualitative level-of-service.

One of the reasons for relatively high unemployment and underemployment rates among the physically disabled is their nonaccessibility to available employment opportunities, given the continuing process of urban dispersal. Another may be in channels and methods used for providing employment information. In any case, it is undesirable to enhance the ghetto of the disenfranchised by investing to create jobs there. Why not invest in systems to take these disenfranchised to existing jobs, shopping opportunities, urban public facilities, and other optional activity sites? In short, provide equal levels of accessibility with accessibility levels equal to or greater than those of present opportunities of the urban environment. Thus physical well being should not preclude transportation systems design but should consider the function criteria as a limit for capacity.

A comprehensive list of level-of-service variables which does not specifically include among them physical access or proximity to transit facilities appears in Table 1 below.

Table 1. Level-of-service Variables.

<table>
<thead>
<tr>
<th>Time</th>
<th>total trip time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>reliability</td>
</tr>
<tr>
<td></td>
<td>time spent at transfer points</td>
</tr>
<tr>
<td></td>
<td>frequency of service</td>
</tr>
<tr>
<td></td>
<td>schedule times</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>User Costs</th>
<th>direct transportation changes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>other direct operating costs (loading, documentation, etc.)</td>
</tr>
<tr>
<td></td>
<td>indirect cost (warehousing, interest, insurance, etc.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Safety</th>
<th>probability of fatality (destruction of cargo)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>probability distribution of accident types (shock-vibration, water damage, etc.)</td>
</tr>
</tbody>
</table>
Comfort and Convenience

- number of changes of vehicle
- physical comfort
- psychological comfort (status privacy, etc.)
- other amenities (baggage handling, etc.)
- enjoyment of trip
- aesthetic experience
- accessibility

Shopper Service

The reasons for developing design objectives or design criteria has been stated well by the American Transit Association:\footnote{18}

"Transit faces a brighter future. There is evidence of an upturn in transit riding in many communities. Public officials at all levels of government and even the automotive and highway interests of the Nation have come to recognize and to accept the essentiality of transit service in our urban communities and metropolitan areas. It is increasingly important, therefore, that mode—as one of the essential tools of transit become the ultimate in attractiveness, dependability and overall performance."

Level-of-service is treated by Wohl and Martin\footnote{19} as being inversely related to the total difficulty which the user experiences in understanding and undertaking a trip in a certain way, at a certain time, and we might add here, under a given set of economic circumstances. The group of factors which singularly and effectively operate to produce discouraging influences upon a prospective traveler is called "price". Price is defined as the set of all expenditures of various types which the potential traveler anticipates consuming as he contemplates the trip. It can be seen that as a level-of-service declines, price increases and vice versa; this relationship makes it possible to relate travel volume directly to level-of-service.\footnote{20}

Accessibility to public transportation is a significant component of level-of-service for examining latent demand for mobility. As access and egress become longer, and anticipated travel "price" increases, travel volume is likely to be reduced accordingly, sometimes interfering with high utility.
To the physically disabled, "price" can be seen as "true price." The lack of systems availability causes the physically disabled citizen to not be able to seek employment. The cost involved for the alternatives are not paid by them, but are shared expenses by all citizens in the form of increased taxes. Here we have a group willing and eager to be productive, but are forced to be tax users instead to tax producers because of physical obstruction in our complex, yet so called harmonious environments. Therefore overall real cost becomes substantially used profits and are reverted into deficits, and human potential is substantially degraded.

In a democratic society it is a proven fact that liberty is not license; but the automobile has given its owner more liberty than his pedestrian fellow citizens. When man meets automobile, the machine prevails. The only escape into mobility from the 3,000 pound monster and its citizen is rapid transit. Upgrading would improve physical well-being, real comfort, convenience in style of life and self respect, and a conscientiousness of service to others.

The prevalence of captive ridership is clear. The fundamental controlling variable of latent mobility demand among the physically disabled is transit level-of-service. Thus the major problems facing the physically disabled are not that public transportation is too expensive; that may or may not be the case. The problem is that it is unavailable or in a form which does not serve these people. It is useful to point out the most important elements of level-of-service with respect to the physically disabled. They are:

1. Access
2. Point of origin knowledge
3. Frequency of departure from point of origin
4. Proximity of the service to the destination
5. Out of pocket cost
6. Mode design (vehicle structure)
Evidence in this section concerning the mobility behavior has drawn from many sources. Although details vary in incidence of transit need, the general pattern of mobility behavior for the physically disabled is clear. As a group they are essentially income poor, in part due to the fact that they are federally supported from either welfare, social security or pensions. Many are therefore autoless, hence are heavily dependent on public transportation or on friends or family for private transportation.

CONCEPT OF SYSTEM AVAILIBILITY—PROLIFERATION AND ADAPTATION

Very little research on facilities for mass transportation has been done during the past fifty years. Our city, state, and federal governments have been busy building streets, roads, and expressways for motorized private passenger vehicles and trucks—and at the same time, smothering railroads and tramways with taxation and regulation. The result is that the technologies of mass transit are far behind.

It is a characteristic nature that each mode of travel have a profile of potential travel barriers. Though most likely there will be some variation due to local condition design, most of the same travel impedances occur in similar systems. An example of a bus ride follows:

"The passenger must locate the bus-stop and wait, usually standing, until the vehicle arrives. Then he must be able to climb the bus steps ... deposit his fare, and locate a seat while maintaining his balance as the bus pulls away from the stop. If a seat is available, he has to negotiate the aisle and be able to sit down and get up rapidly. When all the seats are filled, he must be able to ride standing in a crowded vehicle, holding on to a vertical stanchion or overhead grip. As the passenger approaches his destination, he has to be able to locate his stop, pull the signal cord, and exit down the steps. If he cannot perform any one of these functions, or does not have the endurance to perform them all, then he may forgo the trip."23

Singularity in disability, like barriers in mode transport, seldom occurs
individually. Multiplicity in physical capabilities make it difficult for a person to walk long distances, climb stairs, sit down and stand up, reach, handle small objects. The implications these functional disabilities impose on transportation have enormous impact on system design. Travel barriers within various modes of transportation involve not only fixed architectural barriers, but also factors such as vehicular movements, scheduling, routing, time, pressure and crowds. Many barriers are architectural in nature (see Table 2, from Abt Associates). Obviously, there is much in common between the physical barriers in public buildings and those which occur in transportation stations and vehicles. Most terminals are architectural complexes themselves, and nearly every barrier which occurs in other buildings are found in some transportation system.

Obviously a level-of-service needs to be developed in terms of facility design. What all-out research on facilities for mass transportation may yield will surely be a revolution. Without predicting the ultimate forms of urban communication, and they may well vary among areas, we can easily state certain principles. Transportation must be so inviting that people will gladly forego the private vehicle for public methods. There must be a separation of the pedestrian from his natural enemy, the private automobilist. Also, the city center proper, by ramps, escalators, underpasses and overpasses, elevators must allow pedestrians free movement, easy and comfortable.

However, architectural barriers in transportation system have several characteristics which make them difficult to overcome—situations created by moving crowds and pressures of scheduling. Service tends to be unpredictable; station design conforms to no pattern; unclear specifications as to circulation flow and lack of alternative process routes exist; barriers due to vehicle dynamics—jerky starts and stops, vehicle maintenance, sensory or
Table 2. Travel Barriers by Mode. (From Abt Associates, Transportation Needs of the Handicapped.)

<table>
<thead>
<tr>
<th>Functional Disability</th>
<th>Train</th>
<th>Subway</th>
<th>Bus</th>
<th>Airplane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walk more than one block</td>
<td>Walk from curb through concourse to platform.</td>
<td>Walk from entrance to boarding platform.</td>
<td>Walk from origin to stop or stop to destination</td>
<td>Walk from curb to gate.</td>
</tr>
<tr>
<td>Self-propelled level change</td>
<td>Board train via steps.</td>
<td>Enter or exit station.</td>
<td>Board bus via steps.</td>
<td>Board plane via stairs.</td>
</tr>
<tr>
<td>Sit down, get up</td>
<td>Sit/rise from waiting room or train seats</td>
<td>Sit/rise from seat in car</td>
<td>Sit/rise from seat in lounge or on plane</td>
<td></td>
</tr>
<tr>
<td>Stoop, kneel, crouch</td>
<td>Pick up baggage.</td>
<td>Pick up packages.</td>
<td>Pick up packages.</td>
<td>Pick up baggage.</td>
</tr>
<tr>
<td>Carry 10-pound weight</td>
<td>Carry baggage. Use overhead baggage rack.</td>
<td>Carry packages</td>
<td>Carry packages</td>
<td>Handle own baggage</td>
</tr>
<tr>
<td>Move in crowds</td>
<td>Terminals</td>
<td>Platform and vehicle</td>
<td>Terminal vehicle</td>
<td>Ticket counter, boarding area</td>
</tr>
<tr>
<td>Functional Disability</td>
<td>Mode</td>
<td>Train</td>
<td>Subway</td>
<td>Bus</td>
</tr>
<tr>
<td>-----------------------</td>
<td>------</td>
<td>-------</td>
<td>--------</td>
<td>-----</td>
</tr>
<tr>
<td>Wait standing</td>
<td></td>
<td>Wait on platform.</td>
<td>Wait on platform.</td>
<td>Wait outdoors</td>
</tr>
</tbody>
</table>
visual limitations (for the blind), location, climatic conditions, and route time convenience.

While we have cited necessary measures for adaptation and the needs of transportation system, these we cited in terms of a particular user need service. Systems availability is a much more complex and difficult service to justify. Generally, though, non-personal forms of transportation are not presently supplying the non-car-owning consumer with adequate levels-of-service. Furthermore, the ridership rate is decreasing, transit operators have reduced service levels drastically over the past twenty years.

To compound this, the new technologically innovative transportation systems which are being implemented in Los Angeles, Washington, San Francisco, Montreal are not really aimed at alleviating the latent demand. They are large mileage facilities. Designers emphasize the advantage of high speeds and wide station spacing. This rationale does not benefit and close the coordinated local service need.

While modern systems as the San Francisco system are made accessible in the street sense, elevators, escalators, level platform entrance to vehicle, etc., also providing accessibility in journey destination, the associated expenditure of time and energy because of spatial distribution encourages many to seek other modes which usually means the auto. This produces obvious mobility restrictions among those who have no opportunity of travel by car. This condition therefore requires use of an efficient, accessible mode of alternative transportation, i.e., bus, taxi, etc.

INSTITUTIONALIZATION: INCIDENCE CONSTRAINTS

Large numbers of urban groups, not only the physically disabled, do not have a choice in mode selection, i.e., the so called "captive riders." As a
group they are victims of the all too common "fare increase--service decrease" syndrome. But they are precisely the group who can least afford it. In most businesses, the repetitive customer, "the regulars", are usually given special consideration in the form of high quality service as a reward for loyalty. In urban public transportation the "regulars" are rewarded, usually with a printed announcement that there will be a fare increase on a certain date or service on a particular line will be cut back.26

There are presently significant institutional constraints on the implementation of both the guidelines and the specialized, dynamically routed system.27 The major manufacturers of buses, the responsible transportation company or authority and existing federal and state legislation all impede the implementation of the proposed design and operating guidelines. An understanding of these factors is necessary before realistic plans for implementation can be considered.

Programs to upgrade the convenience of transportation for the physically disabled requires support from manufacturers of transportation vehicles, stations and even entire systems. A statement of policy by a typical transportation concern follows:

"It is the objective and concern of public transport investment to improve the quality of the urban environment for all residents by increasing the range of options to activity patterns."29

This statement seems a little ambiguous when one analyzes records of policy and management. Let's analyze the public transit system in these terms in four parts.

First, we will look at the theory behind the transportation concept. Mass or rapid transit are both concepts of transportation, but neither fulfill the prospects or policy statement of the transportation concern. Mass transit simply means a number of people will move past a point per unit of
time. Rapid transit, unlike mass, must have its own exclusive right-of-way. The term does not necessarily imply high speeds. Anyone considering mass or rapid transit would agree that they are fixed systems, incorporating a system of quick loading and de-loading procedures—maximization of running time.

A lawsuit has been filed in U. S. District Court, which would require the Metro Rapid Transit System to install adequate facilities in its subway stations for the physically disabled. The plaintiffs, three non-profit groups concerned with the welfare of the age and/or physically disabled claim that the Metro is required by federal law to provide such facilities. The lawsuit names as defendant the Washington Metropolitan Transit Authority (WMATA) as the agency responsible for the construction and operation of Metro. Plaintiffs are the Washington Urban League, acting on behalf of its Senior Neighbors and Companies Council, Paralyzed Veterans of America, National Paraplegia Foundation, and Richard Heldinger, a resident of Maryland who is a member of NPF. They are represented by the Institute for Public Interest Representation at Georgetown University Law Center and the Washington law firm of Arnold and Porter.

The lawsuit held by the plaintiff's counsel, states that by Acts of Congress on Aug. 12, 1968 and March 5, 1970, and later regulation adopted by the General Services Administration, WMATA is required to install elevators in all Metro Subway stations which are accessible to the physically disabled. The suit further states that some of Metro's subway stations are substantially complete, but lack such provisions. The plaintiffs have asked the Court to decree that WMATA is constructing Metro in violation of federal law and therefore they seek a preliminary injunction enjoining WMATA from making further expenditures of funds or taking any other action that would make installation of such elevators either more difficult or costly. They also see a permanent injunction enjoining WMATA from constructing Metro stations until it satisfactorily assures the Court that it will comply with federal law and install elevators accessible to the physically impaired.

Secondly, the labor intensive system reflects present labor and operating costs resulting in fare increases or curtailment of services to offset any losses. This imposition of fares reduces the range of urban opportunity among users. In this way, the system is reduced to captive ridership. Many systems introduce transfers to induce these beneficiaries of public transportation to further utilize the system.

Thirdly, the design of present day systems has been a slow evolutionary process in terms of meeting the physical demands of user needs supposedly because new designs must justify retooling and the scare of repairs at the
expense of meeting mass demand levels.\textsuperscript{32} New design innovations require large investments which manufacturers will not make unless they have profit guarantees. The cost of engineering time is another complaint. Transit officials believe marginal investment per station would not be warranted, but it is equally clear that benefits attributable to such investment were never considered.\textsuperscript{33}

The structure of industry can be another deterrent. Representatives of sales and marketing management of a firm indicated that the corporation is constrained by anti-trust legislators which prevent them from seeking a larger market share.\textsuperscript{34}

Fourth, and lastly, in spite of financial subsidy, these authorities still operate as if the transit was a private firm. They maintain a profit oriented outlook, enforcing the theory of profit maximization and deficit minimization. It is this criterion which leads to cut backs, fare hikes, poor service and outrageous operating expenses and fares.

Our efforts have been to give an overview of the transportation crisis. It is a crisis in terms of accessibility to the disabled, the issues which lead to unavailable transportation, some rationale as to the operations and management and some insight as to the nature of the physically disabled. Before we could begin to develop any guidelines, it was necessary to learn more about the dimension of the demand—quantitative and qualitative issues, the existence of what might be labeled as "travel barriers", the impact that architectural barriers have on physical disability which in turn affect capacity for mobility.

We shall next turn to the investigation of the attitudinal and physical changes necessary to accomplish the goals of unrestricted mobility for the physically disabled.
ATTITUDINAL BARRIERS TO TRANSPORTATION MOBILITY – HUMAN FACTORS

If the urban environment is unimaginable without public transportation systems, if it is known that the consumer behavior is price related, if a large proportion of transit riders are the disenfranchised members of urban society, and if one of the objectives of urban transportation is to increase the range of activity options available to the population, then why not utilize the maximization of service, and not minimization of deficit, as the prime operating criterion? Perhaps the necessity of public transportation in the urban environment should be viewed as a public good, similar in nature to the necessities of police and fire protection and schools for children. Instead, urban transportation is operated, advertised, and priced as if the output is a scarce commodity (service) being offered by a private firm. In fact, urban systems are characterized by a large proportion of slack capacity, scarcity occurring only at rush hour peaks.

Design needs of the physically disabled and the design criteria utilized by existing transportation systems represents serious discrepancy in terms of use. Of course, all system users benefit from design improvements which make public transport more comfortable, convenient, and accessible. Service and design quality are luxury goods in a sense, but they are integral parts of the package being marketed—public transportation. Americans display a marked preference of luxury goods of all kinds, perhaps wise strategy for public investment in urban mobility systems calls for a greater consideration of luxury design features.35

A major concept to the variables behind latent demand such as level-of-service could be increased to develop mobility for the disadvantaged groups
not only within the urban core but also to and from suburbia. The disenfranchised--the physically disabled, elderly, poor, young--are at a comparative disadvantage in the urban environment already. Public policy should not further disadvantage these groups through sins of omission or commission. So long as public transport officials in urban areas behave as if they are operating private companies, though they are not, their primary objective continues to be profits. Under such conditions, neither the needs of the physically disabled or quality in design will seriously be considered. Public transport systems' managers are concerned about the "majority" of riders, but the 6 million physically disabled--to hell with them!

How do we change this? First, we experiment. In industry we spend millions of dollars just to find out whether we can produce a new and better product for these complex modern times. A major answer to many of these problems would come from increased demand levels. Operations could become more demand-responsive with subscription service (dial-a-bus), exclusive bus lanes, city center circulation service compounded with adaptive vehicle service could enhance the lives of the physically disabled. At present the plight of the disabled can be summed up thusly:

1. Systems that are presently available are not accessible, convenient, or comfortable, and are far too costly to meet their needs.

2. Those that negotiate public systems find these cumbersome, complex and confusing, irritating, uncomfortable, inconvenient, and often dangerous.

3. Systems operators are usually not reliable, polite, helpful or even fully competent.

4. Agglomeration of networks do not provide sufficient trip information, so even the shortest trip becomes an ordeal.

Of course a transit system will not eliminate wholly the necessity for a highway complex of motor vehicles--cars, trucks, buses, etc. But the
comparison in costs is shocking: an eight lane kill-way has a person-trip capacity of 9,000 at a capital cost of $1,600 per person. A subway, express, elevated or local, has a person-trip capacity of 50,000 at a capital cost of $440 per person—five times the work at one-fourth the cost.38 We must begin now to establish new ways of thinking and doing in relation to mobility efficiency and comfort factors.

TRAVEL BARRIERS OF A TECHNICAL NATURE

Barriers which pose most difficulty in present systems are complete lack of accessibility by the wheelchair user, dynamic movement oriented barriers—acceleration, jerkyness, and time pressure—scheduling, lack of vertical circulation systems that are effective in transporting wheelchairs, crutch users, baby carriages. This infers use of elevators or lift mechanisms of the cab nature. Naturally, new design norms reflect new technological awareness towards building codes and specifications. Reflection on all aspects of the public needs—sanitary, communication, visual and audio frequencies all demand proper and careful thought. Among leading contributions to a healthful environment will be the concern for safety. Exertion demands rest provisions which should be as attractive as convenient. Remember, transportation is not free and access points should respond to all perception levels. Mechanical sensitivity can hamper progress as easily as being lost. Doors have pressure gauging, sliding doors have quick reflexive response while turnstyles can be cumbersome for crutches. Scheduling can be frustrating when infrequent service is the problem and information is either non-existent or very hard to find. Alternative timing arrangements or some policy of differential timing of stop intervals causes it to become the physically disabled's responsibility to adjust their trip making behavior so they can maximize the utility they
receive from the system.

With regard to vehicle design and use, dynamics again require facilities for wheelchair security as well as proper judgment values on the part of the driver. Perhaps low torque engines giving slower starting power, seating capacities as well as geometrics will have to be analyzed. Modifications may be needed at entryway--wider doors, lifts, etc. The maker will have to analyze the need of adaption for their particular instance.

Psychological impact, of appearance, both auditory (sonic approach) and visual (color coordination), of vehicle is important to the user. In the public environment, such as the interior of a vehicle, discomfort can result from noise levels. Color may represent identification, safety, environmental impact. The systems logotype, route identification and related lines can be conveyed through the use of "system color". Step well areas, doors, and other hazards may be identified through color.

Physical comfort is experienced by design elements in the interior of the vehicle--color, signs, information, textured surfaces, handles, grip bars, floors, ceilings, cushioned seats, cabin design, seating arrangement. Also, the level of environmental control is important--heat, air conditioning, air circulation. Service life should be apparent in material selection. Passengers should have a concept of interior of vehicle while they are entering.

The visual environment is usually associated with that mode of transport one usually uses. Some general principles are:

1. Passenger flows in the vehicle should be uni-directional or have wider aisles.

2. Distance from vehicle to nearest usable door should be short.

3. If the same door is used for both entry and exit, then some additional device should be used to control flow; aisle should
allow for turning radius of the wheelchair.

We have included guidelines and illustrations from Abt Association research for the subway (Table 3, Figures 1 and 2), bus and trolley (Table 4, Figures 3-5), train (Table 5, Figures 6 and 7), air travel (Table 6, Figure 8). The tables include travel barriers with respect to location, guidelines and rated effectiveness.

The primary means of access to a transit system is of unequalled importance. Many systems, old and new, use escalators because they are unequalled for the vertical movement of masses of people. By their nature, however, escalators impose specific inflexible conditions on the user.

1. Placement of hands, feet and body must be rapid, coordinated and balanced to move from a stationary surface to one that moves.

2. Reversal of the process must occur at the end of the run.

3. Transference of body direction from a horizontal to a 30 degree slope with a view down the full length of run and back to horizontal must present a tolerable anxiety level.

4. Care must be exercised regarding parcel strings, apparel or shoe strings catching in the leading edge of the tread.

For the above reasons, one person out of nine cannot use an escalator. There is a definite need for an alternative system for these people. Potomac Valley Architects have designed such an alternative, featured in figures 9-15.
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<th>Guidelines</th>
<th>Effectiveness</th>
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<td>Travel Barrier</td>
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<td>Vertical stanchions on benches</td>
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<td>Fold away seat near entrance</td>
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<td>distances</td>
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<td>Moving sidewalks</td>
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TEXTURED FLOOR PATHS
Different patterns direct pedestrians to various platforms, fare collection, exits, etc.

Fig. 1. Subway payment area featuring stereophonic sound pulse to indicate direction to platform, time until next departure, and textured floor paths with different patterns to direct pedestrians to various platforms, fare collection, exits, etc. (From Abt Associates, Transportation Needs of the Handicapped)
Fig. 2. Improved placement of subway car entrances and seats. Double usual number of doors; seats arranged in compartments to shorten walking distances, get passengers seated before start. (From Abt Associates, Transportation Needs of the Handicapped)
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<th>Travel Barrier</th>
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<th>Effectiveness</th>
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<td>Audio signals</td>
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| Crowds | Terminal | Special travel lanes | F |
| | | Separated entrances and exits | F |

| Vehicle | Increase number of buses | G |
| | Limited boarding | G |

| Sudden movement | Vehicle | Special bus lanes | G |
| | acceleration braking and jolting | Padded impact surfaces | F |
| | | Vertical stanchions | F |

| Ride standing | Vehicle | Priority seating | G |
| | | Vehicle stanchions | F |

| Waiting situations | Bus stop | Shelters with safety provisions and adequate seats | G |
| | Terminal | |

Table 4. Summary of bus and trolley guidelines. (From Abt Associates, Transportation Needs of the Handicapped)
Fig. 3. Waiting shelters at bus stops. Wind protection; infra-red radiant heat; stanchions to help passengers sit and rise; lighting for reading and safety; transparent walls for safety; splash guard at curb; timer indicates most recent bus, time to next; ticket-selling machine; sheltered space for wheelchair. (From Abt Associates, Transportation Needs of the Handicapped)
ABOVE: Powered lift in bus functions as steps and platform, extendable portion bridges to curb.

RIGHT: Sections moving together to form platform.

Fig. 4. Powered lift in bus. (From Abt Associates)
Fig. 5. Urban Transit Bus. (From Abt Associates, Transportation Needs of the Handicapped)
Table 5. Summary of Train Guidelines. (From Att Associates, Transportation Needs of the Handicapped)

<table>
<thead>
<tr>
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<th>Effectiveness</th>
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<td>Travel Barrier</td>
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<td>Seating</td>
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<td>Step hand-rail</td>
<td>Vehicles</td>
<td>Extend to platform</td>
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<td>Long walking distances</td>
<td>Stations</td>
<td>Terminal vehicular system&lt;br&gt;Moving sidewalks</td>
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PROVIDE RAISED PLATFORMS AT ALL STATIONS

RADICAL RE-DESIGN OF SYSTEM
Lower car floors, reduce or eliminate boarding steps

BUILD PLATFORM LIFT INTO CARS
Install in some or all vehicles

PROVIDE PORTABLE POWERED LIFTS AT ALL STATIONS

Fig. 6. Possible Improvements in Train Boarding, in descending order of probable cost. (From Abt Associates, Transportation Needs of the Handicapped)
POWERED LIFT INSTALLED IN EXISTING STATION STAIRS

Platform stored flat against wall until summoned to either end of stairs. Folds open to carry wheelchair, person on crutches, or cardiac invalid (on folding jump-seat) who also controls manual brake supplementing automatic one.

Fig. 7. Powered lift installed in existing station stairs. (From Abt Associates, Transportation Needs of the Handicapped)
Table 6. Summary of Air Travel Guidelines. (From Abt Associates, Transportation Needs of the Handicapped)

<table>
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<tr>
<th>Travel Barriers</th>
<th>Location</th>
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<td>Terminals</td>
<td>Gangways</td>
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<td>Hydraulic lift on stairs</td>
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<td>Clear route markings</td>
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<td>Baggage Handlings</td>
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<td>Curb Check-in</td>
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<td>Handrails</td>
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<td>Aisle and doorways</td>
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<td>Fold away seat entrance</td>
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<td>Use of galley entrance</td>
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<td>Travel Barriers</td>
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<td>Chairs attached to floor</td>
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<td>Handgrips on seats</td>
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Fig. 8. Electric Interior Bus in Terminal. Carries passengers and baggage through long corridors. (From Abt Associates, Transportation Needs of the Handicapped)
Fig. 9 Elevator car functioning on a 30 degree incline, as viewed from lower level. (From "Barrier Free Rapid Transit", Potomac Valley Architect)
Fig. 10 Elevator car functioning on a 30 degree incline, as viewed from the upper level. (From "Barrier free rapid transit", Potomac Valley Architect)
Fig. 11 Plan of elevator car system functioning on a 30 degree incline. (From "Barrier free transit", Potomac Valley Architect.)
Fig. 12 Section 'A' (longitudinal section) through elevator car system functioning on a 30 degree incline.
(From "Barrier free transit", Potomac Valley Architect.)
Fig. 13 Section 'B' (cross section) through elevator car system functioning on a 30 degree incline. (From "Barrier free transit", Potomac Valley Architect)
Fig. 14 Section through elevator car functioning on a 30 degree incline. (From "Barrier free rapid transit", Potomac Valley Architect)
Fig. 15 Plan of elevator car functioning on a 30 degree incline. (From "Barrier free rapid transit", Potomac Valley Architect)
INFORMATION SERVICE

Quality in communications is a resource needed and sought after by the physically disabled. They rely on either previous experience or competent information on the environment, especially the environment of moving systems. Transit information is presently inadequate, as there is no systematic way of communicating transit information to the consumer. In our age of such advanced technology, we as a society still have not captured the technique of attitude testing, successful advertising and improving communication channels simply because of economic trivia. Schedules are confusing and require patient telephoning and decoding systems; system's operators are usually uncertain. Therefore either massive attention is spent on developing efficient information systems or authorities pay the economic burden of supplying an effective media.

In line with the above examples, a promising approach to studying latent demand for transit services is to identify and measure the interest of individuals or groups and then establish the role that transit can play in satisfying those interests.

Information, Communication. Operating modes must identify research factors for the waiting passengers. The information must be provided clearly and effectively; it must be instantaneous and direct. The implications of more and better information aids would: 1) increase the number of riders using more than a single route, 2) improve attitudes toward public transit, 3) increase knowledge of the transit system as a whole, 4) decrease satisfaction with information currently offered.

Information and Route Identification. Useful design criteria for improv-
ing the quality of information in transportation systems range from waiting point markers, destination markers, time table information, route dry runs, and graphics.

Stations: Be seen clearly at half block distance
Indication of services (or lines) using the stop; if more than one, then color graphics may differentiate
Starting points (heavily serviced areas)
How one may reach other routes
Indication of which part of the line you are on, where transfer points exist, points of interest, map of the area
Other specific information (station attributes, location of elevators, ramps, escalators)

Reflexive information - Destination Markers:
Each service provide a specific symbol on specific markers
1. Large lettering
2. Bold face type
3. Graphics to reduce words

Destination information
1. Type of service
2. Scenery (on-route visual experience)
3. Install on new buses as well as old

Responsive information - Scheduling:
Take-one time tables or information
Push button audio devices at transfer points indicating stations, major stores
Disseminate through media, movie theaters, shopping center, TV, paper

Experience Information.
Diagramming can be effective in a frame which the user can associate with
1. Beginning, end, transfer point route diagrams are effective for long travel
2. Diagrams which relate the route to community, show facilities (shopping, historical, civic)
3. Diagrams which relate time to stop interval
4. Downtown areas transit in relation to shopping areas

An example of graphic impact is the work of Cambridge Seven and Boston transportation system. The symbol \( \text{T} \) is well known to people of metropolitan and suburban areas of Boston.
Concept of Rapid Symbol Change. Usually there exists a variety of advertising schemes. Advertising can be as attractive as it is informative. The concept of association usually implies a reflexive (instantaneous) or responsive (time-lapsed) association. Advertising should not be displayed so as to detract from the reflexive information provided by the service system. Small, conveniently placed, attractive displays may appear inside actual transit vehicles unless sufficient information is provided by service information systems. If graphics must be used, they should be uniform in nature, minimum in display, and in no way reflect service system graphics.

A pleasing, yet informative, environment can stimulate without the lavish display of unsightly billboards, ribbons, and flyers. A system which allows aesthetic processing can be stimulating and soothing as well as entertaining and educational. We must cease our incessant reaction to post signs and display our wares. Television, newspapers and other media are capable of handling this kind of advertising.

USERS NEED CRITERIA

The physical values for level-of-service may be defined as users need criteria. These indices reflect the human behavior and attitudes as identified with respect to transportation psychology.41

1. Reliability, Confidence
   - Arrive without accident
   - Avoid stopping for repairs; fewer breakdowns
   - Reliable vehicle schedule

2. Travel Time
   - Arrive in shortest time possible
   - Travel in light traffic
   - Arrive at intended time
   - Shortest distance route
   - Avoid changing vehicles; easy transfer when necessary
   - Ride in safest possible vehicle
   - Travel as fast as possible
3. Weather
   Protection from inclement weather while waiting
   Improvement of stations
   Auxiliary facilities

4. Cost
   Small total cost (fare + revenues)

5. Vehicle Condition
   Clean
   Modern equipment

6. Avoid unfamiliar areas
   Maps

7. Self-esteem
   Ride in uncrowded vehicle
   Feeling of independence; route relocation, freedom of choice
   Flexibility
   Avoid more than 5 minute waits
   Comfortable ride; vehicle comfort, quality of ride
   Pride in vehicle

8. Diversion
   Listen to radio
   Talk to family, friends; accommodate group
   Ride with people who chat
   Look at scenery
   Chance to relax
   Chance to read

9. Convenience
   Frequent Service
   Avoid long walks
   Informative waiting
   Restrooms

10. Packaging
    Adequate clearance for package and baggage

11. Fare Payment
    Quick, easy
    Lower rate of off hour travel

CONCEPTS OF SPECIALIZED SYSTEMS

The real cost of varied urban existence for the disenfranchised is relatively greater than for those who are financially secure enough or physically capable of adapting to our present systems. This real cost can be measured
in terms of home employment opportunities, limited choice of residential rates, dependence on others for mobility needs, relative non-accessibility to cultural activities, difficulty in reaching public facilities for socializing, and costly monetary outlays.

These costs backed against the lack of alternatives in the range of urban travel leave the physically disabled and other disenfranchised groups to develop a method for meeting their specific demand, usually resulting in excessive burden on their family, friends, neighbors and economic resources. While the options look bleak, there does exist within the system an opportunity to provide for the demand, yet reduce the cost below that of present personal transportation (e.g. taxi service as it presently exists). This specialized service could satisfy most shopping, medical, recreational and employment needs as well as eliminate the deficient quality of service, measured by various comfort and convenience criteria. Minor modifications in street flow patterns to accommodate transit travel, design of pleasant vehicle interiors, reduced vehicle size, and greater service frequency during off-peak hours are merely suggestive of areas for systems modification.

Modifications to existing systems, no matter how intensive and extensive, can do little to broaden the range of opportunities for sectors of areas where transit service is literally non-existent. The concept of a specialized service is a tool for transit planners to try to provide a service that can rival that of the private automobile in terms of its favorable aspects. Each system could provide an opportunity for mobility for those groups which are mode-dependent, while providing a more personal redundant service for those who are not. A service such as this would equal the degree of penetration and coverage of taxi service. This type of service could offset the corridor orientation of present systems. As a system its characteristics would
be maneuverability, flexibility and availability. It would offer users interaction with their environment with regard to location and time of day. Identifying this specialized system, the concept of "range of requirements" can be expressed more precisely. The system is not in any way meant to supplant existing public transportation systems, but merely to supplement them.

The most obvious consideration of a specialized system should be the mobility idiosyncrasies of the population constituting the market. These factors will introduce design constraints which suggest requirements for specialized systems, special vehicles and services. A specially equipped dynamically routed system has a great potential for meeting the demands of the physically disabled. Since access and egress points vary as to design and barriers (physical), origin to destination may be a prime factor in the system's operation. The processed communication systems, scheduling, and information relay can be considered in various ways—individual contact, radio dispatch, telephone, mailing systems. Application and ultimate use will depend on the demand for the service. Vehicles may vary depending on frequency or type of disability they will encounter. While van type vehicles are most functional, checker cabs altered to "handicap" vehicles may be more convenient for long ride destinations. However, vans are more flexible in spatial organization, and they can carry more passengers and adaptive equipment. One aspect of vehicle design which requires engineering consideration is accessibility functions. Procedures of access to either cabs or vans becomes critical to the inexperienced. Figures 16 and 17 give an example of a vehicle which is a cab, but also can serve the wheelchair user.

Existing in Pittsburg and a few other major cities are other handicap service systems providing transportation of the physically disabled. Usually these are run by taxi companies, therefore there is no real concern for this
Fig. 16 Redesigned taxi. Service for wheelchair, crutch users, everyone.
Fig. 17

TAXI

door and ramp
operator-controlled

gliding door

indicator of
disabled passengers

fold-out ramp
aspect of the business. Often vehicles are poorly kept and drivers have poor judgment qualities while the complete system tends to be high economically and low qualitatively. Hence, service demand is small and their existence is minimal—filling little of the potential demand.

The concept of selling is quite important—the ability to sell one's products through information channels, not only telephone or friend, but a need to develop effective media—selling to a wide range of users—the chronic heart and respiratory patients, the very poor, the elderly. The market is potentially infinite. The system has many virtues; inexpensive, safe, personal, convenient, quality service, experienced drivers, out reach service between city and suburbia, use as institutional vehicles for sightseeing. A service such as this could act as a data bank for the resource of the physically disabled, bringing people restricted to just such a service as this where public transportation is unable to meet their needs. Efficient use of vehicle demand can reduce scheduling. The concept of peak hour service contributes to nothing but overloads resulting in high fares. Since demand between captive riders—the physically disabled and the elderly, is similar to that of the general public, the system will probably have a great peak hour demand as well as an overcapacity of service during off-peak hour periods. These vehicles could expand the capacity of the physically disabled to attend schools, colleges, vocational training. Such vehicles may become essential transport within medical facility complexes or within college campuses. It could offer night time service and delivery. With development of future housing programs, these vehicles could be the primary link from house to nearby activities. It could be incorporated into the design plans of the housing complex.

Dial-a-bus is the most common name given to a system of buses whose routes are determined by individual requests, while the service is in motion.
This service provides operations at a level of service between that of a taxi and that of a bus. Selection may be personal or automated. Operating costs are reduced below taxi-cab levels by simultaneously carrying several people in each vehicle. The realistic aspects of "dial-a-bus" specialized systems can be seen more clearly in a general view of the systems operation. A transportation design, no matter how advanced in concept operates as a homogeneous system, i.e., many components to compose the larger system. Viewed in this manner, the design of a new vehicle must derive from the system in which it is expected to operate. Three major objectives have been pursued in this effort:

1. An investigation of the economics to identify significant improvements that can be brought about through new vehicle design.

2. Specific data relating to use application.


This examination can serve to identify what characteristics are required in a vehicle and how such a vehicle may be most efficiently used in existing operations and for future services. From such a broadened viewpoint, community benefits such as the provision of transportation services for those who are unable to pay for it, or a low fare system for circulation can be put into effect.

Policy Proposal: A Direct Approach. Fleisberg, et al. recognized the need to establish new systems toward meeting the transportation needs of the elderly and physically disabled. Using existing systems as the taxi service may be an effective method for the following reasons:

1. Taxis presently own capital outlay and established companies.

2. Scheduling and information processing is fairly established, eliminating the need for training new dispatchers.

3. Establishing new service will create hostilities amongst established firms, legal action may entail.
4. Taxis are available, new vehicles are not needed.
5. There is familiarity with the existing taxi service.
6. Taxis can be barrier-free vehicles—automobiles adapted to a functional service. Revenues from increased demand could buy functional vehicles.
7. Fares could be fixed, and not based on calculated meters. There could be a zone-fare system.
8. Communications can be leaflet advertising, TV, mail, newspaper ads, word of mouth.
9. Change in taxi regulation (change of metered fares); City Council regulation changes.
10. No subsidy needed.
11. Change in operating staff—write legislation, control scheduling.
12. Group riding not presently accepted, would be encouraged.
13. Cabs will be used more efficiently.
14. Advertising campaign to teach people to use the system would be conducted.
15. Ways of operating rated according to efficiency (based on cost):
   1. many-to-few—most efficient
   2. fixed routes
   3. door-to-door—most inefficient

In conclusion, the recommendation of a converted taxi system approaches the needs of mobility for disenfranchised groups, but the high level of service provided cannot be as low as public transit. However, improvement in the area of design of transportation will yield benefits to all operations regardless of service size. Crucial access requiring improvement are overall transportation system, vehicle design, station function and intervening environment. Advantages offered would be lower investment cost, higher maneuverability, faster access and security benefits. Significant improvements in demand offer new service, new design. Productivity can provide new and better systems operation and services. Until a testable system is constructed...
with the objectives of satisfying social needs, we will be limited to small scale experiments and ad hoc solutions of a specific nature.

**RESOURCE VEHICLE—FUTURE PEOPLE MOVERS**

It seems extremely unlikely that public transportation in existence will be able to accommodate the needs of the severely disabled or the physically disabled child. As a group they need individual services and facilities in terms of vehicle speed, vehicle design, mechanical support and individual care. The variation of services and facilities required among these individuals precludes the use of a standardized type of public transportation system. But they should not be excluded from environmental use because of their physical attributes. They still must be offered the opportunity of public interaction. While demand trips may not be as great, there is still a high utility rate for these people, utility being essential trips such as to work, medical facilities, school, shopping, social services. Much of these needs can be covered by the system of specialized vehicles. Transportation as a system can provide more than pick-up and delivery service. It could be a vital resource to special education facilities, hospitals, training center, rehabilitation centers.

A resource vehicle would be a resource tool, an instrument for helping to bend, mold, and shape some social structure back into life. One intrinsic value may be an educational facility, like a visiting laboratory service. It could provide an education unit, with multi-disciplinary values far too numerous to comprehend. Such a vehicle could be developed with the system's requirements as standard as for those of a specialized system. Technology demands a vehicle, electrically powered (or nuclear) with no obnoxious or lethal gases, that can be banked at readily accessible points. Computers have the ability to keep track of and run the vehicle (as in BART—Bay Area
Transit).

We must make virtue of this concept as a wave of the transit future and the fulfilling aspect will be the new interchanges created—the facility and the provision for the interface between and among modes. We have enough technology of movement by water, land or air, but we still are in the stone age of accommodation for the meeting of these technologies. The next great breakthrough in transit will not move at all! It will be a structure, an organism, which will sort out the people, goods and communications which are not to stop but to go on to endless varieties of destinations. For people, the interchange will encompass the range of human interest to augment and expand the validity of the resource vehicle.

Study Objective: A Resource Vehicle—Study done by Grumman Health Systems. An Improved Vehicle for Environmental Apprehension with Focus on the Wheelchair User

Naturally problems existing are the typical dynamic problems of vehicle design. Noise, conditioned ride, sealancy (drafts and leaks), physical geometry, on-loading, securing and off-loading all add to the dimensions of interior geometries.

Vehicle objectives. To provide a vehicle for prototypical use that can provide aspects of a system intended for study activities as well as multi-disciplinary uses, such as laboratory, rehabilitation, recreation (see Figs. 18 and 19). As a multi-disciplinary vehicle its role as a daily service vehicle is difficult to translate in terms of daily activities. Operation characteristics will depend largely upon its location, use and owners. Functions for special education or school will not be the same as for hospitals, rehabilitation centers, etc. Necessary implementation procedures will depend again on its function in terms of use and the ability to do subordinate activities. We are not trying to lay out a concept, only develop the systematic
ADVANCED CONCEPT SYSTEM

Fig. 18. Resource Vehicle. (From Grumman Sys.)
Fig. 19.
TRANSPORT/EDUCATIONAL ENRICHMENT
theory for engineers and hospitals to develop resources in terms of need.

Vehicle as a Tool. A vehicle which enriches lives while standing parked and moving is more than a piece of equipment; it is an apparatus which aids in the environment, enriching people's lives. It could extend the learning process to include travel time, so as to utilize previous wasted time for furthering the physical and intellectual development of physically disabled passengers (See Figs. 20-22). While these concepts are invigorating, we must not be apprehensive because this is a challenging and stimulating concept. Pitfalls may be the dynamics of the problem, many things are yet to be solved. Users will have to determine prime use vehicular ordering and planning stages for their particular vehicle.

This synopsis attempts to illustrate the need and solutions for an extracurricular learning vehicle. With the new technique demand for education, we believe that transportation poses the right geographic and sociological spatial convenience to increase achievement and participation. Development of systems profile allows for analysis at virtually all processing stages. Profile operations defined by a series of operational events will be used to develop guidelines which should be operational requirements. The objective is to provide an end product oriented to specific operations that is designed and adapted to the problems of the physically disabled rather than requiring them to adapt to the vehicle.

Design Guidelines: Communication of emergency alert
Locking and securing of wheelchairs
Personal equipment storage
Storage of technical aids
Environmental control
Maintenance

At this stage, engineering studies are required to determine cost-effective implications of vehicles, service life and operational characteristics, with the objective to install reliable hardware at minimum cost consistent
Fig. 20. CLASSROOM SUPPLEMENT
Fig. 21. INTERIOR OF NEAR-TERM VEHICLE
Fig. 22

SUMMER RECREATION CONVERSION
with all required functions.

**Environmental Guidelines:**

Temperature and humidity systems to control the vehicle environment and eradicate cold, hot, moist conditions.
Acoustic systems which will reduce undesirable noise and reflected sound by energy absorption and special panels.
Shock and vibration systems to minimize the effects of impact.
Stabilization system to minimize the effects of cornering and pitching.

**Safety Guidelines:**

Automatic floor and wall locking devices to anchor wheelchair with electric failsafe locks.
Safety belts which permit body movement but retrack during any sudden jerk (during an emergency)
Fire indication devices and extinguishing system (liquid-foam).

With concepts of enhanced systems, it is necessary to try them on-board a conventional vehicle, using conventional equipment and construction technologies. The vehicle becomes a tool when equipped with a modular floor pattern, walls and ceiling reinforcements that can be furnished to evaluate the multiple usage concept.

**NATIONAL MASS TRANSIT BILL**

The following provisions for the physically disabled were included in a current mass transit bill:

1. It is up to the states and cities to take advantage of $46.5 million authorized for this purpose by new national policy.

2. It is an opportunity for disabled and organization interests in disabled to work together to get transportation services which meet special needs of the disabled.

This amendment was offered by Rep. Mario Biaggi (N.Y.).

"It is hereby disclosed to be the national policy that elderly and handicapped persons have the same rights as other persons to utilize mass transportation facilities and services; that special efforts shall be made in the planning and design of mass transportation facilities so that the availability to elderly and handicapped persons of mass transportation which they can effectively utilize will be assured; and that all Federal programs offering assistance in the field of mass transit
(including programs under this Act) should contain programs implementing this policy."

The national policy amendment states that the Secretary of Transportation, in addition to making grants and loans for improvement of mass transit generally is authorized to make such grants and loans "for the specific purpose of assisting agencies thereof in providing mass transportation services which are planned, designed, and carried out as to meet needs of the elderly and handicapped." It also provides that of the total obligations for the overall program made by the Secretary, "1 1/2 per centum may be set aside and used exclusively to finance the programs and activities" mentioned above. A similar percentage of "any amounts made available to finance research development and demonstration projects," may also be reserved.

Rep. Biaggi told the House that an estimated 44 million aging and handicapped persons, including veterans of World War II, the Korean War, and Vietnam War, need assurance that they will not find public transportation systems impossible to use. He quoted committee testimony of J. B. Martain, Commissioner on Aging and Special Assistant to the President for the Aging as follows:

"The design of transportation facilities can contribute almost insuperable barriers to some older persons...The lack of access to transportation, for whatever reason, can also result in difficulties in shopping and carrying out their day-to-day activities necessary to assist the older persons in maintaining their independence and ability to remain outside homes for the aged, nursing home or similar institution."

PRIORITIES

1. Supplement existing public transportation for adaptation for the physically disabled.

2. Special supplementary transportation system such as Dial-a-bus which comes directly to the door as demonstrated in Cambridge.

3. In non-urban areas, work needs to be done on rural transportation.
4. M.E.T.A. board needs a representative who is physically disabled or an expert familiar with their needs and problems.

5. Federal subsidy with matched percentage of local subside, to assist manufacturing firms in new design concepts.

footnotes


24. Ibid.
25. Leland Hazard, op cit.
28. Ibid.
30. Leland Hazard, op cit.
32. Rensselaer Research Corp., op cit.
33. Hoel, op cit.
35. Hoel, op cit.
36. Ibid.
38. Leland Hazard, op cit.
40. Rensselaer Research Corp., op cit.
41. Ibid.
42. Hoel, op cit.
44. Ibid.
45. Rensselaer Research Corp., op cit.
47. Hoel, op cit.
48. Ibid.

49. Leland Hazard, op cit.


PART 4

COMMUNITY
INTRODUCTION

This section deals with community as a traditional, but innovating concept—the environment as a support system for the wheelchaired person. It focuses on the ways design regulations, opportunities and constituency can influence the physical performance in using the environment as well as increase response and the full delivery potential of a service system.

Establishing this premise, the concept of community, while traditionally looking at transportation, employment, housing, seeks to develop a structure that allows environmental specialists to analyze little before discussed qualities of the environment in positive, more catalytic interpretations of environmental quality—perceiving and conceiving of it as an index of aid measures which in turn support and reinforce ones use and knowledge of his sense of place and his functionality within that space.

Thus we are speaking of an environment that is community oriented, continually reinforcing the concept of community and the desire to participate in a communal environment through the comprehensive attitudes towards the use, the physiology of environmental perception, functions and interpreters. Rehabilitation consists not simply of the correction of, or compensation for disability, but rather the development of a way of living, and this must inevitably be conditioned by the patterning observed and defined in the community. While this study focuses on community development processes, we have tried to keep in mind the ways in which community contributes to and in turn is supported by the more traditional concerns. Particularly employment, transportation, housing, social and rehabilitative service, and physical and psychological adjustment are relevant. In the same way we have sought to show that while the community needs of the wheelchaired are in some ways unique,
they represent a process that maximizes participant use and representation--
the environment as a support system.

We speak repeatedly of the wheelchair user, the handicapped, or the dis-
abled, but these terms should not suggest a monolithic subset of persons.
The wheelchair users as a group appear to have more dissimilarities than com-
mon attributes. They represent a variety of social spheres in terms of age,
income, education, race and potential, as well as being a minority group whose
geographic locale does not constitute a given area. This dispersal of wheel-
chair users reduces their impact in any given community and it is at this com-
munity level that many crucial decisions are ultimately made. The absence of
any strong political base frustrates efforts to produce effective and immediate
response to environmental need outlines for their use. Given the variety and
dispersion of persons who might benefit from housing and community designed
to accommodate those with mobility problems, any solution or strategy suggested
here must not be taken as a final solution.

Whether a compromise community oriented solution is an adequate response
to recent needs of the wheelchair user depends upon what larger community stra-
tegy is designed and implemented. At the same time, differing modes of com-
munity needs require alternative suggestions for proposals and development
to reflect particular needs and interests. This plan, while limited in scope
is designed as a first step or the most immediate response to mobility solu-
tions. It does facilitate an opportunity to demonstrate ways in which commu-
nity, rehabilitative, transportation services can provide mutual reinforcement
when undertaken as an integrated package.

Indeed the necessity of viewing technological, social and behavioral ser-
vice research and development requirements is inseparable in a strategic approach
to improving the quality of life with respect to overcoming obstacles to imple-
menting present policies and founding new program instruments. Development of community, programmed for the wheelchair user supports project research as follows:

1. Local governance, state and federal; studies of ways that different types of governments function in developing responsive social environments.

2. The advisibility of transferring functions from one to another form of government.

Fiscal policies and the provision of public services at local levels:

1. Studies of the impact of the property tax on location decisions, land use, housing maintenance.

2. Potential benefits of new legal definitions of ownership.

Social and institutional setting of housing programs:

1. Alternative supportive measures of housing quality.

2. Functional criteria for density control.

The above are made with respect to the successful implementation of available technology and to provide a base for further social and cultural program development. The possibility that programmatic intentions are diverted by the intrusion of unanticipated or poorly understood process should be systematically investigated by studies of the ways in which the private sector organizes itself to participate in land and housing development, and in government based programs of community improvement. Research should be initiated to provide systematic data on the organization of the lending, insurance, and building components of the housing industry, the organization of "new town" entrepreneurs, the organization of private redevelopers for participation in urban renewal and similar programmatic efforts.

A series of carefully chosen large scale experiments should be undertaken to explore the significant applications of balanced systems for community development. The potential opportunities of the community as a service center
concept for the organization and distribution of service should be studied and evaluated. An early stage of the research should explore appropriate layouts and combinations of facilities. The feasibility and usefulness of sophisticated systems for non-discretionary services should be evaluated in several communities and several variations. Further efforts should be made to encourage further development needed for adapting the performance criteria concept as a possible alternative to the design of specification-type building codes; and research for low cost housing should seek a means to reduce all cost demerits, especially those outside construction, and should consider the mixed utilization of construction, refurbishing, upgrading and relocation.

ESTABLISHMENT OF COMMUNAL GROUPINGS

While the formulation of the contemporary urban city is in fact an intricate arrangement of various groupings, relating to all aspects of the human personality, descending from the city itself through interest groups, religious groups, club orientation, down to the family itself, they all share a common attribute—the exclusion of the physically disabled. As a group, the physically disabled share all the common desires of other groups as well as policies toward a more physical supportive environment.

This simply means the ecologically planned community must be planned with design regulations which are supportive of the physical needs of the physically disabled and able bodied alike. This requires consideration beyond the architectonic, and the understanding of use, as to the form which will significantly determine the nature and performance of the entire community—designing for opportunities to interact at one's level of physical endurance, yet to claim the activities of innovative planning. The degree to which this cohesiveness is obtained depends to a large degree on the number of facilities
fig. 1
ELEVATED PLAZA/WALKWAY SYSTEM
(FROM CEDAR-RIVERSIDE ASSOC.)
provided, on the services which they represent, on their scale of response, and their placement in terms of communal organization to assure and assist in decreasing stress barriers.

"Community spirit" is a method of influence determined by the mental and physical performance achieved in community use and interaction which as an attitude, is a consideration of environmental quality—human comfort, human maintenance, form as a supportive construct, sense of life, and opportunity to perform in security with a sense of achieving. It is apparent that accessibility to varying degrees of contact and subgroup relationships will develop definitions for planning purposes. To functionally accommodate such latency, strategic development of design constituency anatomy should be incorporated as hardware of any barrier elimination. Components of development might be the interaction in the private and public society, the unity, the biological, institutional and educational expediences. Community scale which encompasses groups of larger scale, has to provide for certain interests which surpass the subset of intercommunal group barriers. These concerns can be vital to the community development as it applies to large and small scale—interior and exterior interaction.

MULTI-DISCIPLINARY PLANNING

The ability to innovate within a development plan results from perception of planning as a process as well as a set of concrete ideas. The constant reassessment of ideas and goals should be a continuing part of the planning process. Why is the use of the environment an important consideration for planning bodies? Perhaps the environment, far from being a theoretical construct or a map pattern, is in reality a world that envelops the lives of its inhabitants whose daily and weekly journeys range through large sections of its structure, whose activities are protected and guided by its spatial form. As
such, it is an accumulated environmental experience, with political, social and economic meaning for each participant. The quality and coherence of their world depends upon, among other things, being considered in a coordinated way at the larger and smaller scales.

When analysing the environment as a supportive agent (metropolitan evolution in particular) one is struck by the lack of objectivity and relatively primitive state of the art. Planning has evolved such a high propinquity for form and structure that real objectives to achieve maximum levels of human performance are unclear, general and vague, often emerging from a narrow base of interest. Goal formulation must include decision theory of the whole breadth of environmental problems and recognize that various parameters of social and other variables by which parameters are made operational are interconnected at many points. The objectives for metropolitan design must satisfy a set of needs, whether those needs are physical in nature for such control groups as the wheelchaired, elderly and young, or cultural, to promote racial need satisfaction. The planner, based on community objectives, has the task of stating his need, then to further investigation for the political machinery of decision making to decide on their ultimate relevance.5

We choose, as did a study by the Joint Center, to concentrate primarily on the important objectives of improving general accessibility within the metropolitan area. These should be considered as background in the present discussion which will focus on the direct effects of the physical environment of the wheelchair user—effects which influence his health, security and comfort and opportunities for choice, self-development, and enjoyment. He should feel at home in the city; he should be able to perceive and structure it clearly in order to plan his life around or through it. He should have a chance to develop, if he chooses, an awareness, understanding of, and involvement
children's recreational resources must be part of the total development planning for FAMIES.

fig. 3
of its workings, meaning and form. Finally the environment should be an inter-
preter of environmental sense. One should be able to derive entertainment,
enjoyment; in return the environment should respond as a catalyst and increase
participation by supportive facilities.

Community success, whether old or new, planned or unplanned, built piece-
meal or in one fell swoop, is the feeling of identity generated by the environ-
ment upon all the individuals and families living within the area. Assuming
that the individual dwelling units are well planned and executed so as to fos-
ter a high standard of living, one must follow through from this important
base. Housing for the wheelchaired, elderly, student, married couple, rich
and poor should be a part of larger concentrations of dwellings for the wel-
fare that permits a stimulating mixture of persons with varied backgrounds.
The exploration of all potential means of developing new housing including
condominiums, cooperatives, special housing which assures a balanced community
will provide the maximum of individual choice in style and cost.

In planning a community, interior spaces must relate to the exterior
spaces, both in access response, removal of impeding barriers--thresholds,
wide grill plates, poorly designed doors and hardware, so that there is an ea-
sy transition from one to the other, both visually and physically. This means
providing a means for safety and protection. These should be part of the
function of a well planned, lighted and ventilated lobby, and perhaps garden
courts with sliding partitions depending upon the nature of the structure.
There is tremendous importance in this focal area--the entrance. While entry
should provide a focal point, it should also offer hospitality to all neigh-
bors, people with a variety of physical traits, the walking as well as the
chairbound.

The process of returning home should be an eager experience, whether by
fig. 4
PLAZA ARCADE
(FROM CEDAR-RIVERSIDE ASSOC.)
elevator, stairs, garden courts, lobby, etc. The concept of a provision for more than one entrance is also a highly feasible and desirable attribute to accommodate all apartment structure types. When one comes home, he should be met with rewards of environmental comfort, privacy, relaxation, recreation and solitude (from neighbors) upon entering his own unit. This feeling must prevail for housewives with baby carriages, the chairbound, elderly, children of all ages, the tired wage earner. The environment must be developed so as to offer support, and perceptual and functional identity. This task must be accomplished while providing the necessary indoor-outdoor spaces for all ages and physical capacitance groups.

The quality in space which encourages a strong, positive identification within its residents is hard to define and more elusive to design. Design for a supportive environment must consider use potential as impact on environmental change; landscape materials to structure a high degree of performance for wheelchairs, carriages, elderly and children; site planning as a tool to serve as informant to environmental perceptions and functions in the use of vegetation, topography, texture, view, patterns, and visual built form; art as an association of place and use, as well as to add information about activities, direction, etc.; and architecture used to influence space perceptions to control harmonious movement within and without a planning sector. The goal is to expand the potentiality of any given element by examining parameters which have an effect on the original concept which will increase man's physical performance in the environment.

In far too many of our metropolitan areas there are treeless streets, strewn with garbage and reeking of vile odors, the composite glare of restless neon lights, billboard advertising at a hectic pace, dangerous traffic intersections, harsh street noises and ugly furniture. Just as a city's streets
should not be fast-paced dilemmas from origin to destinations, so entering a community should not be solely to arrive at a dwelling unit, but also to enjoy the time going thru the community without a vast array of inhibitors. Thus we must eliminate blighting influences such as overcrowding of land, traffic congestion, and ineffective or obsolete use of land.

Comprehensive planning should provide for pedestrian and vehicular separation and efficient space usage including the provision of open space, yet offer shelter from inclement weather. It should be a development of a convenient, efficient, safe and physically accessible circulation system for all modes of ambulation--wheelchairs, walkers, bicycles, automobiles, and buses, separating pedestrian and vehicular traffic, and major institutions and other developments with a climatically controlled walkway system. Unfortunately, there is no formula in designing for fulfilled living. Everyone must develop his own senses.

At the designer's discretion, the private yards, the semi-private and private entrance areas, the enclosed courtyards opening into the larger spaces of various sizes, characters and purposes of such must be integrated by and into a meaningful and sequential whole. Healthy clear movement patterns will be characterized by resilient, nonslip surfaces, smoothly contoured, no banking, curbing, or sharply intersecting planes. Movement corridors should provide for sensual perception for the blind; it should provide traction, but not retarding friction concourses; should have an ease of maintenance and long life duration. Artificial green surface provides good play areas and allow moderately easy wheeling of wheelchairs, carriages, carts, wagons, etc. In throwing various groups of people together--youngsters, oldsters, housewives, people with varying degrees of functional limitations--the chairbound, blind, etc., one encourages an intermingling of the surroundings which are pleasant,
Fig. 5

PLAZA LIFE
(FROM CEDAR-RIVERSIDE ASSOC.)
enjoyable, and accessible to all. Areas should be placed so as to cause a natural and fluid gravitation by those in similar groups, and with similar outdoor space pursuits to the same respective areas. Under such conditions there is a good heterogeneous base for mixing as well as a chance to develop relationships on a homogenous level.

Design for a sense of stability, for predictibility, for efficient travel, for the opportunity to choose, even for a sense of social and political coherence. A well structured environment is essential. Coherence, the inter-relation between parts, can be achieved in three principal pays: through the continuity of circulation patterns, through the visibility or what might be called perceptual accessibility of one part from another, and through character patterning—the repetitious rhythms and regularities of characteristics throughout the spatial pattern. The identity of a place, street, or district will depend on its perceptual intensity and singularity; its visibility and symbolic significance. Survey techniques need to be developed which can approximate scale degrees of identity and diversity in the environment. With these techniques, it is possible to record qualities, intensities, gradients, and contrast in patterning, to focus on problem areas and potential assets, and thereby enable that community to understand more clearly its value and role in the existing structure.

INTEGRATION OF PUBLIC WITH PRIVATE

Different levels of socio-economic communities will require appropriate and responsive auxilliary facilities. Rather than providing spaces for services which might only have limited application in the future of developing potentially unusable space, the idea of flexible leased space can be introduced. These concepts for new growth centers will create new uses and qualities unique
A large residential "community" linked to active commercial development creates enough population density to spin off opportunity for other service industries:

Fig. 6
in character. The specialization and rivalry between old and new patterns will mean a diffusion of uses. With this concept, space will be leased by the developers to public entities as well as private groups. It can provide needed public services to the community. Leased space will permit a modification of services in later stages of growth and the space will promote multiple use of existing facilities. This will allow for a core to be adapted to an existing community using open space textures and policies. Nursery and primary schools should be included, as should senior citizens have their facilities, too. The cultural development can be a very rewarding experience for a young child. The development of delivery systems for community service should also be investigated.

The economic implications to adequately fulfill the considerations presented, might at first suggest a staggering toll. Expensive design is not the acid test, however, as to whether or not a community is vital, but rather design at a human level, which can be carried out in a surprisingly low budget. If people like living in a place, they will put up with what outsiders might consider severe shortcomings.

We have placed emphasis on community cohesive forces because the first real step in developing any processes and goals will be implemented at the community level. Before the wheelchair citizen can gain access to the total environment he must first be properly situated in common communal orientations. The way to avoid isolation is through the functions of inter-relation and inter-dependency between new areas and their urban spaces, through functional transport systems, dispersal as a means of achieving accessible public facilities, etc.

It may seem strange and therefore require some defense, that we are in a discussion which primarily deals in residential community, now discussing commercial activities. It should be obvious that one cannot disassociate the
DRUGS, I. e.,

consumer services and empowerment opportunities can be one and the same.

Fig. 8
Fig. 9

medical - neighborhood

Dental Services
two. Even if we disallow for the moment all of the sociological implications of commercial activity, we must realize that in a community of any significant size some provision must be made to provide services for any goods which residents desire. The laundromat, corner drug store, grocery store, soda fountain should be casual contact centers. Commercial areas may be either dispersed for local communal accessibility, decentralized for inter-neighborhood interaction, or centralized for inter-community interaction. The final decision will depend on how the planner sees the social structure of the community, its needs in terms of meeting existing physical criterion and social structure, and how he balances these forms of interest.

Commercial services, as well as the programming of them, provides the planner with an important tool with which he can combat the island danger and bridge any gap which may exist. Clearly the mercantile needs of people who use community services cannot have their needs completely filled, but provision should be made for types of activities that fill direct needs—retail, clinical, pharmaceutical. It is hopeful to assume the communities will begin to rehabilitate their neighborhood's physical and social structure so that accessibility will allow the chairbound, elderly, and young to take advantage of these areas. Whether commercial areas are needed to serve all diverse economic groups, innovation in entrepreneurship should be encouraged. Introduction of large groups of people automatically stimulates commercial development so that restaurants, department stores, clothing stores will appear commensurate to people's needs and desires.

SOME CONCLUDING REMARKS

The concepts presented represent a wide range of feasibility criteria—to make planners aware of the various paths which he may follow in designing
inflatable plastic swimming pool enclosure would provide for unlimited use.
communal spaces. The planning and user established criteria will ultimately
determine the criteria for any particular combination of communal spaces. These
types of concepts must be established and defined. It is the determining fac-
tor not only for the sociological relationships, but utility in their physi-
cal relationships. At the same time it must be realized that all character-
istics within a particular community cannot be strictly predetermined, but
they can be analyzed. It is not necessary to predetermine precisely what ac-
tivity will naturally occur. Cultural and social communal spaces fall into
two categories: static and kinetic. Ex., a bowling alley requires more al-
teration before one can do anything but bowl in it, but an auditorium houses
plays, concerts, recitals, and an infinite range of other activities. Commu-
nities should have large areas of flexible space so members of the community
can use them as they wish, primarily because it will produce a more realistic
and customized system than could possibly be developed dealing with the speci-
fic specialized types. Also, this flexible space will require enlightened ad-
ministration to allocate its uses and this administering process may itself
be an important facet in inter-communal socializing.

Another serious issue of urban life is its tendency toward abstraction--
its retreat from nature, its lack of enjoyment with the physical world. The
environment is becoming hardened and crystallized into a world of indestruc-
table materials, pruned trees, purined lawns, and fenced off facilities--the
process of succumbing to mechanization. Urban outdoor recreation particular-
ly has become so formalized that almost no opportunity exists for self-expres-
sion or adventure. The need here is for an environment that encourages and
creates intensive participation: children play areas for building mud heaps,
metal playground, construction sites. While seldom visually attractive, this
is not the primary aim children usually associate with learning experiences.
Fig 11

**Sport**

on a **basketball court**

only the other players restrict your movement

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The incorporation of a variety of materials—foams, latex, smooth surfaces can be as enjoyable as it is safe. Old people can sit on it, youth can run, jump, skate on it, children can explore it.

The actual arrangement of the exterior (or semi-enclosed) space offers a variety of possibilities. If they are too small they might become too exclusive or secluded; if they are too large, they will become unfriendly. Other factors which will influence design are convenience, visual assurance between mothers and children, distances from units. Studies of these factors should be defined perceptually and functionally along with the openness and division of its visual form or texture, the patterns and densities of vegetation and users, the type of floor coverage, the existence of view and topography, visual and physical accessibility and availability for public use. Finally, the primary functions of exterior semi-enclosed space can serve in the following ways: 1. Visual contrast with the built up environment, a characteristic which frequently promotes seclusion and privacy and which also serves as a structuring device by breaking the urban pattern

2. Its plastic role encourages experimentation of indefinite purposes, ideal for active recreation, relaxation, adoption of new roles, as a natural heritage, to be conserved for historic, ecological and educational purposes

3. As a productive source of food

The shape of the metropolis catches the eye when we see a map or plan, but it can seldom be perceived or conceptualized from ground level. The viewer sees it in terms of the size and density of its buildings and spaces, the presence of vegetation, topography, views, floor surface, microclimate, signs of activity and other qualities of the urban scene. This introduces mention of the small exterior spaces which automatically attract people. These areas are basically based on the same characteristics as larger urban communal spaces. Yet with growing complexity of life, these spaces should inform us
about information on activities, social patterns, directions, etc. The information perceived depends not only on written signs, but the recognition of landmarks, destinations, familiar objects, etc.

Considerations of planning and development should be intended to create an area of distinguished designs which function effectively. This goal forms the basis for the flexible cooperation which exists between public, private, institutional interests. As initiative shifts from public goals to formulation by the community to implement them by the private developers, it develops the concept of maintaining a flexible community plan, non specific neighborhood plan, and detailed project plan. In addition, intensive development of the interim community and economic resources can result. Thus all parts of the community have the objective of maximizing the advantages of living in a heterogeneous community.

PRIORITIES

1. Physically disabled persons become represented in community action programs.

2. Heterogeneous community organization: mixture should cover physical, social, sex age, race, income spheres.

3. Delivery systems and discretionary services should include:
   - social services
   - rehabilitative service
   - legal service
   - medical service
   - information service

4. Performance criteria ideology should view environment as a support system:
   - aid concepts
   - quality concept
   - physical support in form
   - mental support through identity

5. Legislative approaches should achieve new physical structure, convenient representation, housing quality and quantity, new finance strategy.

6. Private development should achieve new programmatic intentions.
Footnotes

1. Talbot, Rehabilitation Literature. Institute of Rehabilitative Medicine, N. Y. Medical Center, 1966.


7. Cedar-Riverside Assoc., op cit.

8. Ibid.

9. Ibid.

10. Ibid.


12. Ibid.
PART 5

HOUSING
INTRODUCTION

"It is indeed ironical that the physically disabled are often called "victims" of today's society and its technologies, because they have not been able to follow the route of upwardly mobile individuals who have now become established in communities where they enjoy good schools; clean, well-maintained facilities, including streets, and parks, reasonable facilities, including streets and parks, reasonable population density—in what at least approaches a wholesome environment.

"Most handicapped individuals remain hidden away in isolated wells of discomfort and discontent bordering on despair at a moment in history when rapid technological advancement and increased social awareness create conditions with greater potential for their independence and self-fulfillment."\(^1\)

While low and middle income housing throughout the nation might be termed "inadequate," for the physically disabled, such housing simply does not exist except for a few, recently completed projects which are less than ideal. This lack of housing results in unduly long stays in hospitals where the patient is left in an artificially sheltered atmosphere where contact with the larger society is periodic or nonexistent. This isolation leads to psychological division resulting in turn in an impaired self-image, leaving the patients' life at a standstill where he is not able to make decisions on career, family, social life, and his social and cultural development is halted.\(^2\) If adequate housing were available, this unnecessary period of stagnation and the resulting psychological and emotional strain could be eliminated. The disabled person would be able to perform normally at his job, school, as a housewife, or whatever life style chosen.

With the need for housing for the physically disabled clearly established across the nation, the next question to ask, is "what kind of housing should be built?" Because the physically disabled person has most likely drained much or all of his monies on the necessary medical and rehabilitative
services, and has obviously been out of a job for some time, and knowing his future need for expensive medical services will continue probably for the rest of his life, many, if not most, physically disabled persons are in need of some kind of subsidy to meet living expenses. People talk about low cost housing and middle income housing with the suggestion that they are different things. The term "low-cost housing" is actually a fabrication intended to camouflage the fact that in the past thirty years it has been public policy to provide middle-income housing to low-income families at subsidized rent. Low-income housing has never cost less to build than middle-income housing and in some cases it has cost more. The major difference is in land costs because of location and the kind of services that are provided. If cheaper housing which is good for the low income family can be built, it is going to be used by the middle and high income families, too. We can think of no reason why low-cost housing has to look and feel like the extent of its offering is a minimal, maintenance existence.

HUD has put out a publication on minimum standards for elderly and handicapped housing. They define the purpose of such housing as: "A pleasing homelife environment; convenience through arrangement of various elements, prevention of accidents; facilities for social activities, occupation or hobby activities, all provision for such care and assistance of physical and mental health and shall be carefully considered. The requirements contained herein define the minimum level of quality acceptable in each specific condition, and their use in toto will not necessarily achieve a desirable solution. The objective of these standards may be attained only by recognition of the preferences and varying physical conditions of the occupants, ranging from those who are able in all respects to those who are infirm, and in provision for these in planning and attention to detail."
When one thinks of public housing, why does a large rectangular box or several such boxes arranged in some order come to mind? It appears that when such projects are announced, the only considerations are to pack as many people as possible, in as small an area as possible and do it as cheaply as possible. The result is a building institutional in appearance and feeling. What a sad state we are in when architects are designing housing that they would never consider living in themselves. Low density development is choking the cities, yet a high-rise box does not work either. Large high rise developments merely are newly-built slums. Kids running up and down with no areas to play near their own apartment, the degrading sameness from room to room, apartment to apartment, building to building. One must feel compassion for people who are forced to live in such an environment due to economic reasons.

Now that the desperate need for housing the elderly and, more latently, the physically disabled are coming to governmental attention, we see all around us more of these "instant new slums" appearing around our cities. Sure, some are better than others, but few allow for any breadth, depths, or heights of sensory experience for those who live there. Because one is elderly, physically disabled, or in need of financial supplements does not mean that he needs, wants, or should have to settle for less than a healthy environment—physically, socially, psychologically. The HUD standards allow for mere maintenance of life. The architect must go beyond; the subsidizing government must allow them to do it.

A look at MAP objectives in developing adequate housing for the physically disabled should well become part of HUD standards:

"The main purpose is to design and operate a program which will respond to the handicapped person's needs for non-institutional privacy
"There are no absolute parameters for such a program only a concept for environmental freedom that allows:

- living quality (height)
- living variety (breadth)
- living intensity (depth)

Thus this is a three-dimensional concept for freedom, privacy, and independence."

How does one achieve living quality, variety, and intensity? Living quality appears to require two opposing extremes. One one hand we want an intensive meeting place, the place where everybody is together that encourages people to talk to each other, share experiences, understand participation of people with their environment. On the otherhand, it must contain built-in elements of privacy. The family in its dwelling should be able to lead a normal life of varying activities; children playing, perhaps noisily; parities, fights, etc. without disturbing the neighbors or being a source of entertainment or harassment to them. An integration of the social and privacy spaces is essential. An example of how this can be achieved is by terracing or staggering the different apartments so that some of the terraces are side by side, tying the apartments together by a horizontal corridor on the opposite side to achieve the necessary easy mobility channel. Each apartment requires certain amenities which go beyond the minimum HUD standards: sunlight for each unit, a view, a terrace, safe access to play areas. In addition, integration of indoor to outdoor spaces, and integration with the rest of the world for wheelchair users must be achieved. On-site shopping, services, variety of commercial activities, in-house employment and an adequate transportation system whether it be specially adapted taxis, minibuses, or buses or a combination of all of these. Running an errand in a wheelchair, it must be remembered, involves not only more effort, but also more
time. Therefore with many of the necessary and pleasurable facilities close at hand and easy to get to from one's own apartment unnecessary mental and physical stress is eliminated.

Because wheelchairs need a paved and fairly level surface for movement, that does not at all mean we must build a concrete environment. Outdoor spaces, continuous plant life, a wheelchair-accessible park interwoven with the building and paved pathways helps to complete the apartment environment and in turn makes it a pleasurable social, physical and psychological experience.

The residents themselves should be a mixture of people with different income levels, backgrounds, family size, interests, able-bodied with the physically disabled, young and old. With such a mixture, ideally each apartment should be different from every other apartment, as each person is different from every other person; communities should differ from each other as much as their inhabitants do. But, practically this is not possible when working with public housing, hence limited funds. However, there is another scale of variation which is possible. Can the walls be moved, the floor changed, space be adapted to put books where the tenant wants to, shelves be lowered or raised to adjust to different reaching abilities? In short, does he have the ability to change his surrounds to suit his needs? Is there flexibility? This must be allowed for when one plans an apartment which will at different times be occupied by a wide range of different people with a variety of needs and perhaps a range of disabilities. Within each apartment building there should be an option of apartment sizes from efficiency to accommodate the single individual to several bedrooms to accommodate the family. Within each apartment, room sizes should vary, none being too small, hence hampering mobility. In general, there should be a richness of color,
CONVENTIONAL MULTI-FAMILY HOUSING DEVELOPMENT

can be multi-use court outdoors & indoors if feasible

provision for competitive recreation economically
texture and sensitivity toward mobility creating a complete environment making living a total social experience.

The underlying concept for each recommendation must pivot on the subject of mobility; people have to have complete use of their total environment and must be able to move through it, participate in it, and become a part of it. In the case of those with ambulatory impairments, the concept of movement patterns is even more essential. Independence must be planned for and provided.

SITE SELECTION

Site is largely a criteria of social factors—the neighborhood, and physical factors based on engineering data and analysis within the context of a regional district, the urban core, suburban residential or a composite of the two. Its physical nature may be a city block (100' X 100'), a meadow, a hillside or a waterfront. The value of a site to its user will depend on the amount of open space (acreage), topography, contouring (level change), soil conditions (rock, sand, clay), its development (sewage, water, utilities), its zoning ordinance, the character of surrounding area (city structure—streets, curbs; residential, commercial built form), its impact on surrounding area, its location, its costs.

To develop a profile of user criteria in terms of needs for the physically disabled, it is important to analyze the criteria previously presented and to recommend procedural policies. When a site is under consideration for development, naturally information relating to size, present use, zoning, assessed value should be collected. Whether the locating community has restrictive ordinances, zoning, or other local controls which would adversely affect the proposed development in a particular good location,
and the possibility of waivers should be investigated. In applying for such waivers, it is important to remember that the housing is to be residential, designed for independent living. It is neither an institution or a nursing home.

The criteria for selecting residential sites for the physically disabled should be over or above the qualities of noise abatement, smoke, traffic hazards. It should take into account the mobility nature of its residents as well as other physical needs, such as climate orientation, how level the land is, topographical nature, cost, improvement limitations, and the natural look of the site as a whole (view, water, trees, beauty).

Consideration should be given to proposed approaches to general site and area in terms of reconstruction, improvement of streets, sidewalks, utilities. The condition of soil, ground water level, drainage, rock formation and topography should be such as not to create hazards to the property or to the health and safety of occupants. It must provide for use and development of multi-family dwellings and construction of service facilities, as well as give provision for parking space. Subsoil conditions must be appropriate and capable of supporting this construction as well as provide good drainage. If utilities are not available at the site, a realistic estimate of cost is involved, both public and private, to provide utilities. The new development should be examined for its appropriateness for a specific neighborhood. The traffic impact and availability of open space must also be considered. Lastly, while cost estimates for acquisition and development are important in the final stages of site selection, at the preliminary stage cost should not be such a weighted factor. Benefits in location, topography, utility, and accessibility may be positive factors which will validate land purchase.
A good way of analyzing and comparing information collected on major components involved in site selection would be to prepare site profiles. An example a sample site profiles is presented in Appendix C.

**Site—the Neighborhood.** The social implications of site are the neighborhoods which will thus determine the community. The site should consider physical needs of the residents and their mobility needs as well. As previously stated, the location of the site will determine to the extent the project will live or die. Isolation of the development will only result in a ghetto atmosphere. One should have commercial, physical, cultural, social, and recreational accessibility on the site as well as out in the surrounding area.

One should ask himself many questions:

1. Are there accessible provisions for the key service functions such as employment opportunities, clinics, a vocational rehabilitation program, inexpensive private or public recreation (such as movies, parks, playgrounds for physically disabled children, libraries, etc.), churches, banks, stores including drug stores, grocery and variety shops; inexpensive restaurants, nic-nak shops and schools?

2. Is the dispersion ratio of these facilities such that it offers availability without powered vehicles and within the capacities of those with mobility limitations?

3. Are the streets prepared for wheelchair circulation and are the service facilities equipped to handle the maneuverability of wheelchairs?

4. Is the composition of the community heterogeneous or homogeneous—ghetto or flourishing, contain mixed income levels? Is it safe?

5. How are the public services in that section—fire, police, social service, maintenance?

6. To the employed, the mother of school children, staff, and visitors, good transportation is essential. Is the development located near major vehicular patterns or are they readily accessible? To the unemployed, good transportation may keep him in touch with the world, participating in meaningful and dignified activities. Economical transportation with a nearby stop without intervening
hazards, is highly desirable. Such transportation should be existing by the time the development is occupied. 8

"A convenient location is so essential for impaired persons that it may outweigh the other standards and criteria for evaluating residential neighborhoods.

"However, in a development of mixed occupancy (the impaired, the elderly, and/or other families), the needs of all persons must be considered. When serious compromises are involved, an expert would be desirable.

"Neighborhoods close to specialized services, such as sheltered workshops, should be considered if the neighborhood also possesses the other more generally used services and facilities. It is easier and less expensive to arrange transportation for a particular group of tenants using a single facility than to buy multiple, less specialized, but equally essential, public and private facilities and services within reach of all tenants. Urban renewal areas which contemplate contemplate commercial shopping centers and other facilities adequate to housing needs, may furnish desirable sites." 9

DENSITY DEMANDS

In the light that the chairbound are not economically, socially, racially, culturally, or physically categorical or identifiable, their specific human needs to be provided for in housing and community will, of course, vary. The fundamental needs that must be satisfied for all occupants are the following: there is the need for interaction spaces for all family members, especially those which reinforce mother-child relationships; there is the need for places to satisfy privacy demands; and there is a need for places to partake in leisure time or communal activities. Under our present system of low, medium, and high density housing, these human needs may interpret different goals and varying weights of importance.

Low density housing consists traditionally of the tract—the single family, detached dwelling in the suburbs. Each home has its own yard which has relatively low site coverage. There is direct ground level access from

208
barbecue · sunbathe · garden

Fig. 2

objective: to provide all
of the amenities
that one associate
with a private
residence for all
tenants of the
development

sliding
glass
doors

entertain · private
cut-out
extension of
outdoor
space

209
house to yard. Automobiles are driven onto each lot and street.

Middle density housing usually is made up of single family units which have been physically connected to large-multi-single family units. The townhouse is an example of this. Each home is placed on a small lot, and has small public yards or common areas. There may be either direct access from automobile or it may be parked in public areas.

High density housing has typically low site coverage in multi-story, multi-family buildings which have no direct private access from each individual dwelling to the ground. One must use public circulation spaces. Families have no private yards and most ground area is common property. There is no direct connection between the automobile and a family's dwelling. It is usually parked somewhere in a common area. Circulation space is only for circulation--there are usually no interior play yards or play areas.

It is useful to analyze the characteristics of low, middle, and high density housing for their advantages or disadvantages in terms of service response to the chairbound person.

**Low Density Housing**

**Advantages:**

1. Ownership responsibility
2. Ground level accessibility
3. Direct covered parking
4. Single level
5. Maintenance facilities accessible
6. Own laundry center
7. Visual opportunity unlimited
8. Child supervision within premises
9. 360° circulation, both on exterior and interior
10. Individual private spaces
11. Security from noise
12. Self-maintenance opportunities
13. Emergency exits
14. Direct service delivery
15. Individual design
16. Expansion possibilities
17. Controlled garbage area
18. Entertaining space, both inside and out
Disadvantages:
1. Two-story or split level design requires elevator
2. Commercial activities too far
3. Requires automobile
4. Public transportation usually located near main arter-iars
5. Isolation
6. Recreational facilities too far
7. No nearby communal clubs
8. Neighborhood entertainment not sufficient for teenagers
9. Social stress due to lack of outlets
10. Can be very monolithic
11. Upkeep, maintenance (raking, shoveling, seeding, mowing, etc.)
12. Lesser frequency of people
13. Fences

Middle Density Housing

Advantages:
1. Small private yards (sometimes)
2. Allows at least two way visual experience
3. Ground accessibility
4. Same as home ownership
5. Social and neighbor contact is close
6. Privacy
7. Place to relax, recreate
8. Laundry facility
9. Transportation usually near; development close to major vehicular circulation
10. Garbage closely
11. Community maintenance
12. Common facilities

Disadvantages:
1. Usually at least two stories; elevator would be needed
2. Car dependency
3. Car and owner may be physically separated
4. Commercial zones, recreation, shopping, services usually near vehicular traffic patterns
5. Communal facilities
6. Noise outside, and possibly through walls
High Density Housing

Advantages:
1. Contact with people
2. Ground level accessibility
3. Commercial activities, community facilities
4. Public transportation relatively near
5. Noise privacy from outside street sounds
6. Visual privacy
7. Nearness to neighbors—larger social interaction
8. Maintenance economy
9. Recreation variety
10. Need for a car is not a necessity
11. Cooperation among residents
12. Exposure to different ages, social and physical groups
13. Help is always nearby

Disadvantages:
1. Laundry centers distantly located from apartment and shared
2. No direct connection to ground or outside
3. No visual awareness
4. Dependence on mechanical elevators or expenditure of energy on stairs
5. Minimum unit size
6. No indoor play areas
7. Interior acoustical problems
8. No flexibility—rigid standards do not encourage change
9. Long distance from apartment to car area
10. Public access to building—security problems
11. Decreased privacy
12. Collectivity—small voice in management
13. Emphasis on communal
14. Garbage

INTERIM HOUSING — REHABILITATIVE, RESOURCE CENTERS

The discussion of the goals of a community is presented as a policy for service area implementation to insure that adequate housing and services are available for all wheelchaired. To understand the feasibility of such a program, it is necessary to put the facilitating requirements in their proper perspective. Under prescribed new community policy programs, the goals of community should accommodate varying degrees of adaptive facilities in delivery of programs. Our plan is a limited one, designed as a first step.
It does, however, present an opportunity to demonstrate ways in which housing and rehabilitation service can provide mutual reinforcement when undertaken as an integrated package.

Housing needed by persons with physical mobility problems to maintain themselves independently varies greatly from one individual to the next. Some persons may only need a ramp and doorway wide enough to maneuver their wheelchair. Persons who have more severe injury may need barrier-free housing as well as certain supportive services such as help with dressing, marketing, transportation and certain domestic chores. Effective response to these needs seems to have two avenues of functionality. The first is the need for adequate housing to support training and employment; the second is the need for conventional housing. In either case, buildings must be designed as to permit their use by all people. If a specialized housing program must be developed, implemented, and built, it should be incorporated into larger housing developments.

We will first discuss the interim community housing—the rehabilitative, sheltered or halfway houses, then we will speak of the present efforts toward the creation of barrier-free conventional housing.

Resource Center. It is in the interest of those persons who cannot live effectively in conventional housing, but also those who require the need of institutional health care settings (hospitals), that we propose solutions to the housing problems of the physically disabled young adult. The coincidence of housing policy and formulation of plans for the more severely disabled seems to be growing, but in fact legislative enactment procedures have not initiated programs to develop, build, operate, or otherwise bring into being some living arrangements more suitable and more humane than those which presently serve the physically disabled needing some attendant care.
This section is devoted to the resource center, which is more difficult to accomplish than providing adaptive housing alone since adaptive housing, while had enough to develop, at least has much in common with other kinds of housing in terms of physical development, financial arrangements, management, and design. In addition, non-profit groups have successfully brought about subsidized specialized housing, so there is considerable advice and assistance available to the novice nonprofit sponsor.\textsuperscript{12}

One serious deterrent to the concept of housing for the more severely disabled relates to outside attitudes. The opinions, which are usually oppositions, regard this sort of venture as a "species" of medical facility and is immediately labeled as "hospital", "nursing home", or "halfway house". In their variety and ambiguity these phases offer differing technical and lay meanings which suggest complexity beyond comprehension.\textsuperscript{13} Thus "resource center" seems an appropriate phase to incorporate the skills that will be needed in any such venture.

The desire for such a facility was preempted out of the social structure by lack of response, federal ignorance, and the disarray of human talent. Present programs to provide for the severely disabled, those who are young and need assistance, is to locate these persons in nursing homes. This environment, which has no structure either educationally or culturally, has a deleterious effect upon the person socially, emotionally and physically. The anxiety of financial hardship incurred from the nursing home, coupled with level-of-service (lack of service), fear of eviction, unresponsive public agencies and assistance programs all add to the plight of the captured resident.\textsuperscript{14}

This report focuses only on some potential models of supervised residences for persons in training, going to school, or in extended or competi-
tive employment, both married and unmarried, whose physical disability makes it necessary that they receive help with dressing or other routines of supervision in activity related to health and recreation, but who do not require intensive care or supervision.

The number of supervised units needed would be difficult to determine, but coupled by area data, local surveys, a supervised housing program could begin in each area with at least two living facilities, each accommodating between 25-30 clients. These facilities should be centrally located, the resident staff should be considered depending on the individuals in that area. Assistance in dressing, shopping, diet, social and recreational activities helping to facilitate involvement in everyday functions such as transportation, budgeting, banking, appointments, purchasing clothes or getting to work should be included. There is the need to enjoy a more meaningful and happy life with considerable concern for self respect, in a homelike atmosphere where the social interests and abilities are comparable, suitable, and tuned to homogeneity. There is great need for regular transportation—a van, station wagon, or school bus equipped with a hydraulic lift to accommodate the needs of people in wheelchairs.

Duplication of facilities should be eliminated. Each facility should host new and aspiring programs. The living facility should be utilized by a mixed clientele, mobile, non mobile, transitional, those in competitive living experiences. The facility should seek the non profit route with participants as its actual operators. Important issues of the program's development are social, vocational and rehabilitative services to develop, sustain, and employ the varied abilities needed to insure the facility's success and where feasible, outside the facility. There should exist a cooperation between sheltered workshops and employment agencies, school officials and so-
what is the difference between competitive recreation and Physical therapy?

in a viable residential community they should be the same.
cial service agents. Perhaps in the incorporation by large companies of subsidy firms to hire those individuals, the government could help make things possible through tax incentive programs which would serve the interests of the resource center and generate tax revenue for the government.

The major emphasis should be devoted to the development of social group development programs that can serve as a source of information on health, social or rehabilitative service, as well as assistance in work related areas improving work habits, job interviews, application techniques, and social relationships. Social skills developed in living facilities should be transferable to the community, home or job. Group experience can help an individual learn to cope and exercise his feelings of self worth. The groups should offer the resident an opportunity to become a necessary and functioning member of an intimate organization and emphasize every client's individual abilities.

Housing for the physically disabled person should include provisions for the following services:

- system to call for help in emergencies
- transportation, parking
- restaurant, commons room
- recreational, social programs and rooms
- laundry facilities
- medical unit, physical therapy

What is urgently needed is a program working jointly with state and county authorities to arrange housing for the severely disabled and to provide them with essential services as well as assist them in finding work and occupations. The type of facilities envisioned are temporary residences as well as for long term living where the physically disabled client would go after leaving the hospital in order to practice functional training, pursue educational endeavors, receive job training and ease the transition back into the community. It is hoped that such a facility would streamline efforts of
large city hospitals. In order for these persons to function at the highest level, it is necessary to remove architectural barriers in the community buildings. Hopefully the environment would support the needs in living, training and education so that the residents can work part or full time in the competitive labor market. Clientele for the program might be from nursing homes, hospitals, rehabilitation centers or community referrals, or those who had been stranded in their homes because of architectural barriers.

While the required services cannot be anticipated for everyone, they should include homemaker service, therapy consultation, nursing programs, transportation, as well as extended facilities and services such as the educational and job training opportunities. This program would be staffed by registered nurses (perhaps part time), registered therapy specialists (occupational and physical teams), a social worker who would keep a data bank of information on personal skills as well as employment opportunities. If the social worker were himself or herself physically disabled, it would give both the client and social worker a psychological advantage in determining priorities, talents and resources.

The social worker's position is really that of overall coordinator, a vocational specialist, whose job would be given to the gathering of a profile of information on education programs, responsiveness from educational facilities—colleges, universities, trade and technical schools, as well as giving guidelines and consulting educational agencies as to what can be done to aid and supplement the educational services of this type of program. A consulting team of doctors should include a skilled general practitioner, urologist, and orthopedist, with connections to public health clinics.

As mentioned earlier, the funding of such a program is not quite speci-
fic to federal programs, but there still remains many potential resources, such as study grants from the Department of Health, Education and Welfare, Massachusetts Rehabilitation Council or other public programs. Implementation programs may be funded by Boston Medical Fund, Easter Seals Foundation, disability insurance or the Veterans Administration. Obviously these agencies and the support they offer pertains to the operation of such a facility but certainly make no contributive effort to actual construction cost efforts. Federal programs will have to begin to respond to this need for new community concepts.
PRESENT EFFORTS TOWARD BARRIER FREE HOUSING – THE SPECIALIZED HOUSING

Housing for disabled persons who are unable to function effectively in conventional housing but could otherwise function well in a suitable physical environment, has been thought about in two forms: 1) either all buildings must be designed to permit their use by all people, 2) specialized housing must be built. The first approach, usually referred to as the elimination of architectural barriers has so far been applied to those structures built with public funds and intended for general public use--federal buildings, state buildings in Massachusetts. The laws, however (see Standard Code Table, p. 65) are not applicable to public housing, and the decision to build structures especially to accommodate wheelchairs rests with the community. In 1966 HUD published "Minimum property standards--Housing for the Elderly with Special Consideration for the Handicapped." HUD now requires a minimum of 10% of "Turnkey" units, under which most federal public housing is now being built, to have accessible public areas and accessible bathrooms, with no provisions for other special design features.

There are now several low rent facilities in the United States specifically designed to accommodate persons of all ages who are physically disabled. All are owned and operated by their respective local housing authorities and all were built under strict federal cost restraints. In each case, it was the action of local residents which convinced the housing authorities that the project was needed.

Table I compares the Fall River, Seattle and Fargo projects. Most discussion is centered on the Seattle project because it was aimed toward the nonambulatory resident, and was not a mixture of the elderly and physically
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<tr>
<td>Size</td>
<td>200 units</td>
<td>150 units</td>
<td>100 units</td>
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<td></td>
<td>100 1-bedroom</td>
<td>126 1-bedroom</td>
<td>80 1-bedroom</td>
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<td>100 efficiency</td>
<td>18 efficiency</td>
<td>20 2-bedroom</td>
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<tr>
<td>Parking</td>
<td>50 spaces</td>
<td>150 cars</td>
<td>Enclosed parking for open parking</td>
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<td>Control and Financing</td>
<td>Local Housing Auth.</td>
<td>Same</td>
<td>Same</td>
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<td>Low Income Housing</td>
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<td>Eligibility</td>
<td>Elderly and handicapped. Persons physi-</td>
<td>First priority to persons having an</td>
<td>Handicapped persons with incomes not ex-</td>
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<td>cally impaired--unable to maintain them-</td>
<td>orthopedic or neurological handicap</td>
<td>ceeding $3400 for a single person or $3600</td>
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<td>selves independently in the communi-</td>
<td>significantly interfering with ambu-</td>
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<td>ty, either alone or in their family</td>
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<td>group, but not sufficiently disabled</td>
<td>have a greater need for the special</td>
<td>Priority given to persons who have an</td>
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<td>to require hospital care or intensive</td>
<td>design features of Center Park.</td>
<td>orthopedic or neurological handicap</td>
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<td>around-the-clock nursing care as provi-</td>
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<td>ded in nursing homes.</td>
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<td>bulation and who have a greater need</td>
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<td>Horizons Manor.</td>
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<td>Rent</td>
<td>Not given</td>
<td>Based on income and starts with a mi-</td>
<td>Based on income, approximately 20%,</td>
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<td>nimum of $45, including utilities.</td>
<td>and includes utilities.</td>
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<tr>
<td>Immediate Affiliation</td>
<td>Fall River</td>
<td>Seattle</td>
<td>Fargo</td>
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</tr>
<tr>
<td>Affiliation</td>
<td>Earl E. Hussey Hospital</td>
<td>Seattle Handicapped Club Lighthouse for the Blind</td>
<td>Local residents who initiated action</td>
</tr>
<tr>
<td>Food Service</td>
<td>Common Dining room in addition to individual apartment facilities</td>
<td>Individual unit kitchens; community dining on special occasions only (Thanksgiving, Christmas)</td>
<td>Community kitchen facility to make one light meal per day operated by the occupants in addition to individual apartment facilities.</td>
</tr>
<tr>
<td>Location</td>
<td>Public transportation to center of town.</td>
<td>Three blocks to public bus line to center of town.</td>
<td>Not known</td>
</tr>
<tr>
<td>Special Services on Site</td>
<td>Nurse on call at all times, Group dining available, Some medical services on site--occupational and physical therapy in building.</td>
<td>None yet on site.</td>
<td>Crafts and occupational therapy room, physical therapy room, meeting rooms for volunteering to provide education and entertainment to its residents, Group dining, City park adjoining property especially designed for the physically impaired.</td>
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disabled resident, as was not a mixture of the elderly and disabled (as was Fall River), and has been in existence long enough to get some meaningful feedback (Fargo-s has been open for less than ayear) and because it was personally visited.

SEATTLE, WASHINGTON -- CENTER PARK

The Seattle Handicapped Club, as established self-help group, initiated discussions with the Seattle Housing Authority in August, 1962, regarding the housing needs of low-income handicapped persons. It was concluded that public housing offered the only practical solution. The Club petitioned the authority to sponsor a program for 300 units to meet minimum needs; in 1963 the authority agreed to provide only 150 units because of the limited experience nationally in this specialized field and the difficulty of documenting the exact extent of the market. In 1964, the development program was finally approved by the Federal Government. It took nearly two years to clean up various technicalities, including necessary re-zoning and variances in connection with the site (south of Seattle Center) which was purchased from the City. This purchase also included the land to be used as the site for the Multi-service Center. When completed in 1970, it was the only such public housing development in the nation.

Center Park is a conventional public housing development in which the Authority acted as its own developer. The multi-service center which was to be built concurrently adjoining the apartment building was not funded at the same time, so its construction has been delayed. It was finally funded in the summer of 1972.

The physical environment. The building is of irregular design with three wings varying in height from 6 to 7 stories (see Fig. 3). It is of masonry construction with jumbo exterior and interior brick. Architects were
Fig. 3. Rendered drawing of Center Park, Seattle, Washington.
Kirk, Wallace, McKinley, & Assoc. of Seattle. Mr. Paul Kirk, who suffers from ambulatory problems himself, had a special interest in this project. The development cost was $2,596,421. The building contains 126 one-bedroom apartments with solid wall; 18 one-bedrooms with moveable room divider (efficiencies) and 6 two-bedrooms apartments (see Fig. 4).

The special design features built into Center Park are:

1. Electric entrance doors which slide horizontally.

2. Extra large elevators (8' wide X 7' deep) which also include a built-in wall seat for those on crutches, etc. and can accommodate six wheelchairs with wheelchair-height controls.

3. Special kitchen features:
   a. Counter, cabinet and cooking units can be raised or lowered to accommodate the needs of persons in wheelchairs or on crutches (see Fig. 5); change of height requires removal or addition of bottom unit and change of the plumbing when a new tenant moves in (takes approximately 30 minutes).
   b. Below-counter cabinets and drawers for persons in wheelchairs who cannot reach; overhead cupboards for those on crutches who cannot stoop.
   c. Self-closing kitchen drawers on ball-bearings and adjustable shelves (the drawers move with the slightest touch!).
   d. Extra wheel-in storage area for storing of kitchen supplies by those who cannot use overhead cupboards.
   e. Counter-range elements and plug-in broiler or oven which can be used on counter or on top of roll-out section of lower cabinets; can be rolled from kitchen to serving table.
   f. Sink faucets at the side of sink--found easy to reach.
   g. Pull-out kitchen towel racks.
   h. Range controls located at front of counter and knee space under cooking surface.
   i. Pull-across folding screen divider to close off compact kitchen area.

4. Bathroom features:
   a. Extra large with space to permit wheelchairs to be turned around in them.
Fig. 4 Center Park typical efficiency apartment (above) and typical 1-bedroom apartment (below).
Fig. 5  Center Park kitchen (above) and bathroom (below).
b. All bathrooms have tubs and a special lavatory unit which will allow a wheelchair to go under it.

c. Public showers designed to accommodate wheelchairs located on each floor to supplement bathtubs in each apartment. It has both overhead and hand sprays.

5. Folding doors for closets and room dividers; sliding doors leading to the bedrooms and baths; lever-type door handles to individual apartments.


7. Public balconies--large patio on the roof of parking area has been especially well used.

8. Intercom security system, smoke detectors and an emergency alarm system in all apartments.

9. Garbage chutes located on each floor.

These special features have come a long way in providing a physically barrier-free housing environment for the tenants. However, due to the cost limitations inflicted by low-cost housing projects, some of the planned amenities had to be deleted--the outside doors to each individual apartment were to have been sliding doors; there was to have been much needed grab-bars along the corridor walls; various finishes for walls, etc. had to be left out. The largest omission due to lack of funds, the Multiservice Center, was obviously the most needed. This will be further discussed later under the section on social environment.

Due to the newness of such a project, some features were found not to be ideal and in need of correction:

1. The toilet bowls were too high (19½" to top of porcelain, 20½" to top of seat, 21½" to top of lid); according to code requirements, the seat height should have been 20".

2. Portable ovens were too small and too slow. Though costly, a built-in oven which would provide leg or toe space and which would have a door opening to the side or double side doors would have been better.

3. Location of phone jack near the far corner of the living room (it would have been better to have it near the bedroom so that the cord
could reach the bed and living room as well, or of course, have two
phone jacks; light switches were too high for wheelchair users.

4. Ordinary door handles at ordinary heights for doors giving access to
public areas were used; these should have been lower and easier to
operate.

5. Slanted grab bars in bathtubs were used—some find it difficult to
use these. (See Fig. 5)

6. The freezer compartment at the top of the refrigerator is hard to
get at; a vertically divided refrigerator-freezer would be perfer-
able.

7. Fixed bathroom grab bars are unsuited to individual needs—e.g., the
grab bar by the toilet in some cases should extend from floor to
wall—30" up from floor and 30" out from wall; installation of
appropriate grab bars after a resident moves in is now recommended.

8. A garbage chute was located on each floor; there is a need for one
in each wing and for easier to open chutes.

9. There was difficult access from the bedroom to bath and vice versa
(see plan); the doors leading from one to the other are not oppo-
site each other so resident has to make a slight turn when passing
through the hallway.

10. The use of rough brick in interior areas is hard on knuckles and
elbows.

11. The size of sleeping areas in efficiency apartments is too small
for wheelchair maneuverability.

The social environment. Although many physical needs for maneuverabi-
ility of wheelchair or crutch users were provided for in Center Park, one
observing could immediately grasp that it was not a healthy social environ-
ment. The public areas were broken up and too small (9' X 11' on the aver-
age). The largest public area, the patio on top of the parking garage was
well used and adequate on a sunny day, but as one might know, it rains on a
large proportion of Seattle days. The tenants have community dinners for
special occasions. At these times, it has been a monstrous task to seat
all the tenants together. A combination of lobby, lounges and corridor spaces
has been used for such dinners! When the Multiservice center is completed,
then the need for large meeting and gathering places will be decreased. It will contain a cafeteria, recreation and therapeutic services. The general atmosphere of the public areas are lacking in color and in no way are the tenants called upon, able, or inspired to change them. It has not yet moved far enough away from an institutional environment.

Center Park is the only high rise in the residential-industrial area where it is situated. There is a lack of shopping and other facilities and attractions in the area. The sidewalks in the area have not been ramped at the curbs and the streets are unimproved, making wheelchair travel extremely hazardous or impossible. The closest public transportation is three blocks away, and even if this distance could be maneuvered, all wheelchair users and some of those with crutches or canes could not use the bus because of the high steps. There is a strong need for some adapted buses for the use of these 150 residents. Grocery shopping is now done by relatives or friends.

One of the goals, probably the most important, was to provide for the independence of the tenants. However, there were none who held full-time employment, and only a handful worked part-time at sheltered workshops (e.g. Goodwill). The unemployment can be explained in several ways:

1. The inability to find a job in an area such as Seattle where unemployment is above the national average.

2. The unwillingness of employers to hire the physically disabled.

3. Government regulations on low income housing which requires that a resident's income not exceed $3,300 is prohibitive.

4. Absence of sympathetic management: when I inquired as to why no one had a full-time job or salaried part-time job the answer given was "due to their physical disabilities they are unable to work"; when I inquired as to the resident's independence, the reply was "they think they are independent, but I know they are not."

5. Psychological factors: lack of confidence of the physically disabled due to social attitudes such as those expressed in # 4.
6. Lack of accessible transportation; buses unusable, cabs too costly.

There was a lack of variety between apartments and little ability to change them or exhibit any individuality. The only possibility was the existence of window planters outside each apartment. These were found to be a great pleasure to most residents who raise a variety of flowers and vegetables. Not enough has been done to minimize or eliminate the effects of a large and institutional appearance.

FARGO, NORTH DAKOTA -- NEW HORIZONS MANOR

New Horizons Manor is a 100 unit apartment building especially designed to meet the needs of the low income physically disabled and enable them to live independently.

It is a conventional public housing development which the Fargo Housing Authority acted as its own developer. Research for this project was largely done from a study of the Center Park project in Seattle--interviews with the Seattle architects, Seattle Handicapped Club, and Center Park tenants. New Horizons Manor opened its doors in July, 1972. It is a ten story rectangular building with 80 one-bedroom apartments and 20 two-bedroom apartments. The architects were Mutchler, Twichell & Lynch of Fargo.

The special design features includes the best of those in Center Park, plus some improvements.

1. Kitchens:
   a. Counters containing side control sinks and cooking units which can be raised or lowered.
   b. Overhead cabinets with touch-latch doors; shallow storage on back of some doors, and a corner diagonal unit with a lazy susan.
   c. Extra wheel-in storage area for storing of kitchen supplies for those who cannot use overhead cupboards.
   d. Wall ovens with side hinge door and pull out shelf below door.
Fig. 6. Typical apartment layouts from New Horizons Manor, Fargo, N. D.
Fig 7. Typical floor layout at New Horizons Manor, Fargo, North Dakota.
2. Bathrooms
   a. Extra large bathrooms with space to permit wheelchairs to maneuver; special hardware and lavatory units which will permit wheelchair clearance.
   b. shower stalls in each apartment which are large and have a generous number of grab bars, combination adjustable wall and hand shower head, folding plastic shower door, and a fold-down shower seat.
   c. Mirrors with the medicine cabinet below.
   d. Wall hung water closets with an emergency call switch within convenient reach.
   e. Three central tub rooms located on the fourth, seventh, and tenth floors.

3. Doors
   a. Automatic main entrance doors
   b. 3'-0" wide unit entrance doors with lever handles and special closing pulls
   c. Sliding doors in all bathrooms to facilitate easy passage for wheelchairs
   d. Wood folding doors on closets and storage rooms with pulling wand for opening and closing convenience.

4. Safety: an intercom system smoke detectors, a complete sprinkler system, and an emergency alarm system in all apartments.

5. Social facilities
   crafts and occupational therapy room
   physical therapy room
   meeting rooms
   kitchen facilities
   city park adjoining property

Due to the newness of New Horizons, there has been no feedback at this time of its good features and those in need or correction. One can guess that due to its improvement of accessibility features over those of Center Park that in the physical barrier aspect, it is more successful. With the addition of the various social facilities on the site, it can be seen that more interest has been paid to the social needs of the tenants.
RECOMMENDATIONS

It must be emphasized that although much needs to be done with respect to the social and emotional needs of the physically disabled in planning their housing, one should not forget that the Seattle and Fargo projects have come a long way toward solving the elimination of architectural barriers in public housing. From the study of the present efforts toward housing for the disabled, several recommendations can be made:

1. The new HUD standards are intended to apply only to facilities
   a. designed for occupancy by the elderly and physically disabled, having an elevator, consisting of 25 or more units within a single structure
   b. non-residential structures included within a residential complex.

These must be expanded to include other styles of living; family life is especially excluded as high rise living has been found not to accommodate children. The housing projects currently being built (as can be seen from the examples of the Fall River, Seattle, and Fargo apartments) consist of small apartments (efficiencies and one-bedroom). Apartments with more than one bedroom in public housing generally are built in two-story, walk up row house clusters, and thus are excluded from HUD standards for the elderly and physically disabled.

2. Public housing is often now designed for a combination of the elderly and physically disabled. These two groups are similar in many respects: both require more frequent medical attention; age and common problems of physical mobility frequently impose social and psychological isolation upon both groups; both can respond to centrally organized programs of recreation and adult education, both groups can be served by many of the same design features, such as non-slip floors, grab bars, lower cabinets, absence of stairs, etc. On the other hand, outside of these
common physical needs, vast differences appear in the following areas:

a. The goals, ambitions, interests, general psychological outlook, social relationships, etc. for a young or middle-aged person in a wheelchair are greatly different from those of an elderly stroke or heart attack victim also in a wheelchair. While it is perfectly reasonable to expect that a 21 year old paraplegic can look forward to a life of emotional and intellectual growth at a job of his choosing, the completion of college, perhaps marriage and family development, many new and sometimes exciting experiences and social relationships, an elderly person to a large extent has already passed through these phases of his life.

b. The elderly often do not appreciate the noise or activities of younger people around them; young people do not always appreciate being restrained by the demand for quiet.

c. The on-site recreational facilities will be different depending upon age; few young people will be satisfied playing bingo every night; few senior citizens would ever use a basketball court.

d. A young paraplegic's life is likely to be job or school oriented requiring independence and mobility; an elderly paraplegic has different needs.

3. Public housing has put stringent limits on any variety or mixing of people.

a. By putting an upper limit of earned income at less than $4000, any full-time employed physically disabled person or one with a working spouse is immediately excluded; it is obvious that when one has completed his education or job training, his income would exceed that amount.

b. The small size of the built apartments (efficiencies and one-bedroom) encourages mostly single people.

c. In a survey conducted by MAP, which was sent to more than 3000 physically disabled persons throughout Massachusetts and included a wide spectrum of level of disability, economic and social backgrounds, and ages, it was found that most preferred an integration of disabled and non disabled tenants.

4. Public housing projects have traditionally provided minimal services to the residents. Seattle Housing Authority is barred by law from providing transportation for its residents and has not been willing to provide exercise equipment out of fear that tenants will be injured. The only need which public housing has been able to satisfy is to provide
functional low cost shelter for those capable of living alone. Federal housing projects must attempt to meet the psychological and social needs of its residents with adequate transportation, shopping, recreational and social areas, etc. on or near the site if these projects are to succeed; the government must be willing to take on the responsibility.

5. More interesting design differences between apartments is needed. Not all people have the same requirements and taste; there should be some choice available—interior living space should be complimented and supplemented by a reasonable amount of indoor-outdoor community space. Every member of society needs a living environment that permits contact with facilities and services that suit his requirements, and provides the opportunity to change his surroundings to suit his own needs and tastes. A greenhouse, craftroom, community TV lounge, library, an occasional card and game room on alternating floors would be a boost to an apartment building.

6. There is a definite need for the renovation of existing housing to consider the needs of the physically disabled. Legal action should be taken to insure that standards for the elimination of architectural barriers are closely followed. It is extremely difficult in an old city such as Boston to find accessible housing due to the old town house, multi-story style of its buildings. If such buildings could fall under HUD standards and be made accessible, the problem of adequate available housing would be greatly lessened.

7. A large percentage of the physically disabled would like to live in their own homes. Something therefore needs to be done to induce private builders and industry to become involved in the solution to this problem. MAP suggests several alternatives from which to choose:
a. Local builders can be given some tax incentive to build accessible homes.

b. A cooperative effort by the state, federal and local governments and banks could provide a low cost, insured loan program which would enable the physically disabled to become homeowners and tax payers.

PRIORITIES

1. Satisfactory standards should be adopted for the provision of new housing, keeping in view both the ideal requirements and the existing levels of living; also a variety of measures should be adopted, ranging from the provision of sites and services to complete houses which are accessible for purchase or rent.

2. Efforts to mobilize non-monetary resources in labor, construction, and materials as well as legal, business, educational.

3. Through housing cooperatives, building societies, savings and home loan associations, non-profit organizations, special credit facilities could be granted in the form of long-term amortization and low interest rates.

4. Banks, insurance companies may be induced by state guarantees or insurance of mortgage loans to invest funds in housing.

5. Mortgage banks could be established on the basis of the joint liability for the mortgage obligations of the housing associations so that larger and more liberal credits may be obtained, as well as first and second mortgage credit associations, adopted to local conditions and conferred to housing activity.

6. Revolving funds which do not suffer from the drawbacks of annual budgetary allocations could be established for the acquisition and development of land.

7. State and local authorities should assist in the provision of housing for the physically disabled by granting capital and rental subsidies and long term loans at low-interest rates by a variety of tax concessions, by aiding in the acquisition and development of land and in the provision of technical, managerial and consultant services.

8. Long term loans at moderate rates of interest should be used as an effective tool of state or local assistance for the housing of middle and low income groups, whose private savings may not be effective for many years to come and whose rent-paying capacity is not likely to attract private investment, which generally seeks high profit.

9. Inducements, tax rebates, depreciation allowances and similar measures.

10. Increase the use of leased housing programs.
Priorities for Massachusetts

1. Executive Secretary on architectural barriers appointment: preferably a physically disabled individual who is experienced in government and architecture.

2. Passage of law # 5413 for relief from barriers in public housing.


4. State survey of physically disabled persons needing housing and assumption of responsibility of building housing for these in need.

5. Suggestions for the Housing Authority:
   - secure more physically disabled person's applications for public housing
   - physically persons be given priority
   - private home owners be encouraged to convert their homes to permit occupancy by physically disabled under Boston's Housing Authority program.

6. HUD handbook for the physically disabled should be updated.

7. MAP, state and federal agencies should work together to develop housing projects which can accommodate the physically disabled.
THE LIVING UNIT

When considering the design of the unit itself, whether it be a single family home, part of a house, an apartment, etc. there are certain priorities which must be considered. These priorities, dependent upon wheelchair movement, should be designed with flexibility and openness. The following checklist should offer some needed guidelines along with the figures which follow:

1. Is a sense of space emphasized rather than walled off cubicles?
2. Are tight corners avoided?
3. Is there a sense of public (living) and private (bedrooms) areas?
4. Is movement simple and direct?
5. Is there an attitude towards maintenance characteristics? easy access and reach of utensils?
6. Is there an availability to service mechanical equipment?
7. What are the amenities? How is form and living space articulated?

Figs. 9 thru 43 take you on a walking tour through a house from entry, to kitchen.
Entry process to Suburban Residence

fig. 9
ENTRY
Minimum Clearance
Entry process to Apartment

Fig. 10

Shape centrally located allows access to door from main tenant one direction

Opening from in front of door

Opening from behind door

Minimum Clearance Distance 14'-1"

ENTRY
Window positioning

Balcony size and reaching heights

fig. 11
Closing procedure
3 alternatives

make full revolution
and back out closing
door.

open to side position
through and pull

opening procedure
hinged door.

Minimum Clearance Distances

\[ \frac{1}{4} \text{"} - 1' \]

fig. 13

DOOR
Closing procedure can be maintained from behind the back.

Closing position

Opening position

Minimum Clearance Distance $\frac{1}{4}-1$

fig. 14 Door
Three Categories

Case ment  double hung  air vent  

side approach

opening can be achieved

and... 1 way

Minimum Clearance Distance  \( \frac{1}{4} \text{"} - 1 \text{"} \)

fig. 15  WINDOW
Gilding Windows

fig. 16

Minimum Clearance Distance

\(\frac{1}{4}'' - 1''\)

fig. 16 WINDOW
Minimal Clearance

Radius of reach with mop-vacuum

fig. 17 CLEANING

The area represents needed floor space for maximization of work energy

\[ \frac{1}{4} - 1 \]
fig. 18  LAUNDRY

Storage

Dryer

Washer

8'

180°

Front loading, full swing, hinged doors allow front panel access or side access.

Minimum Clearance Between

3/4-1'

250
• KITCHEN CABINETS
• PLAYING PHONOGRAPH
• OPENING WINDOWS
• REACHING BOOKS
• CLEANING
• SHOPPING
• CHECK OUT

fig. 19 VERTICAL REACHING
Closet hung door should have 180° radium.

Entry path to closet access.

Access can be achieved basically one way.

Minimum Clearance Distance: 1/4" - 1".

fig. 20 (CLOSET)
fig. 21

Minimum Clearance Distance

1/4 - 1
Minimum Clearance Distance
("does not include door") 1/4" - 1"

fig. 23 SINGLE Bdrm
Minimum Clearance Distances (do not include closet) $\frac{1}{16} - 1''$

fig. 24 TWIN BDRM
Minimum Clearance Distances (does not include closet) 1/4 - 1'

fig. 25 MASTER BDRM
• Lock Chair
• Remove Side

• Chair to Bed
• Chair to Car
• Chair to Chair

• Make Transfer

fig.26 Lateral Transfer
fig. 27

transfer position
in bed

traditional height

1/2 - 1'
Fig. 30

TOILET APPROACH

Types of Transfer Procedures

1/4" - 1"
Fig. 31 Criteria for Good Bathroom Performance

1/2 - 1'
Minimum Clearance Distances
(door not included chest) 1/4 - 1

Fig. 32 LIVING RM
Fig. 33  Seating Accomodations 1/2 - 1
Fig. 34

Minimum Clearance Distances

Corner provides for placement of buffet

3½' distance required for side approach to buffet

5' distance required for front approach to buffet

16'
open semi-circular kitchen would minimize both pivoting and back & fill notion

Fig. 35
Fig. 36

KITCHEN

Minimum Clearance Distances

\( \frac{1}{4} - 1 \)
Fig. 37  New storage and counter shapes and heights for wheelchair access.

Traditional kitchen cabinetry and access range.

½" - 1"
CONVENTIONAL RANGE

- BENDING
- LIFTING

COUNTER OR WALL OVEN

- LESS SPACE
- LESS BENDING
- EASY TRANSFER OF FOOD FROM OVEN TO COUNTER

Fig. 39 KITCHEN ACTIVITIES
Fig. 40 Mix and Match Kitchen. Adjustable around arm's radius; adjustable up or down; pick or choose components according to needs.
Fig. 41 Mix and match kitchen components; adjust up or down, add as many units as wished.
Fig. 42 Apartment Kitchen. Shows detailed work space with "flip-top" portable oven for homemaker unable to open any standard oven which is attached to art of proper height and wheeled into position to use in front of work-top with 3" swiveling casters and grab handles on two sides; continuous work-top with sink and range in advantageous positions; space at far right for tray and drainer; pull-out spray as part of work-top; upper pullout board of hardwood for cutting, exactly level with oven opening; lower board has cut-out to hold mixing bowl stable and at a comfortable height for beating. (From Wheeler, V. K., Planning Kitchens for Handicapped Homemakers)
Fig. 43a. Wheelchair Kitchen. Kitchen next to level entrance from garage showing laundry center with a front loading combination washer-dryer with front controls; counter for sorting clothes; sliding door storage for soaps, etc.; the refrigerator with side opening freezer at bottom; under the counter in the corner, lazy susan for supplies; front loading dishwasher; worktop 31" above floor with open space below for leg room; pull out board with cut-out to hold mixing bowl; 6" deep sink with rear drain, pull-out spray, easy operating faucet handles.
(From Wheeler, V. H., Planning Kitchens for Handicapped Homemakers) Figure is continued on the following page.
Fig. 43b. Wheelchair kitchen showing worktop corner between sink and cooking top, ideal for food preparation; electric cooking top, with staggered pattern of units, push button controls, almost flush with the work surface so pans can be slid, not lifted, with space open underneath so homemaker can get close with chair; built-in oven 31" above floor, side opening door, pull out board below and roll-out storage section with vertical dividers to hold heavy pots in position for easy lifting. (From Wheeler, V. H., Planning Kitchens for Handicapped Homemakers)
footnotes

1. Massachusetts Association of Paraplegics housing proposal.
2. Ibid.
7. Ibid.
8. Ibid.
9. Ibid.
11. Workshop, "Adequate housing for disabled persons," Prepared for Dept. of Community Affairs in conjunction with Massachusetts Rehabilitation Commission under affiliation with MAP.
13. Ibid.
15. Workshop, op. cit.
17. Ibid.
18. Workshop, op. cit.
20. Fishman, *op. cit.*


SECTION II

SOCIAL

PREJUDICE

Mal
OVERVIEW

The subject of the social influences on the life and behavior of the physically disabled can be divided into two important areas. The first is the social attitudes of society which can pose very powerful obstacles to obtaining independence, and the second is the role of agencies set up to solve some of the pressing problems of the wheelchaired.

Chapter 1, on social attitudes, will show how society's prejudice against the wheelchaird has successfully kept them segregated in transportation, housing, and education, as well as keeping them out of jobs for which they are completely qualified. This prejudice against the physically disabled also makes adjustment within families to a disability far more disrupting and difficult than it already is.

Chapter 2, on agencies, will show how ineffective agencies have been in obtaining the rights of equality for the physically disabled by refusal to let this group be heard and actively participate in decision making processes, by poor management, and by the overlapping and resulting ineffectiveness of many of the agencies.
PART 1

SOCIAL ATTITUDES
INTRODUCTION

Obstacles to a successful and happy life are present both in the physical and social environment. Many obstacles to satisfaction are raised throughout life by other people or by the customs of social living. It is these issues—the social or society oriented or inflicted ones which we are interested in in this chapter. People are often thwarted by the attitudes and actions of parents, friends, associates, and by general public opinion. In addition, their needs can be blocked by the built environment, as this is the setting for social interaction. Lack of something in the environment can prevent need satisfaction as surely as any other obstacle. Something that is lacking has to be provided, just as a barrier has to be surmounted or removed.

To say that the course of life is never smooth is a vast understatement of the problem. It is the degree or intensity of life's hassles which must be faced by an individual which we are most concerned with. Motives must be satisfied, but situations which frustrate and impede normal activity invariably arise. Unhappiness, feelings of worthlessness, behavior which is unproductive, self-defeating, and contradictory are symptoms which are often brought about when a person's self concept is not in agreement with the expectations of society as a whole. People suffer from not only the over expectation of society, but also to under expectation which is truer in the case of the physically disabled than the able bodied. Their ability and usefulness is often overlooked and downgraded by some nameless "silent majority's" attitudes and standards.
SOCIAL INFLUENCES ON BEHAVIOR

Hardly anyone can ever free himself from control of society. Its pressure is brought to bear on all facets of people's behavior, prescribing everything from what you wear to how you should act at various occasions—the so called rules for virtuous living. Most subgroups within a culture also exert influence on the behavior of the individual. The family is usually the first place a child learns about interpersonal relations and about which behaviors are appropriate and acceptable in his society. Then too, friends and associates with whom a person has frequent informal contact also affect how he responds to various situations. Peers are often even more important than parents in determining the behavior of teenagers, whose conformity in dress, hair style, and so on is well known. Therefore, it can be seen that behavior is determined by society at all levels—from parents and family to government and society as a whole.

Our behavior, then, is to a large part influenced or determined by group norms or standards of behavior. We are apt to follow certain roles as deemed right by norms. A role is the behavior expected of us in a particular status. The accent should be placed on the word "expected". A group can expect certain behavior from us because it can confer its disapproval on us if we do not do what is expected. Most of us are likely to do what is expected from us, conforming to what we feel are society's expectations for two reasons. First, those who go against the norms suffer social disapproval or punishment in varying degrees. A second reason for social conformity is that an individual may "go along" with the opinions of his group because he believes or is made to believe these opinions are correct, or at
least probably correct. These two factors—fear of disapproval or rebuff and the belief that the group is correct—are both factors which are probably at work in most situations governing behavior.

THE EFFECT OF PREJUDICE — SEGREGATION

Now one may ask, what happens when certain groups are singled out for some distinguishing trait which they have in common, and this group becomes the focal point of some prejudice or negative attitudes? The consequence of classifying people into categories is that it involves erroneous thinking and beliefs. Obviously, we have many groups who have been so prejudiced against—certain nationality groups, women, and the physically impaired. Jews have been stereotyped as shrewd, and ambitions; Blacks as superstitious and lazy; women as subservient to men; and the physically impaired as paralyzed in mind as well as body. Attitudes such as these are formed from information passed down culturally, from that which we read, see or hear in newspapers, books, TV, etc., from authorities, from contact with prejudiced people. Whatever the source, these stereotyped beliefs tend to be handed down through time without question or thought from those who believe them.

What are the effects of prejudice on those who are the object of prejudice? There are many. In some cases, it creates social conditions that confirm the prejudice. For instance, in the case of people with anti-Black prejudices who believe that Blacks are less intelligent than whites. Believing this, they prevent Blacks from getting adequate schooling, library facilities, housing and other cultural opportunities. The result, of course, is a social handicap for them that prevents them from being as educated as whites. Thus, the prejudice becomes true, creating the social conditions that justify the prejudice. Another equally serious effect of prejudice is
that prejudiced people avoid those against whom they bear a prejudice. This fact applied on a large scale has a very simple result—segregation. Segregated facilities are seldom equal. It prevents different groups from getting to know each other and develop understanding toward each other, thereby allowing for a change in attitude.\(^3\)

This discussion of segregation bears directly on one of the major problems faced by the physically disabled. The same prejudices that are often heard against persons of different color, race, or religion crop up in discussions of physically disabled people. In a report by Naomi Chamberlain of the Rehabilitation Center of the University of Rochester School of Medicine and Dentistry,\(^4\) she reports statements to interviews of businessmen queried in an architectural barrier survey. She has separated them into five attitudes toward the physically disabled:

1. "I wouldn't mind setting aside a few rows in the auditorium for people like that in the back where they wouldn't upset people."

   "I will have a special show for your group."

   "I think the city ought to build a nice theater just for people like that."

These statements are further indications of the old familiar "separate but equal" philosophy of segregation.

2. "I wouldn't mind having a few people like that at different times, but I wouldn't want a lot of them coming into my store. They might die here and that would be bad for business."

   On an occasion we were told of a small group of wheelchair users being turned away from a prominent Boston restaurant because "their appearance would ruin the appetites and enjoyment of those eating in the restaurant."

These statements reflect the old familiar—a few I can tolerate, but as to real acceptance of all—never.
3. "I feel sorry for people like that but they upset me."

"Wouldn't they be happier if we just had enough of you fine missionary spirited people to take whatever they need into their homes?"

"Shouldn't people like that be in a nursing home where they could find others like them?"

These statements are a rejection of those different.

4. "I hired a very nice handicapped man, but he was different. I made over our toilet room so that he could work here. You can't use that in any publicity because I don't want to be flooded with applications from people like that."

"Are you doing this survey to get jobs for those people? My insurance would go up, and besides, in case of fire wouldn't they be a problem? Of course I know a handicapped girl and she was a sweet little thing--they have nice personalities. I guess it's because they are sick."

This is the old and familiar justification by exception--holding to a prejudice for an identifiable group while rationalizing that one is not prejudiced by citing an exception.

5. "All people like that are so twisted up. They don't think like we do."

This is the preassignment of a trait to a group.

As a result of these kinds of segregation resulting from prejudice against the physically disabled, it has been recommended that they should have separate and segregated housing; should use a specialized transportation system rather than public transit; should have an isolated little area within a public park where they can wheel around with only other wheelchairs permitted; should not travel on airlines because they might be in the way if an emergency evacuation became necessary; should have separate schools because they can't run and jump in the play yards. Some of the above have gone beyond the recommendation stage and have actually been enacted. The Seattle
and Fargo Housing developments are examples and have been discussed in the chapter on Public Housing.

Now, with the current intense interest in ecology, and saving the environment, the Nation is up in arms. We are committed, however belatedly to undoing our wrongs and making this environment a safe, comfortable and healthy medium for all of us. Man has obviously done quite a thoughtless job up to now on the environment he has designed himself--our city scapes, our buildings, our transportation facilities, our recreation areas, our housing. The major mistake he has made, which we have pointed out several times in previous chapters, and do not hesitate to mention again, is that he has designed his buildings, houses, cities and transit facilities more suited to a perfect being than it is to man. The designers have failed to realize that it is man's nature to span the whole range of capabilities and to experience all manner of limitations in the period between the cradle and the grave. The physically disabled and the elderly are merely obvious manifestations of the imperfectibility of mankind.

SEGREGATION IN TRANSPORTATION

To cover up this mistake, there are those who would prefer to "sweep under the rug" those who are not able to use that which has supposedly been built for them, rather than righting the wrongs. If they cannot use the transit system, housing, playgrounds which exist or are being built, they should build their own, seems to be the prevalent attitude. You may rightly ask at this point, "who are these nameless forces"? They are administrators, government officials, planners--the decision makers. According to Edmond J. Leonard, Director of Information, President's Committee on Employment of the Handicapped, they are represented by the philosophy of the general mana-
ger of a large urban transit system now under construction in a major city. In the general manager's report to the directors concerning his reluctance to make the system accessible to persons who use wheelchairs he reasons this way:

"While it may be the function of this Authority to provide public transportation to the community, it does not necessarily follow that it must be provided to all persons by the same mode...Perhaps a special system, serving the user at the same fare, could be provided at far less cost and at the same time assure for better transportation."

During discussions at this board meeting, which was open to the public, there was a tape recorded hidden under a wheelchair which picked up the following conversations. One of the directors asked what provisions were being made for the physically disabled where mass transit systems were under construction.

Toronto -- "None, and none was intended."

London -- "It is dangerous for those who ordinarily use the system, as well as dangerous for the handicapped to place them in the environment of the subway operation."

Mr. Robbins, of London, further defended the industry itself on the grounds that "the problems of the subway are different than the responsibilities of other agencies of government."

Not only is the ground transportation involved in this sort of negligent prejudice, but the airlines contribute their stupidity also. Leonard cites an example of a Miami hosted convention of war wounded veterans. However, the convention nearly had to be canceled at the last minute because a prominent airline, which has the very lucrative franchise to the Miami International Airport, refused to carry these veterans. It was only after a frantic meeting at the highest levels which permitted the convention to go forward as scheduled, with the airline magnanimously lifting for a temporary 10-day period its strict rule against the carriage of passengers in wheelchairs.
This kind of regressive philosophy will serve to isolate the physically disabled from the rest of the community. Despite the passage of Federal legislation which dictates that Federal grants cannot be used for facilities which are not accessible to the physically disabled, there are still Neanderthal minds who try to waiver their position beyond the spirit and letter of the law. Without the social approval of society as a whole, laws are ineffective.

SEGREGATION IN HOUSING

Previous to the building of specialized housing for the physically disabled, there was no place that they could live except in institutions, remodelled homes or homes designed especially for them which would allow them any physical mobility. By far, most individuals with ambulatory impairments cannot move about actively taking care of life's daily needs. They are in this sense segregated from the rest of society because their needs have not been built into our structures.

Now, however, the public and government say that they do care, hence the advent of a couple of specialized low cost housing projects for mostly single individuals. For the first time in their lives, some 300 or more persons in the United States have a place to live where bathrooms are accessible and kitchen appliances are within reach. But, let's take a look at the social implications behind such specialized housing.

1. We are willing to provide accessible low cost housing if the apartments are 100% for those with physical disabilities.

2. We are also willing to provide a certain number of accessible apartments in low cost housing if the rest are reserved for the elderly.

3. If the trend continues, as with Center Park in Seattle,
we will place such apartments on a site which is out of the public mainstream of activity and with no accessible public transportation nearby or planned for.

Is it too far-fetched to compare this situation to that of Russia? Leonard writes of the travels of John Gunther through five Russian provinces.

He wrote this about Tashkent, capital of Uzbekistan:

"The most startling thing in Tashkent, as well as in several other Central Asian towns is the astonishing number of amputees. Within moments of arrival, along the streets and markets, we saw cripples hobbling. Some begged, some sold pencils and shoestrings."

"At first I thought that these unfortunates have been shipped down there because the climate is solubrious. I should have known better. A few years ago, Communist authorities decided to clean up Moscow, Leningrad, and other great Russian cities of their more obvious disfiguring elements. So tens of thousands of them were simply picked up, corralled, and shipped out to remote places in Central Asia, and there they stay."

Although this is an extreme example of the segregation of the physically disabled, and we say that our intentions are not the same, it seems to us that the underlying theme is undeniably the same--segregation.

Leonard further writes of plans for a separate community for 2500 physically disabled persons in Wisconsin. If this project is built, and if a reasonably designed public transportation system does not accompany it, we will have these 2500 physically disabled persons settle down in their cozy homes never to return to the outside world, as they will not be able to get beyond the city limits. The planners are hailing this project (named Operation Greensleeves) as a "self-contained community". How right they are!

There is another viewpoint on the specialized housing issue. Ida Daly, president of the Seattle Handicapped Club and a leader in the realization of Center Park after much time and effort believes that specialized housing is not segregation. She writes:
"A critical area of need, just beginning to be recognized by those in a position to do something about it, is again threatened with neglect because a popular 'scare' word is being applied to it. The long struggle to obtain adequate, low-rent, barrier-free housing for the physically handicapped may 'go down the tube' unless we at once challenge the growing concept that it is 'segregation'. Twenty years of watching people isolated in upper rooms by steep stairways, rendered unnecessarily helpless by poorly designed kitchens and bathrooms, forced into substandard buildings and damp basement apartments by rentals above their means, makes the application of the word to such magnificent projects as Center Park apartments in Seattle seem puerile emotionalism and over-sentimentality. Do young men living in fraternities feel 'segregated'? Do teachers living in the University Women's club feel 'pushed aside'? Do the wealthy residents of luxury condominiums think that society has 'rejected' them? Obviously not. Then why should a person who is fortunate enough to find and of his own choosing live in a building and in an apartment within that building where everything has been planned for his convenience and independence be made to feel segregated because he, and his fellow residents, happen to have a physical limitation? As I listened to the more voluble grippers at Center Park, I balanced their complaints with the much-more-frequent expressions of gratitude and pleasure. It was noticeable that those not entirely satisfied, those who felt isolated and saw the situation as 'an island,' were those who had had little experience fighting conditions in the community. They were newly disabled, had lived at home, or were not too badly handicapped to negotiate steps in average housing...

"The problems at Center Park during these first two years have perhaps overshadowed the advantages in the minds of housing personnel responsible for solving them. But they are problems not directly connected with housing. It is my opinion that the areas of health, housekeeping and personal care should be covered by a special group headed by professionals in the three fields and implemented by the use of volunteers and students. I wish this could be tackled by the handicapped themselves, on a national scale. I am certain that the skills and abilities necessary lie within our ranks.

"This help would still the fears within Federal Housing Administration officials who are now backing off from further projects like Center Park. I was told recently that a person in a key post with H.E.W. is recommending against other such construction. This would be a tragic thing to happen to the hundreds still in need of special consideration if they are to reach optimum activity and full enjoyment of life within their remaining capacities."
It seems to us that Daly would not have written her letter if the plight of the disabled population were different. If we would approach the problems of housing with large scale solutions and make all public housing true to the term public—of, belonging to, or concerning the people as a whole; for the use or benefit of all, the desperate need to solve the problem would not be in the form of segregated units. Also, such units have been given "bad press" up to this point for reasons similar to those which we have cited several times, and there is now fear that the Federal Housing Administration will not sponsor any more of such projects. This would leave us with the plight of accessible housing back at the previous desperate level where so many are either living in an institution or stranded at home. So, it appears that we are involved in a vicious circle: we desperately need accessible housing; the only kind which the government will sponsor are segregated projects which are far from the ideal solution, but do succeed in giving the tenants some needed independence; if such units continue to be criticized (and justifiable so) we will revert back to no housing being built. However, there is the solution of making all public housing for all of the public, and therefore providing units in every project for disabled persons. This is the goal which we must work toward.

SEGREGATION IN EDUCATION

The most obvious case of segregation occurs within the school system where for years, the physically disabled have had special but separate schools or have been put into so called "special education" classes. The present system of isolation of physically disabled children is depriving them of having a normal relationship of meeting fellow students after school or being "one of the gang." At an early age the physically disabled child
thus already feels left out and inferior. If these children could attend
regular schools from kindergarten on and be allowed to compete with able
bodied children throughout the school years, an understanding could be es-
tablished between the two. Now, most able bodied children have no contact
or knowledge of the disabled, in fact rarely do they ever see anyone in a
wheelchair or barces. In this way, the prejudices of society are easily
passed on to children as they have no experience of their own.

When introduced on as normal a basis as possible, able bodied and phy-
sically disabled children together are capable of setting an example for
adult human relationships. Laura Hughes writes of a second grader in leg
braces who reflects:9 "At first it was kind of hard. I mean getting to
know the other kids--and I can't play some of the games they can. There are
other games though, so it's okay." And his able bodied classmate shrugs off
any difference between them with "He's my friend--that's all." This kind of
acceptance of each other and the hopefully appreciation of each individual's
contributions can only come about if the two are allowed to get to know each
other.

Public schools of Houston, Texas are attempting to emphasize this "stu-
dent to student" contact in a regular classroom. With a $50,000 grant from
the U. S. Office of Education, the Houston school district has initiated a
program to eventually eliminate most special education classes for the phy-
sically disabled children in the district. Under the new program, physi-
cally disabled students will join able bodied students in attending regular
classrooms at the school in the zone where they reside, instead of being
bussed to the special classes in frequently separate, far removed schools,
as was necessary with the past system. No opposition to the program has
been raised by either parents or teachers. Special education teachers are
being retrained as consultants to regular classrooms and will go from school to school wherever help is needed. There are children of various disabilities who are already attending regular classes successfully.

Yet, most public schools across the country remain less than receptive to the needs of an equal education for all children. The education remains not only separate, but unequal as well. Special education classes for the physically disabled child are damaging to those children and to the able bodied as well who take on the view of society that these children do not measure up. Leonard Eaton, a poster boy for cerebral palsy in 1950 relates his school experiences:

"My education was segregated because I did not attend class with the non-handicapped students until I entered high school. All disabled students were lumped together in what was called a 'special class.' Indeed we were a 'special class,' since our academic workload was geared to the intelligence level of the lowest achiever in our grade. My non-handicapped friends, all of whom I met outside of school, were learning geometry while I was doing simple arithmetic; they were reading Ivanhoe while I was reading "See Spot Run." It was tacitly assumed that since we were physically handicapped we also had the same mental ability. This philosophy of education caused the brighter handicapped students to give up on education. They often became academically lazy. If some instructor did try once or twice to give them grade school level work, by then the student often did not perform because he or she had never developed good work habits. This failure on the part of the bright student was used as further evidence of his incapacity to do grade level work.

"It is obvious that in giving the handicapped student separate and unequal treatment, society is saddling him with an education disability to add to his physical one.

"But this system of learning creates a third burden far greater than the other two. This third burden is intense self-hate. These students often thought of themselves as inferior beings, not so much for their crutches and braces but because of the different treatment these devices brought on. Many students spent their entire academic day dreaming of being with the 'norms' (non handicapped) upstairs, because they were 'better' people. Of course, the 'norms'
never came downstairs to be with us. If by chance there was a meeting on the ground-floor level, it was accomplished with shy embarrassment.

"What I am saying here is that much of the argument which led to the outlawing of racial segregation in the school could be applied in the case of the handicapped. To be treated as inferior makes one feel inferior, and unfortunately leads to inferiority."

A different viewpoint says that physically disabled children should not attend regular schools because the exposure to so many activities which they are unable to participate in would be psychologically damaging. The solution to this lies in the hands of planners and architects. They have at their fingertips the tools and ability to design schools which will allow for total accessibility for maximum participation of all students. There will always be things that the physically disabled are unable to do, but if there are enough alternative activities which they can participate in with the able bodied, there will be a minimum of watching and a maximum of joint activities. Integrated schools is an extremely important method for the able bodied to gain an understanding of and compassion for the physically disabled, and it will also contribute to the adjustment and independence of the disabled child.

What about higher education? The doors of most college campuses have been closed to disabled students because of inaccessible facilities and policies of discouraging their applications. It is only by making school administrators aware of the problem that changes can come about. A small group of disabled students at the University of Michigan got organized and set out to make some changes there. On a Wheelchair Awareness Day, University of Michigan administrators spent their first day in a wheelchair to sensitize them to the difficulties faced everyday by disabled students. Some of the observations made were the following:
"I felt helpless and self-conscious. I was sure that people were watching me."

"I tried to get a drink of water. It was impossible."

"I found that I could carry on my daily routine, but I got a lot more tired. I saw friends across the room but found myself not going over to talk with them because it was just too much effort."

The participation of the Regents was valuable in terms of the publicity it gave to the problem of wheelchair mobility, but it also had significance in the increased awareness of the participating staff members about the problems faced daily by wheelchair users. The University of Michigan is well on the way toward removing prejudice against disabled students and removing the apathy that stands in the way of making it conscious of the needs of all who want to attend a university. Only through awareness will the prejudice which segregates or prohibits the wheelchair user in the pursuit of their goals be removed. Attitude change is needed for progress.

SEGREGATION IN RECREATION

The same issue that is involved in the transportation, housing and education problems is pertinent in the area of parks and recreation facilities. Should we have separate (hence usually unequal) areas where the physically disabled can congregate? Up near Tallahassee the Forest Service dedicated its Trout Pond Recreation Area which happily has all the accommodations necessary for the comfort of the physically disabled. One columnist wrote:

"It's the plumbing that sticks in your mind even longer than the natural beauty of the spot, after you visit the unique campground for the handicapped in Apalachicola National Forest. A man in a wheelchair can go to the bathroom privately, and with no help."

This statement, we do not feel, deserves further comment in these civilized times. But, let us take a closer look at what Trout Pond is. It is a
recreation area reserved exclusively for the physically disabled, with prior reservations necessary. Although it might be true that the facilities are extremely pleasant, and even luxurious, it should upset the physically disabled because they are really being shut in under the pretense that the able bodied are being shut out. Also, the able bodied should object to such an area because they too are being prejudiced against in that they cannot use such a pleasant place themselves.\textsuperscript{13} It appears that segregation never provides an acceptable solution to any of these problems.

**PREJUDICE, THE JOB MARKET, AND THE PROGRAM OF VOCATIONAL REHABILITATION**

Most stories in magazines or newspapers which one reads on the physically disabled individual are success stories. From a vocational standpoint, these persons are no longer handicapped, as one of the reasons for printing their story is that they have overcome the handicapping effect of their disability sufficiently to earn a living. Undoubtedly some of these persons read about used services provided by the Federal-State programs of Vocational Rehabilitation.\textsuperscript{14}

For a physically disabled person to be gainfully employed, he must have courage, determination, a willingness to put in long and sometimes painful hours, and patience. He also must satisfy the educational or training qualifications for a particular job. But more than these traits are necessary--there are some requirements of the employer also. He must not have preestablished prejudices or negative attitudes toward the physically disabled and therefore judge all individuals on their ability to do the job, he must understand the mobility requirements of a wheelchair user, and his building must have complete accessibility--entrance, restrooms, cafeteria,
Does the thought of job hunting now seem like an overwhelming proposition?

When a physically disabled person goes in search of a job which he is qualified for, he often meets a variety of reasons for his not being hired. A wheelchair user would often be turned down for a teaching job for any or all of the following given reasons:

1. Couldn't help evacuate children in case of fire, earthquake, or similar disaster.
2. School has many steps at all entrances, thus making entrance by wheelchair impossible.
3. Classroom is on the second or third floor where steps make access by wheelchair impossible—there is no elevator.
4. Children would not respect a teacher confined to a wheelchair, so discipline would be an insurmountable problem.
5. Our teachers are required to perform other duties, such as taking tickets at games and someone in a wheelchair couldn't help out with these duties.

Although several of these reasons appear to involve physical problems, there are social attitudes underlying all of them. Either an outright prejudice (4 and 5) or an apathy toward solving the architectural barrier problem is involved. There have been some schoolboards and hiring personnel who have recognized the teaching ability of teachers in wheelchairs and placed them in schools where there are ground level entrances and the classroom is on the ground floor. As far as the question of respect from the students, there are attributes and an understanding of life that a well-adjusted, physically disabled person can pass on to the students—a rare opportunity for those students. It is far more apparent that prejudice is the principle reason why wheelchaired teachers are not being hired and in many cases not even being given the courtesy of an interview.
How does the Department of Rehabilitation fit into the job scene? The job of the Department is to determine medically and educationally if a person has the potential of becoming "fit for gainful employment." Assuming an individual is judged eligible, and a goal is set, the counselor will arrange for training either in school, on the job, or in the home. Although not stated, it seems that the counselor should do more than arrange for the tools to look for a job. He should provide understanding and especially encouragement to the people he serves. This is not always the case, as cited in the following example:

"I want to tell you of an experience I had with prejudice. It occurred in my dealings with the vocational rehabilitation office in my city. I applied for assistance... From the first, the man I dealt with seemed to take a dislike to me. He treated me like a child. He would not even let me express an opinion... The decided to send me to photography school. When I had completed my course the rehabilitation office seemingly forgot me and did not keep track of my progress. I was a somewhat shy individual at the time and just did not have the push or forcefulness to go many places looking for a job as a photographer, therefore I accomplished nothing with my training."

Although the will to work cannot be handed over on a silver platter, one cannot but wonder if the situation would have led to employment if the counselor had not been discourteous and demeaning and had offered some much needed encouragement, confidence and interest.

Rehabilitation professionals must develop an understanding of the people they are serving and only when that happens can they consider the real needs of disabled persons. In the past few years a new force has emerged on the rehabilitation scene, namely, the consumer organization which evolved from scattered groups of recreation and socially oriented physically disabled persons in Massachusetts. Their approach was to try to serve as an adjunct to existing structures by serving on their boards, serving as consultants, conducting surveys, promoting legislation, etc. The major way this affects a
Rehabilitation Research and Training Program is that it involves the consumer in the decision making process of policies for themselves. Before, it was quite possible that the Program professionals did not really know what client he was serving or his priorities. He had to speculate on how effective some proposal would be in the life style of the impaired based on what he thought must be vital to his needs. This consumer group can assist the NRA on all levels. Starting with the conceptualization process, the consumer can be of valuable assistance by:

1. Assisting with the establishment of priorities.
2. Anticipating any possible resistance to a project at the grass roots level.
3. Providing information to his constituency.
4. Giving technical assistance from his group.

The physically disabled people deserve the opportunity to share in any decision making process affecting their life style. The workings of Mass. Rehabilitation Council will be discussed in detail in the following chapter.

FAMILY DYNAMICS

The family as a social group and marriage as an individual relationship has not been given proper recognition in the field of rehabilitation. There is an immediate need for two things to happen in this regard:

1. Those who counsel and advise the disabled--the rehabilitation counselors, psychologists, social workers and even the physicians need to recognize the significance of marital and family relationships to the disabled, especially the more severely disabled such as those with spinal cord injuries.

2. Those who are disabled should demand more help from professional personnel with their problems in areas of marital and family adjustment.

Where family is concerned, there are two entirely different situations...
which must be discussed separately—a family where one parent is disabled, and a family where one of the children is disabled.

A Disabled Parent. The dynamics of marriage and family involve a complicated range of delicate and emotional nuances which even challenge the adjustment process of the non-disabled as witnessed by the high divorce rate today. When you add a disability to the difficulty of marital and family adjustment, you have all the problems of a non-disabled family plus those imposed by the disability itself, thus skewing the problem out of proportion. Family is the most basic of all our institutional structures and it is probably the most complex of all of them. It meets the fundamental needs for preservation of the species, regulation of sex desires, and acts as a haven for the rearing and basic education of the young. It is emotionally packed and the most absorptive of all relationships.

What happens when a parent becomes disabled? The situation may be so severe that it produces a traumatized home. It affects the nature of family interactions so that the family as a group may no longer have the social and psychological cohesion it once had. Let us consider first the case of the husband and father being disabled. There is a blow to masculinity which creates role ambiguity and role reversal where the husband is forced to stay at home and become the homemaker while the wife becomes breadwinner. He can no longer participate in the same sports and games with his children that he once did. Family outings become a limited and difficult trip. The family is faced with new financial expenses—medical bills, the need for renovation of the home or a new house altogether, expensive new equipment. The loss of a job on the part of the disabled husband only magnifies these problems all out of proportion.

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When the wife is the disabled party, there are different difficulties. She will have difficulty in being the same kind of homemaker she once was. There will be many appliances which she can no longer use easily and quickly as she once did. Washing clothes, doing dishes, cooking a meal become real chores to her now. Taking care of the children becomes difficult, the dashing here-and-there performance of the nameless number of errands she used to run becomes impossible. She too will feel a blow to femininity feelings.

Psychologically, a disability may cause ego damages, personality damages, insecurity, fears and guilt which greatly affect the ability of an individual (male or female) to function adequately. Disability may affect the nature of the husband-wife relationship and especially change the nature of sexual adjustment. Inadequate feelings resulting from dependency also plays a large role in adjustment. The disabled person can easily feel that he or she is a burden to the rest of the family members.

The children of a disabled parent have problems of adapting to a physical disability of a parent, too. The attitudes and sympathy of their friends affect the children. They see other parents actively participating in family recreation, attending PTA meetings in an inaccessible school, doing things which one of his parents cannot do because of environmental barriers. The parent is no longer able to do as many things as he or she used to do for the child, especially if the family has more than one child. Earlier responsibility and new adjustments must therefore be faced by the children of a disabled parent.

Thomason points out that:

"In rehabilitation, we have traditionally perceived the individual as the rehabilitative unit and, in many instances, ignored the fact that the disabled person is a member of a marital and family unit. Several writers have stressed the importance of family solidarity as a positive factor in rehabilitation. Perhaps it is time for rehabilitation personnel and others to think of the marital or family unit as the basic rehabilitation unit."
A Disabled Child. When it is the child who is born or later becomes disabled, the problems involved are quite different. Parents play a key role in the adjustment of the child to society and family living. In many cases, the parents over react and tend to smother the child. Maire Sanders writes:

"For the disabled, parental attitudes are most important. In many instances, the light in which Mom and Dad see us means the difference between success and failure. If they shelter us from the world, we can't develop our full resources, or if they shove us away, we may become resentful and filled with self-pity. But if they encourage us to be as independent as possible and to utilize all our potentials, we should be able to reach our goals and attain personal satisfaction. For example, when Eve, a cerebral palsied, was in her late teens, a famous doctor offered her a job taking care of young handicapped children in a special school. In addition to a small salary, Eve would have received free room and board, a chance to complete her education, and the therapy that she needed so badly. As Eve loved children, and her parents, being poor, had never been able to give her many advantages, this seemed to be an opportunity of a lifetime! She was about to accept this ideal situation when her parents pleaded with her to stay home since she was an only child, and they couldn't bear the thought of her moving to another state...."

In other cases, the sibblings suffer because the amount of special care and attention devoted to the disabled child is taken away from their time with their parents. Resentment and jealousy can easily result in such a situation.

Social attitudes toward disability are also apt to affect the whole family with changes in friendships. Some friendships will change because the family can no longer visit previously close friends in their home because of architectural barriers. They cannot ask their friends to do away with all the steps in their own home! Other friendships change because of attitudes towards the abilities of the physically disabled. They cannot participate in the same sports with friends that they used to and the desire to suggest new ones does not exist. Gwen Norton, as a mother tells of her experiences:
"Personally, we never knew what discrimination was till our Ann was hurt. People we thought were friends turned away as from the plague—and this wasn’t just our experiences with bad injury... others found out, too, who their real friends were—very unexpectedly acquaintances became friends and vice versa. Being in a wheelchair gives the uninformed the opinion that you just couldn’t be all there—in the first place, if you were you’d not have got in such a predicament... (an) Educational Consultant... surprised our Ann no end by talking baby talk to her—another just ignored her—never even said 'Hello'... Prejudice born of ignorance most surely, as all prejudice is, but coming from people who should know better, it hurts."

When a disabled person is in a new situation involving new environs and new faces, it is natural that he becomes somewhat apprehensive. From past experiences he knows that some people react toward him as if he were a mindless idiot. In restaurants some waiters have been known not to speak directly to the disabled party and have others order form him. When it is the husband who is disabled, he is justifiably offended and outraged when his wife is asked what her husband wants when he is there himself inches from the waiter. The same thing is apt to happen while shopping, house hunting, etc.

It can be seen that when a member of a family becomes disabled, rehabilitation or adjustment depends not only upon the attitudes of society as a whole, but on the attitude and action of each family member. The family is a social group in society, and all these forces come into play when the family is forced to adjust to new situations and interact with each other, friends, and the environment.
CONCLUSIONS AND RECOMMENDATIONS

We may well ask the question now--what does society expect of a physically disabled individual? They have passed laws, most far too shortsighted to do any long range good. They have taken some action toward segregation of the disabled in education, housing, recreation. The disabled have largely been ignored in the area of transportation. The present state of our welfare system seems to encourage unemployment and divorce in order to qualify for any of their needed services.

People would be able to appreciate the similarities and differences in other people if they were given the opportunity to relate to each other. But

RECOMMENDATIONS.

1. Get rid of the segregation principal and work toward an environment to be enjoyed by all citizens of all races, sizes, and individual characteristics.

2. Each one of us make a basic affirmation of the rights of all people, and in this way personally and socially do away with any existing prejudicial attitudes, and lay low the regressive forces which would banish the physically disabled to a state of isolation.

3. We as architects and planners can build a sympathetic environment, sympathetic to the rights and needs of all people who normally have difficulty in using the environment. We can overcome problems with intelligent planning and scheduling and above all, flexibility in any given situation.
footnotes


3 Ibid.


6 Ibid.

7 Ibid.

8 Daly, I. "Specialized housing is not segregation." Accent on Living, Spring, 1972, 11-12.

9 Hughes, L. "Public schools and crippled kids." Accent on Living, Fall, 1972, 10-11.

10 Ibid.


12 Duffy, Y. "We made University officials listen to the problems of disabled students." Accent on Living, Fall, 1972, 40-47.

13 Leonard, E. J. "Are we handicapped an endangered species?"

14 Scher, P. L. "Training and job opportunities are waiting for you, and you may be able to qualify!" Accent on Living, Spring, 1969, 40-42.

15 Ibid.


17 Ibid.
18. Scher, P. L. "Training and job opportunities are waiting for you...and you may be able to qualify!"


22. Ibid.

23. Ibid.

24. Sanders, M. "Do parents have to be our biggest handicap?" Accent on Living, Spring, 1972, 14.

PART 2

SOCIAL AGENCIES
INTRODUCTION

The non existence and deterioration of adequate housing is everywhere in evidence. This is especially true for the wheelchair citizen. Statistical studies of housing are merely confirming the above, and assume a lack of concern and a decline of interest on the part of developers to produce housing units, thus being the primary factor in the fragmentation of our uncoordinated efforts to produce housing both at the public or private level of service. Developers assume a role of not being able to supply housing due to the lack of necessary capital, while in the same flavor very few users can afford to buy housing. Thus housing problems and their solutions invade every sphere of concern, even in those who surround themselves with the illusions of out-dated codes and obsolete social policies.

The prime sponsors of housing, the federal government and its related divisions (HA, RA, etc.), banks, and insurance companies are a focal source of economic power, ineffective when it comes to solving the housing issues of inadequacy, cost burdening, and inaccessibility because of their limitations when performing on local levels of concern. The concern for action presupposes a very basic question. In the demand for housing for the wheelchair user, how can these agencies efficiently resolve the demand practically through financial means? The answer lies in a recognition of the potentials of a powerful and flexible regional or local organization able to maintain very narrow fluctuations in housing authorities as well as housing mortgage lending and at the same time provide incentives to induce, influence, and stimulate the public and private sectors in housing.

Thus the system is viewed as a development process examined through Housing Agencies, institutions (public and private), and finance resources.
Activities are evaluated in the light of their role in economics, aesthetics, environment, management, and overall general philosophies toward the development of community.

The approach we attempt to review is that quality in environment as well as user function can only be ascertained by citizen participation. While concepts of community development are issues of citizen participation, the nature of community and concern for the wheelchair have been developed in a separate chapter on community.

The mediating function between citizen participation and development process is the lack of translation of means—communications. Adverse forces demand analysis and examination of this complex organism. Discussion would thus investigate the function of communication, its effectiveness and responsiveness. Planning for development processes depends upon the way in which various planning agencies in a city interact. This process represents an ongoing flow of information in two directions: first, an upward flow of basic statistical data, needs, and feedback, and secondly, a downward flow of information from the planning bodies to the public explaining programs and alternatives.

The upward flow of statistical data consists of social and economic information as it functions to improve the context of decision making and planning. It usually reflects two categories: 1) multi-purpose metropolitan wide data of significant elements of the urban environment, 2) specific information, detailed in nature, usually issue oriented, on the level of user needs. The downward flow of information is of increased importance as it becomes generally recognized that in order to achieve effective planning, citizens must be actively involved in the planning process. Citizen participation, therefore is a tool which aids planners to improve their own planning
expressed by defined community intentions.3

The wheelchair user has unique communications in that he exists in an incredibly aware community which has ramifications for citizen participation. The variety of organizations causes competition for their attention and interests. In order to maintain credibility among the plethora of agencies, each must prove that it functions through and for the people. However, there has never been much cohesion within these diverse groups. In spite of the many agencies, cities are not well arranged and instead reflect a disorganized mass of organizations. The private housing sector, on the other hand, is constantly faced with the competition of the commercial and industrial sectors in the money market.4 The planner of today faces the problems of prejudiced expectations based on past experiences and disappointments. The wheelchair users have been consulted as to their preference in anticipation of a grant, but usually the grant is at a lower level than ordinarily expected. "Plan comprehensively", they are told, but the funds made available preclude significant treatment of the problem at a comprehensive level. The federal government promised a "war on poverty", which later diminished into poverty programs, delivery being much less that it led communities to expect.5 Even if the community and its planners work together to achieve something of value, the lack of coordination within the city structure provides no means of insuring that the city departments responsible for maintenance will follow through. What is needed is some sort of long range commitment that will not vary with the business cycle, and a coordination among the business sectors, the housing industry, and the governmental agencies.

PLETHORA IN SYSTEM AGENCIES

Successful planning for broad based defined community development objec-
tives, which means including the wheelchaired, elderly, poor, depends upon the way in which the various planning bodies relate to the communities in which they work. These approaches and relationships will encompass functions of both the environment in which the planning is incorporated and the way the participants define their roles within it. These areas affect the communications process.

Rabinowitz, in *City Politics and Planning*, explores the fragmentation of systems and the implications that structure has for planning. Since the wheelchair users' residence location has no defined point of origin, their structural problem seems to correspond accordingly in each residencial location. Structurally, the fragmentation of systems is composed of numerous and diverse communities whose nature is both locally functional and geographic which develops concepts for local interest (self interest) which are limited in their planning scope and perspective and lacking in cohesive and coordinated planning. While the concentration of a strong central government exists, the concept of strong city leadership does not. The fragmented system has no visible leadership group or groups. Formal holders of authority (mayors, city managers, etc.) may be thrust into decision making by virtue of this vacuum which no one really leads. The chief executive has limited power and is reluctant to initiate new programs, such that, given his inability to rely on the executive to sell his planning proposal, the effectiveness of the planner is greatly reduced. Thus, the citizen's participation is a null theory.

If communication represents an ideal, then common goals can only be reached through residence discussion which leads to citizen participation. And, if such discussions are to influence the planning process at all, complete participation must begin and continue throughout the planning process.
to allow participants to appreciate the full complexity of planning and its various ramifications. The discussants, moreover, should represent broad-based community constituency—the wheelchair user whose goals and values reflect change demanded by the elderly, the poor, the young, and the confined. The planner should not limit himself to the constellations of interests that maintain established formal organizations—permanent organizations existing subgroups or potential interest groups cannot be left unrepresented.

The system, as known under its fragmentation policies, cannot grip the issues and, of course, cannot obtain a real commitment to any given policy course due, not as much to influential persons or organizations which seek to prevent something from happening in order to protect their own interests, as it is to the mixture of parties who come in when they perceive that they may be injured by a particular measure. These latter groups use their resources to block actions, such that controversial projects receiving even a nominal approval are likely to get bogged down in the implementation stage. Oppositions by various groups often includes not only groups of citizens adversely affected by a particular project, but other agencies, both public and private, who leap into action the moment they perceive a diminution of their own sovereignty implied in a project or the planning process. Once this controversy begins, there is little to stop it from snowballing until it blocks all progress. The fragmented system provides some channels of action, but there are no bending or sanctuary structures capable of limiting or reducing conflict inherent in open system decision making.

Fragmentation of defined community is then the dicotomy caused by two opposing trends of organization structure. Agencies agree that planning should somehow be more coordinated among various city agencies, both public and private, but would require new ways such agencies are administered. A
centralized system would pull together program structures on the one hand, but maintainance must not be at the expense of resident or citizen participation. There is a contradictory element here: centralized planning efforts for the entire city through vertical organizations such as task forces, and at the same time, decentralized planning horizontally through vehicles such as local service centers which would combine under one roof the health, welfare, legal and employment services for a single area to allow for local participation in decision making.9

While comprehensive planning is impractical in the eyes of social scientists and planners, it is necessary for effective planning to acquire a centralization of influence and decentralization to involve defined communities. For numerous reasons theory or output from citizens is necessarily low since in order for anything to be done under public auspices, the diffusion of authority, as well as inability to act due to the likelihood of stlmates on controversial issues, must be overcome. The future will depend on the cohesion of unity between planning bodies and community representative bodies and on effective compromise solutions.

CITIZEN PARTICIPATION OF WHEELCHAIR USERS

Frieden states that proponents of community development, local initiatives, decisions or plans have viable means regardless of the citizens (environmental users) directly affected by them who do not make the decisions at each stop of the way.10 But, unless citizens have a major and meaningful part in the development of plans themselves, they are not being asked to do more than just approve or veto actions which do not mean very much. This section tries to establish difficulties that these agencies encounter in handling the needs of the wheelchair user, and the role that citizen partici-
Citizen participation for the wheelchair user, as established by the Office of Economic opportunity (OEO) as part of its Community Action Program, is virtually nonexistent. Yet, it was an essential feature of the Urban Anti-Poverty Program, as an end in itself, not just a means. Citizen involvement, it was maintained, senses both individual and societal goals, promoting better, more responsive decisions on the part of the city government and other local planning agencies, as well as integrating groups in the development processes.

But the wheelchair citizen, not defined by generic minority, specific locale, income, nor age, have not been communicated with on a representative basis, remaining an alienated group and not prescribing to the ways others define or articulate community needs because of their inappropriateness or inadequacy. The wheelchair citizens have been forced to coalition with new agency descriptives, hoping these would respond to their immediate needs. Unfortunately, the agencies fell victim to inappropriate representation with different value focuses, mainly because in no way did the representatives understand or experience the needs of the wheelchair user and therefore could not logically speak on their behalf.

Life planning in general, citizen participation is caught in the need to both centralize its planning activities to match plans with accessible and available resources within a city-wide perspective, and decentralize responsibility to smaller community or regional units in order to assure responsiveness to needs and to develop the capacity among citizens for leadership, problem-solving, and participation in areas that affect their lives. Therefore the integration of planning methods and citizen participation calls for a large degree of cooperation and coordinated action between the feeder
agencies. Structurally, city, town, or community environments are fragmented by geographic concerns, such that it is difficult for neighboring communities to function autonomously. While inter-geographic communication is difficult to achieve, the lack of homogeneity usually is characterized by the dominance of a specific interest group whose concerns and interests can be made more readily visible and audible. Thus the wheelchair citizen, who can neither communicate inter-geographically nor between groups effectively, remains isolated and dominated by the cries of the dominant representing factors whose concerns and interests do not coincide with the physically disabled. Lacking a city-wide interest or perspective, the approach these groups use to confront their problems is one of self-interest.

A case in point is the way in which the various communities respond to the prospect of housing needs, especially public housing needs. Example: the city of Cambridge opted for elderly housing programs. The point therefore is not that Cambridge will have more elderly units than its citizens require, but that the proportion of elderly units under construction, as compared to other types of housing, bears no relation to the total needs of the city as a whole. While 5% allocation for the wheelchair is allotted in elderly units, this figure is in no way a reasonable estimate of the demand level of the city. Approaching problems in terms of a limited perspective on each group's own specific interests, they failed to appreciate the complexity involved in a comprehensive planning sense. Consequently, resources become inefficiently allocated and a great waste of time and energy expenditure results.

Employed approaches are often varied and therefore very confusing for citizens to participate effectively with each organization. To improve the living conditions of the wheelchair citizen, for example, may be the common
objective of several groups, even though one agency may support higher welfare benefits, another may implement comprehensive employment programs, when the common program to establish is resource criteria for the wheelchair user. The in-house residence services compete for a high demand of funds, which further aggravates efforts to achieve coordinated planning, as the different groups, myopic in outlook, lose sight of the fact that their real purpose is to build cohesiveness within the community. Competition for funds, moreover, will often lead agencies to make quick, sketchy proposals, the details of which are to be "worked out later". These proposals lack broad based citizen participation in their formulation, but they must be made in the name of the city government and as such, have no guarantee that the city departments will in fact execute the programs as they were intended. Given the difficulty of the fragmented system in achieving any consensus, explicit proposals would most likely present a problem with meeting application deadlines and thus cause potential funds to be lost.

Planning an environment which can accommodate the wheelchair user is completely removed from the planning of an environment in which everyday citizen participation is concerned. Basically this is because of the fragmentation of interest groups' needs and responsiveness to Federal, state and local planning bodies. Fragmentation causes duplication which in turn provokes confusion in planning tactics—no strategic aim because of no strategic concerns.

If coordination of planning efforts has yet to be deemed reasonable, policy still dictates separation, segregation, and isolation—separate policy for the elderly, the wheelchaired, the poor, etc. While the need is to study in detail the specific interests of each group, there is also a need to have a centralized functioning body which oversees the network of bodies and agencies.
Before evaluating wheelchaired citizen involvement in planning, it should be noted that many of the problems one encounters are not unique to any particular city, but are rather intrinsic to the very concept of their participation. Basically we must keep in mind the issues involved in the nature of citizen participation, namely:

1. Of what value is citizen participation, in the context of a group; in the context of a larger community?

2. Does citizen participation assume a level of sophistication and capability which most citizens do not have?

3. Can citizen participation become bureaucratic, agency competitive, and self-goal oriented projecting signs of self-destruction?

4. Does inefficiency in time, energy and resources inherent in democratic consensus getting, as well as likelihood of stalemate, outweigh benefits derived from citizen participation? How important is process objective? What relation is it to specific content?

MASS. COUNCIL ORGANIZATION OF THE HANDICAPPED (MCOH)

An analysis of how Massachusetts Council Organization of the Handicapped (MCOH) has worked to further effective citizen participation for the wheelchaired in Boston may be used to gain some insight into this city's present problems and offer some predictions about the future of community action programs. The MCOH has existed approximately three years in Boston, affiliated with numerous local agencies--MAB, Easter Seals, Boston City Council, and more. MCOH receives input and feedback from various advisory groups such as task forces, public and private bodies and ad hoc resident groups. Its administrative structure consists of a Board of Directors, an Executive Director and qualified staff. The MCOH board has been labeled a "citizens board" and while it is in fact composed of a number of representatives from public and private sectors, its orientation is definitely toward the wheelchaired.
As an original approach of confrontation politics, the organization has tended to attract stratified groups whose attitudes it appears have some justification. The overall program purpose it to:

1. Awaken the community to the deep-rooted social, economic and physical needs which are the underlying problems to inhumanity and poverty.

2. Bring new and needed services to the wheelchair community, then improve community condition, filling in gaps left by existing structure.

3. Involve the wheelchaired in all programs as planning participants rather than solely as program beneficiaries.

4. Serve as a catalyst for developing local leaders and effect permanent change in institutional structure.

Ross consolidates these functions and calls it "community organization":

"...Community Organization is a process by which a community identifies its needs or objectives, orders, ranks these needs or objectives, develops the confidence and will to work with these needs or objectives, funds the resources (internal and/or external). To deal with these needs or objectives, takes action in respect to them, and in so doing extends and develops cooperative attitudes and practices in the community."

Basically, MCOH seeks to initiate, administer, and carry out ongoing programs. Its staff takes an advocate's role and works on its own initiative to recognize and define community needs and recommend action programs (as opposed to simply responding to resident appeal). It provides the staff with technical knowledge (such as how to apply for grants, how to incorporate, etc.) necessary to organize and get moving.

Project or action oriented, MCCH picks something to do and does it; unlike the Model Cities Board, which became effectively paralyzed through constant bickering, this organization functions relatively smoothly and has been able to accomplish quite a bit. While most of MCOH funds come from private sponsorship and handicapped organizations, one of the agency's main
priorities is the mobilization of local resources. Often this takes the form of informal requests among opinion leaders, and as a coordination instrument, it should be noted that some of MCOH's most significant accomplishments have come from the cooperation and assistance of the city structure and occasionally a private agency.

Significant aspects of MCOH seem to be the functioning team task forces formed under its direction, and its interdepartmental structure that was established under the mandate of council organization representatives. They established hearings to hold City Councilors responsible for any further actions in environmental programs and progress. They have had successful establishment of criteria within the Departments of Parks and Recreation, Transportation, Public Works, but some agencies have been reluctant to divest their support, such as school departments, traffic departments. Much favorable criteria has been established within the Redevelopment Authority and Housing Authority as well as Department of Community Affairs to establish new design and building code criteria and major policy change. Effective from the point of view of participation, these teams and task forces are generally recognized throughout the wheelchaired community and local agencies alike as the most representative and most trusted of the action groups. MCOH planning teams serve both as a focus for organization and as resident sounding boards.

Community reaction as to the value of MCOH on the whole is quite favorable, which in a city as diverse as Boston, should say something in itself. Most wheelchair citizens agree however, that the effect of MCOH is more a question of the education to help make people more responsible for their own need developments. MCOH and programs like it have made the public more aware; they have given these demand communities knowledge of the way of
getting things done; they have taught them where some of the buttons are.

"A few years ago," one resident explained, "people weren't running for office. There used to be no such thing as residents going to City Hall... the people are more vocal now, more aware that they can have impact... MCOH has become a cohesive force in these demand communities; it brought them together... first we had MCOH, then we started MCSH [Mass, Council for Specialized Housing] and of course there has always been MAP [Mass, Assoc. of Paraplegics]."

From an institutional point of view, MCOH has been both a blessing and a curse. Clearly it has been largely responsible for the emerging of defined community awareness and subsequent pressure for response to needs that have been placed upon the powerful institutions. MCOH has given these institutions viable citizens groups with some authority to speak for the community with which to negotiate, and it has made community spokesmen easier to find. Furthermore, some institutional agencies--federal, state, or local, are willing to contribute resources through non categorical grants in the form of more permissive programs. It has become increasingly important for groups to team, define their interests, articulate their needs, and state their priorities. Unless they prove competent at this task, block-grant-systems going to municipalities will prove no more, and possibly less, effective in delivery of services where needed than the categorical system they may replace, and funds from those local institutions willing to donate resources to the community will remain stagnant for lack of direction.

MASS. REHABILITATION COMMISSION

Agencies which are welfare oriented and rehabilitative in nature should provide: 1) service for the family, child, socially, physically, and mentally handicapped as well as those in an emergency situation, 2) community services for youth welfare, labor welfare, community groups, etc., 3) services undertaken within the framework of related services or those outside social
welfare field. These are preventive or remedial services, operating by aiding individuals, groups and community through material help, institutional care, counseling and other casework, group activities for youth and adults and services developed within the framework of urban-suburban development.

The framework for an approach to such programs can be observed:

1. from mere relief of distress to a process of complete rehabilitation of the physically disabled individual and family
2. from merely curative programs to preventive service
3. from the mere maintenance of a few severely disabled individuals to the education, training and after-care of the largest numbers needing such services
4. from merely providing custodial care to mixed groups suffering from varied handicaps to the development of specialized services for the rehabilitation of specific categories of the disabled clarified scientifically and treated according to individual needs

The programmatic development of minimum quality of standardization, objectives, and responsibility of government authorities measured by:

1. long-term rehabilitation, not merely temporary relief
2. social behavioral knowledge of group problems in isolation
3. recognition of the value of handicapped groups, instead of the low priority accorded them by the local authorities, on the assumption that they are relatively of little significance to economic development.
4. an overall planning methodology
5. rational basis for determining the allocation of resources

The following is a summary of major recommendations relating to the structuring of services:

Decentralization of Rehabilitation Services
specialized services
supervising consultants
facilitating communications

Area Program Services
prevention, case finding, outreach
vocational evaluation and training
physical and mental restriction
personal adjustment training
undergraduate, technical, and professional education
transitional and extended sheltered employment
vocational placement and follow up
day care for adults
personal counseling
social and recreational programs
adaptive housing (hostels, etc.)
transportation
home bound employment
homemaking, attendant and other services in the home
consulation to agencies

Purchase of Service Agreements
public and private coordination (sharing)

Staff as Client Advocates

Alerting Stations to Minimize Vocational and Occupational Handicaps
clergyman, physician, school, hospital
health departments
nurses associations
social service agencies
liason consultants to MRC

Recommendation for the role of MRC:

Establish broader statutes (new legislation--1956 regulations are no longer adequate)
Human service programs
Expansion of services to public agencies
Flexibility in rehabilitation through funding strategies (inter-agency communication)
More authority as an agency
Disabled group participation in decision making

CONCLUSIONS

Does the feasibility of citizen participation and involvement assume too much? A point of interest is that the position of the citizen is tenuous. One cannot expect all citizens to have the knowledge and overview necessary for coordination of planning techniques. There must be the realization that the citizen cannot assume the responsibility of public function with its technology, diversity, and complexity or organization and coordination. Red tape, changing and complex bureaucratic guidelines, a constant flow of trans-
mitted notices, and multi-dimensional application forms and regulations preclude effective citizen participation by reason of their complexity and the technical knowledge required.

Citizen participation remains a controversial issue, not so much for its feasibility and effectiveness, but more so for its coordination and implementation process. It certainly contains tremendous obstacles to overcome if it is to function efficiently at making local planning more responsive to local government, basically because of:

1. Programs like MCOH

2. A number of dedicated and enthusiastic individuals who serve as cohesive factors by virtue of their personalities and overall understanding

3. A new determination on the part of the planning agencies to make programs truly responsive by work with and through citizen participation and planning.

The important overview of concepts of rehabilitation programs and Mass. Rehabilitation Council (MRC) in particular are:

1. The reorganization and expansion of the agency and its concept—an advocate agency

2. Linkage with more of the private agencies and a closer cooperative arrangement with consumer groups

3. Modernization of state governments and federal levels of application which avoid duplication

Because there is such a plethora of agencies, we have only discussed MCOH and MRC, the two agencies which relate most directly to the physically disabled population. A further discussion of relevant agencies relating especially to housing needs appears in Appendix B.
footnotes


4 Enwonwu, J. C. "Development process in housing."

5 Novack, M. "Community development through citizen participation."


8 Novack, M. "Community development through citizen participation."

9 Ibid.


11 Novack, M. "Community development through citizen participation."


14 The Governor’s Conference on Rehabilitation. Co-Sponsored by the Governor’s Advisory Committee on Rehabilitation and Massachusetts Rehabilitation Comm., June, 1970.
"By gosh, I never looked at things that way!"
INTRODUCTION

The normal life of an organism, whether man or animal, is not one of quiescence, but one of action. Man constantly seeks stimulation and activity, and indeed both of these concepts are necessary to achieve mental and physical health. A healthy level of psychological functioning depends upon active participation with the environment. An individual must be able to use his own endowments in productive activity and must be free to use his abilities to the fullest.

What happens when these drives are thwarted? Needless to say, innumerable obstacles to drive satisfaction are present both in the physical and social environment. It is the physical obstacles, in particular, that concern us in this chapter. They may result from either deficiencies in the environment, the dimension of over-building or a combination of both. These environmental barriers to goal-directed activity are those which are externally imposed. Most are man-made. When an individual is prevented or hindered from achieving his goal or goals, frustration results which in turn leads to physical and emotional stress.

Everyone at some time has experience obstacles and fully knows the feeling of frustration. But never have they experienced it to the extent that our physically disabled population has. Physical injury, sickness, or birth defects can disable; the environmental condition handicaps. A disturbance-producing environment in turn produces a disturbance or imbalance within the individual developing from his participation or lack of participation in it. The result, stress which may upset his emotional equilibrium, his physio-chemical state, his conception of himself and other, and his ability to function effectively in his various environments and roles. Gans talks about stress as the measure of external forces, i.e. from design, transport,
and all elements which compose our built and planned environments as well as psychological and social environments. Their effect either singly or in combination all total upon the user—the physically disabled. His ability to use, transcend, relate, and translate their respective functions and services in a manner which will create an atmosphere of safety, comfort, ease and desirability without being a hindrance to his mobility and interactions is a key determinant of mental health.

Even a severe disability need not imply loss of independence. Provided that a woman's home is convenient, she may perform her regular duties as housewife and mother in a wheelchair. Provided that schools, stores, banks, etc., are accessible, she may carry out normal activity of PTA meetings, shopping and business. The working man or woman confined to a wheelchair is still able to move about independently, provided that there are no staircases or other barriers in the office or factory where he or she works, and provided that he or she can get to work. If permitted, a wheelchair user can earn a comfortable living for himself and his family.

But obviously, this full usefulness and resulting independence does not exist in most cases. In every aspect in the life of a wheelchair user, his intentions are thwarted. The physically disabled person in a generic sense is limited, not restricted, in the activities he can perform. Such limitations may affect the mental as well as add to the determination of his physical well being. Once the disability and resulting limitations in activity are accepted by the individual, he should be well on the way toward leading a normal life if it were not for the many outside stresses placed upon him. Ideally, increased opportunity for mobility of the physically disabled would increase their activity level such that they could approximate performance levels of the able bodied individual, thus increasing his evaluation of self-
concept and worth values. In order to evaluate the social and psychological benefits of increased mobility to the disabled, it is necessary to examine the whole individual, psychological as well as physical values, in the context of American Society.  

PSYCHOLOGICAL AND PHYSICAL VALUES

An injury as severe as paraplegia (or quadraplegia) will demand a complete reorientation of one's life and habits. Despite this extreme upheaval of everything the paraplegic has been accustomed to, the gap can be bridged successfully. Much of the responsibility for success will depend upon the disabled individual himself.

After the injured person has admitted to the truth of his disability and no longer prays every night for a miracle cure, growth and recovery can begin. With the desire to once again be strong, healthy, and a functioning member of society, he gets busy and ready for action and participation in the world. This involves exercise in any shape or form to build up the muscles, getting back to being honest with himself about his present capabilities, and intimate knowledge of the movement patterns of himself and his wheelchair.

Before too long a time, he develops psychological mobility. He is strong enough psychologically and physically to once again face the American Society and assert his independence.

VALUES OF THE AMERICAN SOCIETY

What does the American Society have to offer to a person with physical disability? Wright, in her book, Physical Disability--A Psychological Approach, pointed out that disability is socially devaluing because of
society's negative evaluative attitudes which convince the individual that he is inferior and incapable of normal social participation. Goffman further substantiates Wright by introducing the concept of stigma as a psychological process by which certain individuals are removed from society due to their outward disability with recognizable traits. These traits, not being accepted by society values, are deemed as a stigma, thus compartmentalizing the physically disabled individual. Thus, because one's physical standards are set to applaud the attractive body possessed with exceptional dexterity, health, intellect, the disabled, because of their very visible failings are deemed inferior not only physically, but mentally as well. This ignorant conception of disability—that outward crippling signs also reflect an inner crippling tendency or mental stagnation—is a widely held attitude and is indeed reflective of our social and educational values. This is one of the forms of American prejudice resulting in segregation. Thus, the consequences for many physically disabled persons are evident: because he is believed to be inferior "first in the socio-economic sense because he is unemployed, and next in the psychological sense since he internalizes the belief that he is inadequate as a human being."?

VALUES DETERMINE ENVIRONMENT

The structural system of society determines the availability of jobs and income, as well as the opportunities to acquire the material and non-material tools for the pursuit of life goals. The physical structure, especially its stratification and integrated-segregated systems, determine whether people are to have access to the institutions that enable them to participate in the economy and to feel socially and personally useful. These systems can determine whether or to what extent micro structures will develop. It will
be the stage for social interaction, group activity and the intensity of life style.

The physical world, as it now exists, is a permanent stress on the life of the physically disabled. It is a virtually vertical world which opposes the inherent horizontal system of the wheelchair. The nature of this built environment is directly reflective of the attitude of society toward this disenfranchised group of people. Their needs for mobility, hence independence has been ignored.

The fact that one's physical disability results in poverty, unemployment, underemployment, low socio-economic status and life in an economically depressed area are associated to high rates of mental stress in the individual, his family and friends. It is largely a result of standards and specifications of the building industry as well as planning criteria and implemented technological achievement. Major urban studies have indicated that people living in economically depressed communities run a greater risk of mental stress than those of similar socio-economic levels living in more fortunate areas, presumably because unemployment not only adds new stresses, but the additional burden of reduced compensation and the lack of good transportation and facilities to meet their physical needs. In addition to living at poverty levels, the physically disabled individual is thrust into the standardized environment built for the so-called "normal" man—using criteria that is neither objective, functional or responsive to the environmental needs of the physically disabled chairbound person.

Identifying "stress" as the environmental condition, and the "physically disabled" as the individual, response can be made to the setting and directing of our attention to the general environmental factor—architectural barriers—which cause many undue problems such as the strain on energies,
economics, health, time and frustration of disabled people everywhere. Environmental stress also expresses our concern about the measurement of environmental quality and the increasing importance of comfort, convenience, accessibility and well-being—the factors which should be the rationale behind planned environments, but obviously are not. The physically disabled, shunned and hidden by society, have not been given an opportunity to choose for themselves. Physical planning as it exists today permits only cultural and physical stressors.

Environments change, sometimes through choice, through new technology, often because major events are taking place over which the individual citizen has no control. The disabled individual considers change to be both a treat and a challenge. He fears that he will not be able to cope with either new physical, social or psychological environments, going on the information gained from his own past experience. How the individual copes, adapts and modifies his behavior becomes a vastly important question. The direction that future environmental change takes will be an important determinant here.

The physically disabled are particularly susceptible to environmental stress. Health of these groups has shown marked relationship to occupational, financial, residential, and family stresses. Change in housing can and has resulted in serious increases in degree and variety of illness. Reducing the stresses in the work, play, and housing environments of the physically disabled will reduce the incidence of illness, both mental and physical.
THE GOAL IS MOBILITY

Mobility is a process involving changes in the relationships of a person to the environment, to other persons, or social experience. A necessary condition of mobility is that it permits changes to allow for different evaluation of that person's psychological status. Planning to create these psychological experiences is approaching criteria of decent mental health. Before going into the planning implications for mobility, it is important to look at what is involved in mental health.

Psychiatrists today tend to think in terms of two definitions of mental health, which might be called "minimal" and "maximal". They are quite different in their policy implications. The minimal emphasizes the absence of emotional disturbance in the individual, or the relative absence, for no individual in any society can live without some emotional conflict. This may be thought of as a negative definition as it stipulates an absence or lack of something. On the otherhand, the maximal definition may be thought of as a positive conception of mental health. It emphasizes not the prevention of mental illness, but the determination and achievement of the best, i.e. mentally healthiest patterns of living—the ability of the individual to maximize the pursuit of goals with a minimum of emotional disturbance and within the environment of his choice. Both definitions of mental health assume the existence of environments which are relatively disturbance-free and encourage most people to achieve their personal goals with a minimum of internal disturbance. We must now ask what qualities determine a low-disturbance producing environment and what supporting features of the environment are important?
Adaptive facilities, such as housing, provide the facilities needed to exist and it therefore provides a less stressful situation. But such adaptive units are not the total answer if there still remains the lack of social and occupational outlets. However, it does improve ones increased privacy, independence, and feelings of self-respect. The housing especially adapted to the needs of the wheelchair-d are a good beginning in obtaining good mental health, and when varieties of life style is available in the form of options in housing structures, we will be closer to the goal of mobility. One needs to live in an environment of heterogeneity—a balanced community. He must have the option to choose how and where he wants to live and it must be an environment which allows both physical mobility and independence.

The concept of the influence of environmental stimuli on mental health cannot be discussed without considering the two kinds of planning—physical environmental planning as distinguished from social environmental planning. Project Headstart, Medicare, Mental Health Service, Rehabilitation Services, and welfare programs have gained wide acceptance and represent on-going social planning. But, the concept of social planning has yet itself either to gain what could be called full acceptance of the society or to develop definite formal relationships with physical environmental planning. This division into two areas of planning is perhaps a matter of practical convenience, but it remains us of the interdependencies of the two approaches. Clearly before the physical environment may be altered toward a specific criterion, the situation or variable of concern must gain some degree of social importance. Mature and sensitive planning studies and practice will recognize the need for adaption of the environment to man, rather than for man to adapt to unfriendly environments. The cost—financial, psychological, physical—of man having to adapt to such an environment is undeniably
higher than the cost of doing things right in the first place. Building a "friendly" environment adapted to the needs of all people can only come about through the linking of physical with social environmental planning. The first step in planning for mental health, according to Gans, is to design the characteristics of such environments, and the conditions which bring them into being.  

Our society is equipped with a vast assortment of specialists—psychologists, sociologists, engineers, architects, planners to name a few. The question is, how can the effectiveness of such a socially and technologically oriented society be mobilized to prevent the life disrupting tendencies that now exist in our physically structured environment? The contribution that planners can make to mental health is as significant as architectural and engineering contributions. Combination of the minds in these disciplines can make sure that the environment does not create additional sources of stress to people's lives but works to enhance life itself. The determination of what adds stress, which situations produce tension should not be made solely by these specialists, however, but by the users themselves—the people for whom the environment is being built for.

We must encourage the growing concern about the measurement of environmental quality and the increasing importance of maximizing comfort, convenience, accessibility, and satisfaction as the rationale behind planned environments. It is not sufficient that planners and policy makers alone be sensitively aware of their environments. The entire citizenry must also be made aware of the many aspects of their environments so that standards and policies can gain wide public understanding and support.

There is no general theory of environmental design which approaches a policy on the subject of environmental stress. There are no definitive
standards of articulation in scope of the physically disabled environmental needs. There is a deficit of motivation among planners, architects and environmental specialists to obtain an environmental policy which will provide for the independence and mobility of the total population. There is a strong need to advance beyond the minimum standards and approach optimum standards and produce a world which is psychologically, physically and socially a better world for all.

CONCLUSIONS

The implications involved in the issue of psychological reaction of the physically disabled to the environment are:

1. The physically disabled individual exists in a social environment whose expectations and evaluations affect him profoundly.

2. The environment relegates him to inferior status and limits his rewards because of his physical condition.

3. In order to understand society’s attitude toward him and his limitations, the disabled person may accept or reject the stigma according to his opportunity and intentions.

4. Consequently, the behavior of the physically disabled individual is due not only to society’s restrictions on his opportunities, but also his integration of society’s values and attitudes into his self-concept.

5. Based on the previous suppositions, changing the physically disabled opportunities will alter not only society’s attitude toward his capabilities, but also his own self-concept.
Mobility, as new identity, is qualified by the previous orientation of the psychological meaning of social interaction. It becomes obvious that changes in the physical environment will produce outreaching effects on the social environment. Environmental changes that would allow the physically disabled individual to function in a normal way and to participate more fully in the usual activities of daily living would necessarily affect the number and kind of associations these individuals have with other members of society. The more satisfaction that can be gained from environmental participations, the closer one will approximate a normal life style. The extent to which the environment is maximized to meet these needs depends upon our architect's, planners, environmental specialists' work with psychologists, sociologists, elected officials, and all other members of society.
footnotes


8 Gans, H. J. "Planning and city planning for mental health."

9 Ibid.


11 Ibid.
THE DISABLING DISEASES

It is difficult to obtain an accurate picture of the extent of physical disability in this country due to disease. However, the following section will attempt to give an overall picture of the effect of disability due to disease on physical mobility. The following is based on information obtained from Fishman and Marshall. Only the most common diseases will be discussed.

ARTHritis

Characteristics - Painful inflammation of the joints, with some destruction of the joints and adjacent bones, and resulting deformities. The disease may start at any age, but most often between 25 and 55 years of age. Known causes include infection, injury and degenerative joint disease.

Effect on Mobility - People with arthritis have an impairment of ability to walk or use arms, hands, fingers, with consequent limitation of activities. They have very stiff joints and move slowly, painfully and unsteadily. They have difficulty in climbing high steps and curbs, and in negotiating steep gradients.

Prognosis - Generally the various forms of the disease cause continuing deterioration. Drugs, physical and occupational therapy, and mechanical devices may make the patient more comfortable.

Long-Term Care Needs - Continuing medical care and supervision, physical and occupational therapy, bracing and orthopedic surgery, training in activities of daily living and use of special equipment, help with housekeeping and personal care, transportation, etc.

CEREBRAL PALSY

Characteristics - Impaired control of movement with lack of control of some or all extremities, involuntary movements, lack of balance and body control; usually associated with injury or illness at birth.

Effect on Mobility - The different types of cerebral palsy may result in weakness, poor balance, wild uncoordinated movement; impairment may also include speech, vision, and hearing problems. Walking and self-care may not be possible.
Prognosis - The condition itself is usually static, but handicaps may impair normal physical growth and development. Life expectancy may be near normal.

Long-Term Care Needs - Continuing medical supervision, with necessary physical and occupational therapy, orthopedic surgery, bracing, counseling, help with personal care, etc.

MULTIPLE SCLEROSIS

Characteristics - Progressive destruction of the central nervous system from unknown cause, with loss of motor and sensory functions. The disease is characterized by early periods of partial recovery between increasingly severe attacks.

Effect on Mobility - Sclerosis causes paralysis of muscles and disorders of balance and vision, impaired coordination, easy fatiguability, numbness, and some tremor or paralysis. A wheelchair may eventually become necessary.

Prognosis - Attacks may be frequent or infrequent, with years of relatively normal functioning between early attacks. Disability increases after each attack, although life span may be considerable. In rapidly developing cases the sufferer may be permanently confined to a wheelchair within months.

Long-Term Care Needs - Hospitalization may be required during severe attacks; at other times, individual may need medical and rehabilitation care, psychological and social support, help with housekeeping and personal care needs.

MUSCULAR DYSTROPHY

Characteristics - Progressive degeneration of muscles, with resulting weakness, usually occurring first in childhood or youth. It is more common among males than females. The cause of the disease is unknown, but there is an hereditary component.

Effect on Mobility - Increasing weakness with eventual loss of function in arms, legs, face and/or body, depending upon the particular form of the disease. A wheelchair eventually becomes essential.

Prognosis - There is usually increasing disability and eventual death after five or more years. There is no effective medical treatment.

Long-Term Care Needs - Medical, psychological, and social support for patient and family. Physical therapy, special braces, mechanical aids and help with personal care are usually needed.
PARALYTIC POLIONYELITIS

Characteristics - Paralysis of arms, legs, and/or chest and trunk resulting from infection of the spinal cord.

Effect on Mobility - Loss of functional use of any voluntary muscles of extremities, neck, and/or trunk. Normal physical growth and development may be affected if paralysis occurs during childhood. Wasting and paralysis of the limbs may result in unsteadiness especially on gradients and difficulty in climbing steps. Many people with polio are confined to wheelchairs.

Prognosis - Impairments are usually permanent although some functioning can be improved through early treatment and rehabilitation. With proper care and treatment life expectancy may be near normal.

Long-Term Care Needs - Continuing medical care and rehabilitation; physical therapy; mechanical breathing devices, braces, and other assistive equipment are often required; attendant care and help with activities of daily living and social support are needed.
DISABILITY THROUGH TRAUMA

Impairment due to unnatural causes accounts for the fastest growing number of physical disabilities. Injury due to trauma may be the result of sporting accidents, automobile accidents, or war. Adding to those permanently injured in WWII or the Korean War, are the large numbers of returning veterans of the costly Vietnam War.

PARAPLEGIA

Characteristics - Condition that results from injury to the spinal cord at the thoracic or lumbar level (see Fig. 1), depending upon where the injury occurs in the spine (it may also be caused by disease such as cerebral palsy, poliomyelitis, spina bifida, multiple sclerosis and other diseases); It is a paralysis of the legs and lower part of the body, both motion and sensation being affected. The individual has sound use of his upper extremities.

Effect on Mobility - Extent of disability varies, depending on the part of the spinal cord that is damaged and on the attitude and retraining of the patient. Eventually, most paraplegics can be independent with the use of braces and crutches.

Prognosis - Impairments are permanent. Life expectancy is near normal with proper care and treatment.

Long-Term Care Needs - Continuing medical and nursing supervision; training or retraining for patient and family in the prevention of respiratory and urinary infections, bed sores, and further disability from contractures or disuse of limbs.

QUADRIPLEGIA

Characteristics - Condition that results from injury to the spinal cord at the cervical level. The upper extremities are affected as well as the lower extremities.

Effect on Mobility - Extent and degree of disability varies, depending on the part of the spinal cord that is damaged and on the attitude and retraining of the patient. Some individuals may be able to use a wheelchair or walk with the help of crutches and attendants.

Prognosis - Impairments are permanent. Life expectancy may be near normal with proper care and treatment.
DISCLAIMER

MISSING PAGE(S)

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Long-Term Care Needs - Continuing medical and nursing supervision; training or retraining for patient and family in the prevention of respiratory and urinary infections, bed sores, and further disability from contractures or disuse of limbs. Ramps, lifts, and assistance with housekeeping, personal care, social, psychological, and financial problems are often needed.

HEMIPLEGIA

Paralysis of one side of the body. Extent and degree of disability depends on amount of paralysis to affected side. In severe cases both arm and legs are affected and are non-functional. Usually the leg is functional for support with varying degrees of function in the upper extremity.

AMPUTATION

Surgical removal of limb or limbs due to injury or disease. In the case of amputation of the leg, some unsteadiness results, especially on gradients.

Fig. 1. The spinal cord.
THE OUTLOOK FOR NEUROLOGICAL DISEASE AND INJURY

The first organization concerned with the medical problems of paraplegia (quadriplegia, spina cord injury) was the Paralyzed Veterans of America (PVA). Established after World War II, it was composed largely of paraplegics and quadriplegics with service connected disabilities. In more recent years when the ranks of paraplegia were swelled by conditions with spinal cord injuries from automobiles or sporting accidents, the National Paraplegia Foundation (NPF) was created. As a joint venture, these groups did much to help paraplegics adjust to life in a wheelchair—fighting long and hard battles to combat architectural barriers, improve access to public transportation, ameliorate medical difficulties, and support the paraplegic’s desire for meaningful work and normal family life. The NPF has also pushed hard to change the old notion that paraplegia is incurable. However, a cure is not, and should not be the only goal. One cannot over stress the numbers of persons affected by paraplegia—those going to be affected by it, and those painfully living with the affliction who would rather not settle for rehabilitation and prevention; they want to be cured. Another burden is that of finance, loss in medical expenses plus the loss in potential taxable income as a result of paraplegia exceeds one million dollars annually.

"Medical care today is adequate to sustain life but not to cure life-long paralysis victims. The cost in dollars, in human anguish, and in blighted dreams is enormous and will increase. Persons permanently disabled by trauma cost billions of dollars per year and require more days of hospitalization than does any other group of medical-surgical patients, as reported in the Congressional Record, July 21, 1971."

Even considered in these economic terms, there can be enormous returns for investing the tiny fraction of about 0.1% of this amount in laboratory
research aimed at a method for obtaining effective spinal cord regeneration. There is no other reasonable prospect; the potential spinoff is ever greater, for regrowth of functional connections in the spinal cord and brain would provide a practical solution for an even wider range of destructive neurological and neurosurgical diseases.

Is this merely a pipe dream? According to Dr. Francis Schmitt, research in clinical neuroscience is achieving a new tempo; offering new promise for advance in fields previously thought too complex or intrinsically too refracted for practical solutions in the forseeable future. These can be categorized as inquiries to the central nervous system of man, including the brain, spinal cord, and peripheral nervous system.

At present there are a few research teams working in this area throughout various parts of the country; but the federal government is spending only a few hundred thousand dollars annually on cure research, an amount striking inconsistent both with the size of the affected community and the emerging medical consensus that such research would be productive. The National Institute of Neurological Diseases and Stroke has reported that there are some good, but not outstanding, proposals that we could support if we had more research grant funds. There are many more good but not top priority applications for basic research which might be useful in spinal cord injury which are unable to continue because of lack of support. They also report because of fiscal policies, they cannot directly expand their operations.

Sidman and Schmitt have listed the essential components of a plan for action, as we have summarized them as follows:

1. Immediate creation of a "Task Force on Nervous System Growth and Regeneration" centered in the biomedical community but coordinated and staffed by the National Institutes of Neurological Diseases and Stroke and Child Health and Human Development, the institutes with primary strength in matters concerning the nervous system and
mammalian growth and development, respectively. The Task Force should serve as a clearing house for information concerning all ongoing research on neural growth and regeneration, and should be requested to develop a picture within six months of where this important field of research stands today and where it is going, with a set of recommendations as a basis for future efficient planning and funding.

2. Allocation of a special fund for research on growth and regeneration in the nervous system over and above the NIH budget, in the amount of $2,000,000 for the first year and $3,000,000 for the second year, further funding to be based on reports of the above mentioned Task Force.

   a. Support of individual new research grants in the expectation that the importance and the explicit Congressional recognition will entice new scientific recruits.

   b. The formulation of pertinent training grants should be encouraged and funded by the Institutes under special guidelines similar to those which served effectively in the past to stimulate the development of other special fields such as child neurology and neuroradiology.
footnotes


6 Ibid.


8 White, K. M. Lecture.

9 Sidman, R. L. and Schmit, F. O. "Central Nervous System Regeneration."
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Letter sent to residents of specialized housing ........... 359
QUESTIONNAIRE

INSTRUCTIONS: PLEASE PUT NO NAMES ON QUESTIONNAIRE! IN ALL QUESTIONS CHECK ALL APPROPRIATE RESPONSES WHICH APPLY TO YOUR SITUATION. IF NO ANSWER APPLIES TO YOU, FEEL FREE TO ADD OR COMMENT ON THE QUESTION.

1. FAMILY HIERARCHY: ARE YOU
   __male __female __parent __living with parents
   __single __independent

   WHAT IS YOUR AGE? __________

2. HOW OLD WERE YOU WHEN DISABLED? __________

   HOW LONG AGO WAS THIS? __________

3. WHAT IS YOUR HANDICAP?
   __polio __para __quad __hemi __hemi __M.D.
   __M.S. __other, please specify __________

4. IF HANDICAPPED AT BIRTH OR WHEN YOUNG, WHERE DID YOU GET YOUR EDUCATIONAL TRAINING?
   __parents __friends __tutors __public or private school
   __college __no schooling

5. DO YOU LIVE IN AN AREA WHICH IS
   __suburban, with a low density of other homes
   __residential suburban, within a short driving distance to a shopping center
   __urban, within a short public transportation ride or drive to a main shopping area
   __urban, within walking distance of a variety of stores
   __none of the above, please specify __________
6. DO YOU LIVE IN A
   ___ high rise apartment (6 or more floors)
   ___ low rise apartment (5 or less floors)
   ___ public housing
   ___ multiple family house
   ___ single family house
   ___ other, please specify what___________________

7. YOU LIVE WHERE YOU DO BECAUSE OF
   ___ its physical nature (accessibility)
   ___ location amenities
   ___ economics
   ___ you want to

   ARE YOU PRESENT LIVING QUARTERS ADEQUATE FOR YOUR
   MOBILITY NEEDS?
   ___ yes  ___ no

8. HAVE YOU EVER HAD YOUR HOME OR APARTMENT REMODELLED
   FOR REASONS OTHER THAN GENERAL MAINTENANCE?
   ___ yes  ___ no

   IF YES, WAS IT ___ bedroom ___ bathroom ___ kitchen
   ___ entry ___ ramps ___ other, please specify________

   ARE THERE ROOMS, FURNISHINGS OR APPLIANCES IN YOUR
   HOME WHICH YOU CANNOT USE? WHICH, AND WHY NOT?

   ________________________________
9. DO YOU KNOW OF ANYONE STRANDED AT HOME? __yes __no
   IF YES, WHAT ARE THE CIRCUMSTANCES?_____________________________________

10. IF YOU HAVE MOVED, WAS IT BECAUSE OF __location
    ___physical nature (accessibility) ___economics
    ___neighborhood (amenities) ___because you wanted to

11. DO YOU FEEL THAT YOUR NEIGHBORHOOD RESPONDS TO YOUR NEEDS? __yes __no
    IN WHICH WAYS? __location (work) ___economics
    ___amenities (parks, playgrounds) ___health (medical care)
    ___services (commercial needs) ___neighbors
    ___recreation

12. WHAT BUILDINGS ARE INACCESSIBLE IN YOUR COMMUNITY AND DO NOT ALLOW YOU TO TRANSACT THE NECESSARY BUSINESSES TO MEET YOUR NEEDS?
    ___churches ___banks ___restaurants ___court house
    ___town hall ___theaters ___schools ___YMCA or YWCA
    ___library  LIST OTHERS_____________________________________

13. WHERE DO YOU DISCOVER HINDRANCES AND CIRCULATION DIFFICULTIES?
    ___supermarkets ___grocery stores ___malls
    ___commercial strips

    NUMBER THE FOLLOWING IN ORDER OF DIFFICULTY (A NUMBER 1 WOULD BE MOST DIFFICULT)
    ___aisles ___counters ___food bins ___shelves
    ___check out ___customer service

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14. Taxes are paid so that certain social and rehabilitative services may be provided. Are you aware of the number of services available to you?

Yes ___ no ___ 

If no, state reason: ____________________________

How did you obtain information about these social services?

_friend ___ doctor ___ rehab center ___ social service representative

15. Do you feel that federal and state agencies (for example, H.E.W., Mass. Rehab. Comm., [KRC]) respond, and are aware of the interactions and interdependencies of the handicapped with his physical and social environment?

Yes ___ no ___ 

Briefly explain: ____________________________

16. Do you find enough available information on getting around in our ever changing environment?

Yes ___ no ___ 

Where do you look for such information and in what form is it: ____________________________

17. Do you own your own car ___ use public transport ___ depend on parents or friends ___

18. If you drive, do highways meet your needs in terms of

_shelter ___ food ___ sanitary facilities

19. If public transportation is your primary source of travel, what is your primary mode?

_bus ___ train ___ rapid transit ___ taxi

20. In which ways could public transportation be a more efficient system?

_access ___ frequency ___ cab design ___ fares ___ adaptive facilities (elevators) ___ waiting stations
21. IF YOU TRAVEL LONG DISTANCES, WHAT NODE DO YOU USE?

plane  train  bus  car

WHICH OF THE ABOVE CAN YOU NOT USE FOR PHYSICAL REASONS?

22. ARE YOU APPREHENSIVE ABOUT BEING AROUND NEW PLACES AND STRANGERS BECAUSE OF YOUR PHYSICAL CONDITION?

yes  no

IF YES, IS IT BECAUSE

you have thoughts of being unhealthy and are therefore uncomfortable

you are generally uncomfortable in new surroundings because of unfamiliarity with distinguishable, manuverable channels

23. DO YOU FIND THE ATTITUDES OF OTHER PEOPLE WHEN THEY ENCOUNTER YOU TO BE

favorable (accepting)  unfavorable (rejecting or shying)

curious

24. DO YOU FIND THE COMPETITIVE SPIRIT AND AGGRESSIVENESS OF OUR SOCIETY TO BE A HINDRANCE OR A FACILITATOR TO MEETING YOUR LIVING NEEDS?

encourages you to achieve

discourages you from trying

25. DOES THE INFLUENCE OF EMOTIONAL STRAIN CHANGE YOUR PERCEPTION OF THE ORGANIZATION, STRUCTURE AND SHAPE OF THE ENVIRONMENT SO THAT USE OF IT BECOMES COMPLICATED AND CONFUSED?

yes  no

26. IS YOUR EDUCATIONAL STATUS REFLECTED BY YOUR PROFESSIONAL DEVELOPMENT?  yes  no  BRIEFLY EXPLAIN

NOTE: Question 26 was eliminated in the analysis because many of the surveyed indicated difficulty in understanding the wording of it.
27. DID YOU HAVE TO CHANGE JOBS WHEN YOU BECAME HANDICAPPED?  __yes  __no

WHAT IS YOUR PRESENT JOB?_________________________________________

WHAT WAS YOUR FORMER JOB?________________________________________

28. WHAT FACETS OF BEING HANDICAPPED DO YOU FIND DEMEANING?
   __people's attitudes  __effort expended
   __mental barriers  __physical barriers

29. DID BECOMING HANDICAPPED CHANGE YOUR LIFE FROM ONE OF INDEPENDENCE TO ONE OF DEPENDENCE?  __yes  __no

30. DID YOUR FRIENDSHIPS CHANGE AS A RESULT OF YOUR BECOMING HANDICAPPED?  __yes  __no

31. DO YOU SPEND MORE TIME WITH OTHER HANDICAPPED PEOPLE THAN WITH "NORMAL-EVERYDAY-FREAKS"?  __yes  __no

32. DO YOU FIND MORE PROBLEMS RELATED TO THE PHYSICAL ENVIRONMENT THAN PROBLEMS IN PEOPLE-RELATED SITUATIONS?
   __physical environment  __people

   WHICH IS EASIER TO DEAL WITH?  __physical  __people

33. DID BECOMING HANDICAPPED CAUSE DISRUPTION IN YOUR FAMILY?  __yes  __no  IF YES, PLEASE LIST WAYS IT WAS A DISRUPTION_________________________________________

   ________________________________________________________________

34. AS ARCHITECTS, HOW COULD WE IMPROVE YOUR SAFETY, EASE OR CONVENIENCE?_________________________________________

   ________________________________________________________________

(continue on back of page)
Dear Member:

We are inviting you to participate with us in expanding knowledge for the needs of the handicapped in present and future environmental considerations—designing, planning, social service. My name is Charles Cofield, quadraplegic (MAP member) and my colleague’s name is Carol Wooten. We are graduate students in architecture at Mass. Institute of Technology and have been working on the problem of architectural-environmental barriers which make it difficult or impossible for those who have ambulatory problems, i.e. paraplegics and quadraplegics in particular. These letters are being sent to you under the auspices of MAP and Mr. Elmer Bartels.

At present our work—our Masters Thesis—is continuing the already begun research of Mr. Robert Lynch. Our thesis, "An Environmental Approach to User Independence—the Wheelchaired Handicapped", will approach the evolution of new design standards for federal authorities, organizational concepts for architects, a useful manual for the ambitious handicapped, and a social process to amend the nearly irreversible damage of public, social and rehabilitative services. Our concept is that as architects through rational processes we can approach the technical aspects of the handicap needs ranging from micro (individual) to macro (public) scales of need: Optimum environment with man as the measure.

It is here we are in need of your assistance, as the system’s user. We need the unmeasurable data—the philosophical and inert knowledge of your experience. Attached is a short questionnaire which we would appreciate your answering and returning within 1 week if at all possible since the information you give us must be organized, and we must begin to propose design solutions and recommendations for a Dec. 1, 1972 submittal. Thanks for your cooperation. At times the questionnaire may seem personal, but it is because we are trying to place emphasis on new environmental controls to make our environment more compatible with man’s psychological and physical capacities and limitations. Therefore, we must question you on psychological and social issues. To insure your privacy, we are asking that you do not put your name on the questionnaire.

We would greatly appreciate any information on the problems you come up against that are not covered in the questionnaire or elaborations on any question which you want to comment on. Also, we are interested in any solutions which you have found successful, any sketches, photographs or drawings of what your house or apartment looks like, problems of finance, etc.

Hope to hear from you soon. Thanks for your help!

Sincerely,

Charles Cofield
Carol Wooten

P. S. If you would just like to talk, call any evening: 354-4401 Carol
253-1000 dorm ext.
8582 Charles
Dear Resident:

We are inviting you to participate with us in expanding knowledge for the needs of the handicapped in present and future environmental considerations—designing, planning social service. My name is Charles Cofield, quadraplegic, and my colleague's name is Carol Wooten. We are graduate students in architecture at Massachusetts Institute of Technology and have been working on the problem of architectural-environmental barriers which make it difficult or impossible for those who have ambulatory problems, i.e. paraplegics and quadraplegics in particular.

At present our work—our Masters Thesis—"An Environmental Approach to User Independence—the Wheelchaired Handicapped", will approach the evolution of new design standards for federal authorities, organizational concepts for architects, a useful manual for the ambitious handicapped, and a social process to amend the nearly irreversible damage of public, social and rehabilitative services. Our concept is that as architects through rational processes we can approach the technical aspects of the handicap needs ranging from micro (individual) to macro (public) scales of need: Optimum environment with man as the measure.

It is here that we are in need of your assistance, as the system's users. We need the unmeasurable data, the philosophical and inert knowledge of your experience. Attached is a short questionnaire which we would appreciate your answering and returning to the Manager of your apartment building within 1 week if at all possible since the information you give us must be organized, and we must begin to propose design solutions and recommendations for a Dec. 1, 1972 submittal. Thanks for your cooperation. At times the questionnaire may seem personal, but it is because we are trying to place emphasis on new environmental controls to make our environment more compatible with man's psychological and physical capacities and limitations. Therefore, we must question you on psychological and social issues. To insure your privacy, we are asking that you do not put your name on the questionnaire.

We would greatly appreciate any information on the problems you come up against that are not covered in the questionnaire or elaborations on any question which you want to comment on.

Thanks for your help!

Sincerely,

Charles Cofield
Carol Wooten
GENERAL CHARACTERISTICS

The purpose of the survey was to question the physically disabled themselves about what physical, psychological and social barriers they encounter in using the environment. The survey form was sent to 206 members of Massachusetts Association of Paraplegics (MAP), a statewide organization of persons who, by birth, disease, or accident, are physically limited by a necessity for a wheelchair, crutches, or other mechanical assists to locomotion. Included were all types of disabilities covering a wide possible spectrum of level of disability, economic and social backgrounds. Out of the 206 surveys sent to MAP members, 129 were returned.

In addition, 25 questionnaires were sent to the manager of each of the three specially built public housing projects—Highland Heights, Fall River, Massachusetts; Center Park, Seattle, Washington; New Horizons Manor, Fargo, North Dakota. The manager was to distribute them to 25 residents, have the resident fill the questionnaire out, then collect them and return them to us. The response was disappointing. Highland Heights refused to participate on the grounds that our questionnaire would be damaging to the people living at Highland Heights, and that they were also presently being surveyed by their own questionnaires. The manager from New Horizons Manor returned 15 of the 25 questionnaires; the manager of Center Park returned 7.

The results of the specialized housing residents have been listed separately and put beside the MAP results in the tables for comparison. The percentages were based on total responses from all surveyed, however, except in the cases where the type of housing was involved, hence responses were not comparable.
This section considers the general characteristics of the sample with regard to age, sex, marital status, disability, and education. We did not include large groups of those living in institutions or rehabilitation centers as their environment is more protected, and they would find a majority of our questions no relevant to their current lifestyle.

**Age.** Table 1 gives an age distribution. Of those surveyed, 84% were in the 21-60 age group. The relatively small number of people over 60 reflects the fact that no special efforts were made to include the elderly in this survey even though they may experience many of the same problems of the wheelchair user, we felt that their goals, ambitions, and activities were somewhat different. New Horizons Manor will be referred to as "NHM" in the tables; Center Park, as "CP".

<table>
<thead>
<tr>
<th>AGE GROUP</th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 21</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>21-30</td>
<td>25</td>
<td>2</td>
<td>0</td>
<td>27</td>
<td>18</td>
</tr>
<tr>
<td>31-40</td>
<td>35</td>
<td>3</td>
<td>1</td>
<td>39</td>
<td>26</td>
</tr>
<tr>
<td>41-50</td>
<td>27</td>
<td>2</td>
<td>1</td>
<td>30</td>
<td>19</td>
</tr>
<tr>
<td>51-60</td>
<td>25</td>
<td>2</td>
<td>2</td>
<td>29</td>
<td>19</td>
</tr>
<tr>
<td>61-70</td>
<td>11</td>
<td>4</td>
<td>3</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td>71+</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**Age When Disabled.** Table 2 gives information on the age at which the individual developed a disabling disease or an injury. It can be seen that the largest number, 79% were disabled before reaching 31 years of age. Childhood disease was a large factor in disabilities under 10 years of age, while injury was common in the 21 to 30 age group.
Table 2. Age when disabled.

<table>
<thead>
<tr>
<th>AGE GROUP</th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>At birth</td>
<td>22</td>
<td>2</td>
<td>0</td>
<td>24</td>
<td>15</td>
</tr>
<tr>
<td>Under 10</td>
<td>27</td>
<td>3</td>
<td>1</td>
<td>31</td>
<td>21</td>
</tr>
<tr>
<td>10-20</td>
<td>22</td>
<td>2</td>
<td>1</td>
<td>25</td>
<td>17</td>
</tr>
<tr>
<td>21-30</td>
<td>35</td>
<td>4</td>
<td>0</td>
<td>39</td>
<td>26</td>
</tr>
<tr>
<td>31-40</td>
<td>17</td>
<td>1</td>
<td>2</td>
<td>20</td>
<td>13</td>
</tr>
<tr>
<td>41-50</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>51-60</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>61+</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Sex and Marital Status. Table 3 gives information with regard to the sex of the individuals sampled. It has further been broken down into marital status which suggests the type of living arrangements they have.

Table 3. Sex distribution.

<table>
<thead>
<tr>
<th></th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>87</td>
<td>9</td>
<td>3</td>
<td>99</td>
<td>65</td>
</tr>
<tr>
<td>Females</td>
<td>42</td>
<td>6</td>
<td>4</td>
<td>52</td>
<td>35</td>
</tr>
<tr>
<td>Married male</td>
<td>31</td>
<td>3</td>
<td>0</td>
<td>34</td>
<td>16</td>
</tr>
<tr>
<td>Married female</td>
<td>15</td>
<td>1</td>
<td>0</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Male parent</td>
<td>24</td>
<td>2</td>
<td>0</td>
<td>26</td>
<td>13</td>
</tr>
<tr>
<td>Female parent</td>
<td>12</td>
<td>1</td>
<td>0</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Single male independent</td>
<td>12</td>
<td>6</td>
<td>3</td>
<td>21</td>
<td>12</td>
</tr>
<tr>
<td>Single female independent</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Single male living w/parents</td>
<td>27</td>
<td>0</td>
<td>0</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>Single female living w/parents</td>
<td>19</td>
<td>2</td>
<td>0</td>
<td>21</td>
<td>21</td>
</tr>
</tbody>
</table>
Disability. Table 4 indicates the type of disability of the individuals in the sample. Those who indicated specific diseases, such as polio, cerebral palsy, multiple sclerosis, etc., could also have been in the category of paraplegia or quadraplegia, even though they did not indicate it.

Table 4. Type of disability.

<table>
<thead>
<tr>
<th>DISABILITY</th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polio</td>
<td>39</td>
<td>2</td>
<td>2</td>
<td>43</td>
</tr>
<tr>
<td>Quadruplegia</td>
<td>29</td>
<td></td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>Paraplegia</td>
<td>28</td>
<td>5</td>
<td></td>
<td>33</td>
</tr>
<tr>
<td>Cerebral palsy</td>
<td>11</td>
<td>2</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>Multiple sclerosis</td>
<td>7</td>
<td>2</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Arthritis</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Hemiplegia</td>
<td>2</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Spina bifida</td>
<td>2</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Amytonia congenita</td>
<td>2</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Muscular dystrophy</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Hemorage</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Stroke</td>
<td>1</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Artificial or malformed limb</td>
<td>1</td>
<td>1</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Brain tumor</td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Dwarf</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Highest Education. The question asked on education applies only to those who were disabled at birth or when young. Table 5 indicates that a high percentage of people so disabled have completed or attended college.

Table 5. Highest education completed if disabled when young.

<table>
<thead>
<tr>
<th>TYPE OF EDUCATION</th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No schooling</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Parents (at home)</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Tutors</td>
<td>4</td>
<td></td>
<td>4</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Public or private school</td>
<td>37</td>
<td>2</td>
<td>1</td>
<td>40</td>
<td>53</td>
</tr>
<tr>
<td>College</td>
<td>27</td>
<td>3</td>
<td>1</td>
<td>31</td>
<td>40</td>
</tr>
</tbody>
</table>
HOUSING

This group of questions pertains to the type of housing lived in, reasons for living where they do, and judgments on the accessibility and adequacy of the home.

Density and Type of Dwelling. We were interested in the density of the area where the surveyed lived, as well as the type of house or apartment lived in. Table 6 indicates density characteristics, and Table 7 indicates the type of dwelling. The results of the specialized housing residents were kept separate from MAP members, as their housing situation obviously differed significantly from the others surveyed. Percentages from the residents of Center Park were not taken, as they would not be valid because of the small sample size. The residents of Center Park had difficulty assessing the density of the area where they lived, as it is residential-industrial with a nearby drugstore, but no nearby grocery or department stores.

Table 6. Density of neighborhood.

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>MAP No.</th>
<th>%</th>
<th>NHM No.</th>
<th>%</th>
<th>CP No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Suburban, low density</td>
<td>15</td>
<td>19</td>
<td>66</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Residential suburban</td>
<td>52</td>
<td>66</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban, transportation to shopping</td>
<td>13</td>
<td>16</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban, close to shopping</td>
<td>17</td>
<td>21</td>
<td>15</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Mobile home park</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

364
Table 7. Type of home structure.

<table>
<thead>
<tr>
<th>STRUCTURE</th>
<th>MAP No.</th>
<th>%</th>
<th>NHM No.</th>
<th>%</th>
<th>CP No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>High rise (6 or more floors)</td>
<td>4</td>
<td>3</td>
<td>15</td>
<td>100</td>
<td>7</td>
</tr>
<tr>
<td>Low rise (5 or less floors)</td>
<td>11</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multifamily house</td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public housing</td>
<td>23</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single family home</td>
<td>84</td>
<td>67</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rehabilitation center; institution</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobile home</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College dorm</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Determining Reasons. Table 8 gives an indication of why people live in the area and home which they have indicated. More than one reason was often chosen.

Table 8. Reason for living where people do

<table>
<thead>
<tr>
<th>REASON</th>
<th>MAP No.</th>
<th>%</th>
<th>NHM No.</th>
<th>%</th>
<th>CP No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>You want to</td>
<td>52</td>
<td>66</td>
<td>6</td>
<td>40</td>
<td>2</td>
</tr>
<tr>
<td>Physical nature</td>
<td>43</td>
<td>55</td>
<td>14</td>
<td>93</td>
<td>6</td>
</tr>
<tr>
<td>Economics</td>
<td>37</td>
<td>47</td>
<td>6</td>
<td>40</td>
<td>6</td>
</tr>
<tr>
<td>Location amenities</td>
<td>25</td>
<td>32</td>
<td>2</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Previously owned the house</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No alternative</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Adequacy of Home. In answer to the question on whether the living quarters were adequate to mobility needs, Table 9 indicates the results. This cannot be taken that most homes automatically accommodate mobility needs, as most of the people who indicated adequacy of living quarters also indicated that some remodelling had been done (See Tables 10 and 11), and that some parts of the home were still inaccessible (Table 12).
Table 9. Adequacy of living quarters.

<table>
<thead>
<tr>
<th></th>
<th>MAP No.</th>
<th>%</th>
<th>NHM No.</th>
<th>%</th>
<th>CP No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate</td>
<td>107</td>
<td>84</td>
<td>15</td>
<td>100</td>
<td>6</td>
</tr>
<tr>
<td>Inadequate</td>
<td>21</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 10. Frequency of remodelling.

<table>
<thead>
<tr>
<th></th>
<th>MAP No.</th>
<th>%</th>
<th>NHM</th>
<th>CP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remodelled</td>
<td>64</td>
<td>50</td>
<td>Not relevant</td>
<td>Not relevant</td>
</tr>
<tr>
<td>Not remodelled</td>
<td>55</td>
<td>43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specially built home</td>
<td>9</td>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 11. Home remodelling.

<table>
<thead>
<tr>
<th>ROOM REMODELLED OR CHANGE MADE</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ramps installed</td>
<td>55</td>
</tr>
<tr>
<td>Entry</td>
<td>30</td>
</tr>
<tr>
<td>Bathroom</td>
<td>26</td>
</tr>
<tr>
<td>Bedroom</td>
<td>16</td>
</tr>
<tr>
<td>Kitchen</td>
<td>10</td>
</tr>
<tr>
<td>Elevators installed</td>
<td>6</td>
</tr>
<tr>
<td>Removed thresholds</td>
<td>3</td>
</tr>
<tr>
<td>Doorways widened</td>
<td>3</td>
</tr>
<tr>
<td>Railings added</td>
<td>2</td>
</tr>
<tr>
<td>Stair glide (for wheelchair)</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 12. Inaccessible elements in the home

<table>
<thead>
<tr>
<th>ELEMENT</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstairs rooms</td>
<td>17</td>
</tr>
<tr>
<td>Basement (washer, dryer)</td>
<td>8</td>
</tr>
<tr>
<td>Kitchen appliances and sink</td>
<td>17</td>
</tr>
<tr>
<td>Bathrooms</td>
<td>8</td>
</tr>
<tr>
<td>Kitchen cabinets</td>
<td>7</td>
</tr>
<tr>
<td>Most of house</td>
<td>6</td>
</tr>
<tr>
<td>Too narrow interior doorways</td>
<td>3</td>
</tr>
<tr>
<td>Bedrooms</td>
<td>2</td>
</tr>
<tr>
<td>Light fixtures</td>
<td>2</td>
</tr>
<tr>
<td>Switches</td>
<td>1</td>
</tr>
<tr>
<td>Television</td>
<td>1</td>
</tr>
</tbody>
</table>
Stranded Individuals. We suspected that there are many individuals who are stranded in their own homes. Table 13 indicates reasons why some people are stranded. Seventy percent are stranded because of architectural barriers.

Table 13. Stranded individuals.

<table>
<thead>
<tr>
<th>REASON FOR STRANDING</th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stairs</td>
<td>23</td>
<td></td>
<td></td>
<td>50</td>
</tr>
<tr>
<td>No transportation</td>
<td>8</td>
<td>1</td>
<td></td>
<td>9 20</td>
</tr>
<tr>
<td>No one to help</td>
<td>7</td>
<td>2</td>
<td></td>
<td>9 20</td>
</tr>
<tr>
<td>Biological severity of disability</td>
<td>4</td>
<td>1</td>
<td></td>
<td>5 10</td>
</tr>
<tr>
<td>Psychological dependency</td>
<td>1</td>
<td></td>
<td></td>
<td>1 1</td>
</tr>
</tbody>
</table>

Reason for Moving. Forty-five people indicated that they had moved. Table 14 gives the reasons why the surveyed who have moved did so. It can be seen that the physical nature of the house was a major factor.

Table 14. Reasons for moving.

<table>
<thead>
<tr>
<th>REASON</th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical nature</td>
<td>35</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Wanted to</td>
<td>25</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Economics</td>
<td>14</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Location</td>
<td>13</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Neighborhood amenities</td>
<td>9</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
COMMUNITY

How one feels about his neighborhood, the services and amenities which it provides was felt to be of interest. Table 15 indicates that most people feel that their neighborhood does respond to at least some of their needs, mostly in terms of neighbors, services and location.

Table 15. Neighborhood responsiveness

<table>
<thead>
<tr>
<th></th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responds</td>
<td>75</td>
<td>13</td>
<td>4</td>
<td>91</td>
<td>69</td>
</tr>
<tr>
<td>Does not respond</td>
<td>37</td>
<td>1</td>
<td>3</td>
<td>41</td>
<td>31</td>
</tr>
</tbody>
</table>

RESPONDS IN TERMS OF:

<table>
<thead>
<tr>
<th></th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neighbors</td>
<td>53</td>
<td>6</td>
<td>2</td>
<td>61</td>
<td>41</td>
</tr>
<tr>
<td>Services (commercial needs)</td>
<td>33</td>
<td>9</td>
<td>4</td>
<td>46</td>
<td>31</td>
</tr>
<tr>
<td>Location (work)</td>
<td>39</td>
<td>3</td>
<td>1</td>
<td>43</td>
<td>29</td>
</tr>
<tr>
<td>Health (medical needs)</td>
<td>28</td>
<td>6</td>
<td>3</td>
<td>37</td>
<td>25</td>
</tr>
<tr>
<td>Economics</td>
<td>22</td>
<td>8</td>
<td>3</td>
<td>33</td>
<td>22</td>
</tr>
<tr>
<td>Amenities (parks, playgrounds)</td>
<td>21</td>
<td>3</td>
<td>2</td>
<td>26</td>
<td>17</td>
</tr>
<tr>
<td>Recreation</td>
<td>18</td>
<td>6</td>
<td>3</td>
<td>27</td>
<td>18</td>
</tr>
</tbody>
</table>
PUBLIC BUILDINGS

Public buildings were found to be sadly lacking in accessibility. Churches, town halls, courthouses, and libraries were most often indicated as being inaccessible (see Table 16).

Table 16. Inaccessible buildings.

<table>
<thead>
<tr>
<th>BUILDING</th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Church</td>
<td>69</td>
<td>3</td>
<td>4</td>
<td>76</td>
<td>51</td>
</tr>
<tr>
<td>Courthouse</td>
<td>69</td>
<td>3</td>
<td>1</td>
<td>75</td>
<td>50</td>
</tr>
<tr>
<td>Town hall</td>
<td>69</td>
<td>1</td>
<td>1</td>
<td>71</td>
<td>48</td>
</tr>
<tr>
<td>Library</td>
<td>61</td>
<td>2</td>
<td>2</td>
<td>65</td>
<td>44</td>
</tr>
<tr>
<td>Schools</td>
<td>48</td>
<td>2</td>
<td>3</td>
<td>53</td>
<td>36</td>
</tr>
<tr>
<td>Restaurants</td>
<td>36</td>
<td>4</td>
<td>4</td>
<td>44</td>
<td>30</td>
</tr>
<tr>
<td>Theaters</td>
<td>33</td>
<td>4</td>
<td>4</td>
<td>41</td>
<td>28</td>
</tr>
<tr>
<td>YMCA - YWCA</td>
<td>32</td>
<td>2</td>
<td>3</td>
<td>37</td>
<td>25</td>
</tr>
<tr>
<td>Banks</td>
<td>28</td>
<td>1</td>
<td>2</td>
<td>31</td>
<td>21</td>
</tr>
</tbody>
</table>

ADDITIONS:

- Stores: 7
- Post office: 4
- Doctors office: 3
- Dentists office: 2
- Health Center
- Police
- Fire Dept.
- Bowling
- Stadiums
- Museums
- Social Security Office
- City Hall
- Voting areas
- Veterans Bldg.
- Aquarium

Commercial Activities. A survey of the difficulties encountered while shopping was of interest. While many wheelchair users were found to be able to shop in malls, those with crutches or leg braces indicated that
they could not use malls because too much walking was involved. It was also pointed out that although once inside a mall, there were usually no steps, getting from the parking lot to the shops usually involved getting up a curb which separated parking from the mall itself. The results indicated in Table 17 are thus somewhat confounded, but interesting nevertheless. Table 18 indicates the difficulty encountered in supermarkets. Each item was ranked according to difficulty. The lower the average (mean) the more difficult the task was judged to be.

Table 17. Shopping hindrances or circulation difficulties.

<table>
<thead>
<tr>
<th></th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supermarkets</td>
<td>33</td>
<td>2</td>
<td>4</td>
<td>39</td>
<td>26</td>
</tr>
<tr>
<td>Commercial strips</td>
<td>30</td>
<td>6</td>
<td>2</td>
<td>38</td>
<td>26</td>
</tr>
<tr>
<td>Grocery stores</td>
<td>30</td>
<td>2</td>
<td>2</td>
<td>34</td>
<td>23</td>
</tr>
<tr>
<td>Malls</td>
<td>19</td>
<td>2</td>
<td>0</td>
<td>21</td>
<td>14</td>
</tr>
</tbody>
</table>

Table 18. Supermarket difficulties.

<table>
<thead>
<tr>
<th></th>
<th>AVERAGE (MEAN) RANKING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shelves</td>
<td>2.01</td>
</tr>
<tr>
<td>Check out</td>
<td>2.60</td>
</tr>
<tr>
<td>Food bins</td>
<td>2.88</td>
</tr>
<tr>
<td>Aisles</td>
<td>3.58</td>
</tr>
<tr>
<td>Counters</td>
<td>3.68</td>
</tr>
<tr>
<td>Customer service</td>
<td>4.71</td>
</tr>
</tbody>
</table>
There are certain services and agencies which have been established to take care of the needs of the physically disabled. We wanted to know if these services were known about, needed, used, or effective, and what the people thought of rehabilitation programs in general. Table 19 indicates awareness of such services and reasons for unawareness. Table 20 shows where the 84 who indicated awareness obtained the information on the services. Table 21 gives an indication of what the users think of Federal-State Rehabilitation Agencies.

Table 19. Awareness of rehabilitative services.

<table>
<thead>
<tr>
<th>Source</th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aware</td>
<td>68</td>
<td>11</td>
<td>5</td>
<td>84</td>
<td>60</td>
</tr>
<tr>
<td>Unaware</td>
<td>49</td>
<td>3</td>
<td>2</td>
<td>54</td>
<td>40</td>
</tr>
</tbody>
</table>

Reason for Unawareness

<table>
<thead>
<tr>
<th>Reason</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Don't care or need help</td>
<td>9</td>
</tr>
<tr>
<td>No information was made available</td>
<td>15</td>
</tr>
</tbody>
</table>

Table 20. Source of rehabilitative information.

<table>
<thead>
<tr>
<th>Source</th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social service representative</td>
<td>27</td>
<td>6</td>
<td>4</td>
<td>37</td>
<td>44</td>
</tr>
<tr>
<td>Friend</td>
<td>29</td>
<td>3</td>
<td>4</td>
<td>36</td>
<td>43</td>
</tr>
<tr>
<td>Rehabilitation center</td>
<td>26</td>
<td>4</td>
<td>2</td>
<td>32</td>
<td>38</td>
</tr>
<tr>
<td>Doctor</td>
<td>15</td>
<td>2</td>
<td>3</td>
<td>20</td>
<td>24</td>
</tr>
<tr>
<td>MAP; handicapped organ.</td>
<td>11</td>
<td></td>
<td></td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td>Found through own inquiry</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special publications</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Easter Seals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Therapist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Table 21. Responsiveness of Federal-State agencies.

<table>
<thead>
<tr>
<th></th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responsive</td>
<td>33</td>
<td>5</td>
<td>1</td>
<td>39</td>
<td>32</td>
</tr>
<tr>
<td>Not responsive</td>
<td>73</td>
<td>7</td>
<td>4</td>
<td>84</td>
<td>68</td>
</tr>
</tbody>
</table>

**POSITIVE COMMENTS:**
- Are becoming more aware of needs of disabled: 5
- Meets needs: 2
- Are doing their best: 1

**NEGATIVE COMMENTS:**
- Insufficient funding: 5
- They lack knowledge of disabled people's needs & individual potential: 6
- Difficult to get help: 11
  - w/regard to jobs: 6
  - w/regard to education: 2
- They don't care: 3
- No representation of disabled people: 2
- Don't give disabled enough to live on: 3
- Agencies don't respond: 3
- Agencies too slow to respond: 3
- Can't get into Rehab. Bldg!: 1
- Reorganization needed-- outdated regulations: 2
- Had trouble with MDC: 1
- Provide too few services: 1
- Too tangled in their own bureaucracy: 1
- No contact: 4
Information. People with ambulatory problems have a difficult time being active in the environment largely because of architectural barriers and the lack of information on where such barriers exist and in what form they are in. Table 22 indicates that the majority of the surveyed felt that information was difficult to come by. Those who were successful, used the sources listed below. It can be seen that they depend largely on special publications and clubs for the physically disabled.

Table 22. Environmental information.

<table>
<thead>
<tr>
<th>Source</th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful in finding information</td>
<td>35</td>
<td>7</td>
<td>4</td>
<td>48</td>
<td>41</td>
</tr>
<tr>
<td>Unsuccessful in finding information</td>
<td>62</td>
<td>5</td>
<td>2</td>
<td>69</td>
<td>59</td>
</tr>
</tbody>
</table>

SOURCE:

- Special pamphlets or publications
- MAP or other handicapped club
- Magazines or newspapers
- Friends
- TV or radio
- Own investigation
- Easter Seals' Wheeling through Boston
- Government offices
- Books
TRANSPORTATION

The intention of the questions on transportation was to find what mode is most often used and what improvements in the public transportation system would enable them to use it. Table 23 shows that most physically disabled people of our sample own their own car. Very few could use public transportation. Table 24 shows that highways do meet some of the needs of travelers, although many indicated that the lack of accessible rest rooms was the major problem in travelling.

Table 23. Mode of transportation.

<table>
<thead>
<tr>
<th>Mode of transportation</th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own own car</td>
<td>75</td>
<td>7</td>
<td>2</td>
<td>84</td>
</tr>
<tr>
<td>Depend on friend or parents</td>
<td>50</td>
<td>7</td>
<td>4</td>
<td>61</td>
</tr>
<tr>
<td>Use public transportation</td>
<td>9</td>
<td>3</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>Paid driver</td>
<td>1</td>
<td></td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

Table 24. Highway meets needs.

<table>
<thead>
<tr>
<th>MEETS NEEDS IN TERMS OF:</th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>48</td>
<td>3</td>
<td>1</td>
<td>52</td>
</tr>
<tr>
<td>Shelter</td>
<td>37</td>
<td>3</td>
<td></td>
<td>40</td>
</tr>
<tr>
<td>Sanitary facilities</td>
<td>24</td>
<td>2</td>
<td></td>
<td>26</td>
</tr>
</tbody>
</table>

Public Transportation. Taxi is the only public mode of transportation that is used to any extent (Table 25), although many people did not consider the taxi as part of the public transportation system (see Table 23 above). Fig. 26 gives an indication of where most people surveyed believe changes need to be made for a more efficient system. Most of those who indicated fare reduction were taxi cab users.
Long Distance Travel. Most surveyed indicated that they prefer to travel long distances by car. Airports posed a problem for some people both in accessibility to the loading area and the airplane itself. Trains and busses were inaccessible for most (see Tables 27 and 28).
EMPLOYMENT CHANGE

When becoming disabled while working full time, many surveyed either had to change jobs or became unemployed. Table 29 gives the results to this question. Those listed below the dotted line were residents of the specialized housing projects. It should be noted that none currently hold full-time jobs.

Table 29. Effect of disability on employment.

<table>
<thead>
<tr>
<th>HOW JOB CHANGED:</th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORMER</td>
<td>PRESENT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self employed businessman</td>
<td>Free-lance writer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field engineer</td>
<td>Technical writer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vulcanizer</td>
<td>Secretary</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aviator</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction mechanic</td>
<td>Office clerk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoe repairman</td>
<td>Telephone solicitor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction machine operator</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk route driver</td>
<td>Psychologist</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanic</td>
<td>Student</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distribution manager</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural nurse</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supt. of boy's institution</td>
<td>Director of speech-hearing center</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aeronautical engineer</td>
<td>Jeweller-watchmaker</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q. C. inspector &amp; draftsman</td>
<td>Student</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owner-operator of bus-taxi service</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serviceman in Army</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction ironworker</td>
<td>Super, in Ed., MRC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building construction apprentice (mason)</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bread salesman</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher</td>
<td>Government program coordinator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Executive legal secretary</td>
<td>Homemaker</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secretary</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FORMER</td>
<td>PRESENT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>----------------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machine operator</td>
<td>Translator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physicist</td>
<td>Technical editor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Print contractor</td>
<td>Accountant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineer</td>
<td>Self-employed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrician</td>
<td>Micro-film reader</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asst. to Dean at school</td>
<td>Consultant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrician</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correctional officer</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office clerk</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restaurant manager</td>
<td>Clerical service</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X-ray technician</td>
<td>Occupational therapist</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher of retarded</td>
<td>Assistant professor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General office work</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lineman</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farm work</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Welder</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching</td>
<td>Babysitting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Book keeper</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical labor</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owner-manager of store</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bench assembly worker</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accountant</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upholsterer, aircraft mechanic</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pastor</td>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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SOCIAL ATTITUDES

The physically disabled have been surveyed several times on their physical needs, but never, as far as we know, have they been surveyed on their social attitudes toward their environment—physical, social and psychological. We realize that attitudes are difficult to assess, but we felt that it was worth trying.

Apprehensiveness in New Places. Table 30 shows that most of the surveyed were not apprehensive about being around new places and strangers. For those who were uncomfortable, it was mostly because they are generally uncomfortable around new surroundings because they are unfamiliar with the mobility pathways.

Table 30. Apprehensiveness in new places.

<table>
<thead>
<tr>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apprehensive</td>
<td>38</td>
<td>6</td>
<td>2</td>
<td>46</td>
</tr>
<tr>
<td>Not apprehensive</td>
<td>83</td>
<td>9</td>
<td>5</td>
<td>97</td>
</tr>
</tbody>
</table>

REASON FOR APPREHENSION

Thoughts of being unhealthy | 10  | 0  | 1     | 11 | 22 |
Unfamiliarity w/surrounds    | 33  | 6  | 1     | 40 | 78 |

Attitudes of Other People. Most of the surveyed felt that the attitude of other people they encounter were both favorable and curious toward themselves (see Table 31).

Competition. Most people found the competitiveness of our society to be a facilitator in achievement (see Table 32).
Table 31. Attitudes of other people.

<table>
<thead>
<tr>
<th>Attitude</th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favorable (accepting)</td>
<td>94</td>
<td>10</td>
<td>7</td>
<td>111</td>
<td>74</td>
</tr>
<tr>
<td>Curious</td>
<td>59</td>
<td>9</td>
<td>2</td>
<td>70</td>
<td>47</td>
</tr>
<tr>
<td>Unfavorable (rejecting or shying)</td>
<td>17</td>
<td>1</td>
<td>0</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td>Shocked</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Helpful</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 32. Effect of competitiveness in society.

<table>
<thead>
<tr>
<th>Effect</th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encourages achievement</td>
<td>92</td>
<td>8</td>
<td>5</td>
<td>105</td>
<td>80</td>
</tr>
<tr>
<td>Discourages from trying</td>
<td>22</td>
<td>3</td>
<td>1</td>
<td>26</td>
<td>20</td>
</tr>
</tbody>
</table>

Effect of Emotional Strain on Perceptions. In answer to the question on whether the influence of emotional strain changes the perception of the environment so that use of it becomes complicated and confused, Table 33 indicates the answer to be "no". However several people indicated difficulty in understanding the wording of this question.

Table 33. Emotional strain effect on environmental confusion.

<table>
<thead>
<tr>
<th>Effect</th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does cause confusion</td>
<td>31</td>
<td>2</td>
<td>0</td>
<td>33</td>
<td>29</td>
</tr>
<tr>
<td>Does not cause confusion</td>
<td>70</td>
<td>8</td>
<td>5</td>
<td>83</td>
<td>71</td>
</tr>
</tbody>
</table>

Demeaning Facets of Being Disabled. Table 34 indicates that physical barriers are by far the most demeaning facet involved with being physically disabled to deal with.

Loss of Independence. In answer to the question of whether becoming disabled changed life from one of independence to dependence, some had difficulty in answering because they became dependent in some ways, while not in others (See Table 35).
Table 34. Demeaning facets of being physically disabled.

<table>
<thead>
<tr>
<th></th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical barriers</td>
<td>93</td>
<td>8</td>
<td>7</td>
<td>108</td>
<td>72</td>
</tr>
<tr>
<td>People's attitudes</td>
<td>34</td>
<td>6</td>
<td>2</td>
<td>42</td>
<td>28</td>
</tr>
<tr>
<td>Mental barriers</td>
<td>31</td>
<td>4</td>
<td>0</td>
<td>35</td>
<td>24</td>
</tr>
<tr>
<td>Effort expended</td>
<td>23</td>
<td>2</td>
<td>2</td>
<td>27</td>
<td>19</td>
</tr>
</tbody>
</table>

Table 35. Change from independence to dependence.

<table>
<thead>
<tr>
<th></th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did change to dependence</td>
<td>53</td>
<td>5</td>
<td>4</td>
<td>62</td>
<td>52</td>
</tr>
<tr>
<td>Did not change to dependence</td>
<td>35</td>
<td>5</td>
<td>2</td>
<td>42</td>
<td>36</td>
</tr>
<tr>
<td>Yes and no</td>
<td>13</td>
<td>1</td>
<td>0</td>
<td>14</td>
<td>12</td>
</tr>
</tbody>
</table>

Friendships. Some friendships were found to change as a result of being disabled, although there was certainly evidence that this does not hold true as a rule (Table 36). Most surveyed spend more time with non-disabled people, perhaps because there are so many of them (Table 37). The results of the specialized housing residents were not combined with MAP members due to obvious differences in housing.

Table 36. Change of friendships.

<table>
<thead>
<tr>
<th></th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friendships changed</td>
<td>45</td>
<td>2</td>
<td>4</td>
<td>51</td>
<td>43</td>
</tr>
<tr>
<td>Friendships did not change</td>
<td>49</td>
<td>7</td>
<td>3</td>
<td>59</td>
<td>50</td>
</tr>
<tr>
<td>Some change occurred</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>7</td>
</tr>
</tbody>
</table>

Table 37. Time spent with friends.

<table>
<thead>
<tr>
<th></th>
<th>NHM</th>
<th>CP</th>
<th>MAP</th>
<th>% MAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>More with able bodied</td>
<td>4</td>
<td>0</td>
<td>97</td>
<td>81</td>
</tr>
<tr>
<td>More with other disabled</td>
<td>11</td>
<td>6</td>
<td>21</td>
<td>17</td>
</tr>
<tr>
<td>Both equally</td>
<td>11</td>
<td>6</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

380
Physical vs. Social Related Problems. Table 38 indicates that the surveyed find more problems related to the physical environment and that these are harder to deal with as compared with people-related problems. Several indicated difficulty in answering this question as they felt that both problems were closely intertwined.

Table 38. Physical vs. people problems.

<table>
<thead>
<tr>
<th></th>
<th>MNP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL %</th>
</tr>
</thead>
<tbody>
<tr>
<td>More problems with physical environment</td>
<td>84</td>
<td>9</td>
<td>7</td>
<td>100</td>
</tr>
<tr>
<td>More problems with people</td>
<td>24</td>
<td>2</td>
<td>0</td>
<td>26</td>
</tr>
</tbody>
</table>

Physical environment easier to deal with
People easier to deal with 33 3 2 38 28

Family. Becoming disabled did, in most cases indicate that it caused a disruption in the family (Table 39). Many who indicated that it did not cause a disruption were those injured at birth, and therefore probably do not know the full extend of the changes which occurred in family relationships at that time. Table 40 gives the ways in which the family was disrupted.

Table 39. Family disruption.

<table>
<thead>
<tr>
<th></th>
<th>MNP</th>
<th>NHM</th>
<th>CP</th>
<th>TOTAL %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did disrupt</td>
<td>52</td>
<td>5</td>
<td>4</td>
<td>61</td>
</tr>
<tr>
<td>Did not disrupt</td>
<td>40</td>
<td>8</td>
<td>3</td>
<td>51</td>
</tr>
</tbody>
</table>
Table 40. Ways family was disrupted.

<table>
<thead>
<tr>
<th>Dependency - total care</th>
<th>MAP</th>
<th>NHM</th>
<th>CP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial problems</td>
<td>15</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Spouse left</td>
<td>8</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Emotional</td>
<td>5</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Children suffer</td>
<td>5</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Rearing children difficult/</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>impossible</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over protective mother</td>
<td>4</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Sibling problems</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Acceptance of disability</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Marital sex problems</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Left out of family activities</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Mobility</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Wife went to work</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother had to quit work to care for me</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Death of a parent</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Had to buy a new home</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitudes of family members</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School problems</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Space problems</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Breakdown of communications</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Fatigue</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Spouse became alcoholic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sacrifices by parents</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Marital problems</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
WHAT ARCHITECTS CAN (SHOULD) DO

In answer to the question "What can we as architects do to improve your safety, ease or convenience?" we received over 100 suggestions. They are organized below according to the structure or part of the environment affected. The recommendation for eradicating all architectural barriers was made by almost everyone and is therefore not included.

Outdoor Public Places
1. Corner cuts or ramping of curbs (13 requests)
2. Paved pathways at beaches to water
3. More indoor-outdoor spaces (covered)
4. Use of fill and terracing instead of ugly ramps
5. Heated sidewalks
6. Wheelchair access to parks
7. Smooth, wide walkways

Public Buildings

Entrances
1. Street level entrances, no steps; or ramped entrance (46 requests)
2. Elimination of thresholds (3 requests)
3. When stairs are used, railings on both sides of the stairs (8 requests)
4. Electric doors (6 requests)
5. Less heavy doors (4 requests)

Parking
1. Ample convenient parking (3 requests)
2. Special reserved parking near public buildings (2 requests)
3. Covered garages with apartment buildings (2 requests)
4. Signal near public buildings to indicate help is needed from car to entrance
5. Do away with fences around grocery stores which keep grocery carts in, and wheelchair people out

Elevators, escalators
1. Larger elevators
2. Lower elevator controls (2 requests)
3. Elevators in all public buildings (10 requests)
4. Fewer escalators
Doors, hardware, finishes
1. Wider doorways (22 requests)
2. Less heavy doors (4 requests)
3. Elimination of door thresholds (3 requests)
4. Doors that do not spring shut
5. Levers on doors instead of knobs
6. Lower door knobs
7. Paint that doesn't scrape off too easily
8. Non slip flooring
9. No carpets

Public Restrooms
1. Accessible bathrooms in public buildings (12 requests)
2. Wider doorway openings to restrooms (16 requests)
3. Accessible bathrooms in motels and hotels (2 requests)
4. Grab bars at toilets (4 requests)

Corridors
1. Wider corridors (2 requests)
2. Interesting corridors
3. Reachable drinking fountains and public telephones (6 requests)

Specific building requests
1. Accessible balconies in theater, churches, auditoriums
2. More malls and shopping centers
3. Accessible schools and colleges
4. Room to sit in a wheelchair in theater, auditorium, etc.
5. Recreation centers which can be used by wheelchair users
6. Approachable counters and tables
7. Room for wheelchair in restaurant at table
8. Wide aisles in department stores
9. Wide checkout counters in supermarket
10. All medical centers with elevators

Housing

Public housing
1. All public housing built be accessible for wheelchair users
2. Build 2-bedroom apartments for middle income people
3. Build homes for quadraplegics and paraplegics

Within the home

Appliances, hardware, switches
1. Kitchen appliances placed where they can be reached (esp. the controls) (5 requests)
2. Bathroom doors which open out so that you cannot fall against them and be locked in
3. Windows that can be worked (3 requests)
4. Switches and electric outlets at wheelchair heights (2 requests)
5. Pushbutton switches and telephones
6. Lower rods in closets
7. Slide out cabinets and shelves
8. Floors that don't need waxing and are soil resistant

**Safety.**
1. Built in fire alarm

**Amenities**
1. More balconies
2. Attractive open spaces in house

**Transportation - mobility**

**Along the highway**
1. Emergency phones along the highway
2. Accessible restrooms in service stations (4 requests)

**Public transportation**
1. Accessible public transportation systems (3 requests)
2. Busses with lower steps
3. Waiting stations at same level as bus, train, plane (3 requests)

**Design**
1. Marketable accessible cars like one by Pratt Institute (taller, wider doors, ramp)
2. Design a cheaper wheelchair
3. Better motorized chairs (brakes too sudden)

**Government or Law**
1. Enforce federal and state codes (2 requests)
2. Wider application of codes to all public buildings (2 requests)
3. Real estate abatements for disabled
4. People to check on disabled persons' well being and needs
5. Health insurance

**Information channels**
1. More information among and between the inflicted

**To the Architect**
1. Build houses for the disabled (2 requests)
2. Convince builders, other architects, and clients of the need for accessible buildings (3 requests)
3. Have architectural offices work with handicapped organizations
4. Be available for consultation
5. Design every building with the severest handicap in mind (4 requests)
DEPARTMENT OF PLANNING AND DEVELOPMENT

Planning is a function coordinated to a great degree by the departments of city government, responsible and accountable to elected officials. The agency usually serves in an advisory capacity and provides technical assistance to the City Council, City Manager, and other departments as well as neighborhood planning teams, citizen groups and private agencies and institutions. Functioning activities vary from zoning restrictions to capital improvement programs to housing research and policy formulation. The extent of involvement to which each of these areas are coordinated varies widely, yet previous studies have failed recognition and provision for the wheelchair citizen at full capacity.

Recent years have seen the advent of consolidation within the planning framework links to the Community Affairs Office. By concerting these efforts, it eliminated much of the duplication and overlapping of work loads as well as clarifying responsibility. However, City Hall remains basically fragmented (i.e. recreation, manpower, planning are still considered separately), rather than through an inter-disciplinary approach. Communication among departments revolves mostly around specific subject matter so that lack of coordination within City Hall still stands as a major obstacle to effective planning. Without effective coordination among municipalities, citizen participation cannot mean very much.

Evaluation of several housing developments for the wheelchair users reveals deficient attitudes and responses to assure the real needs of users were met. Where physical quality is a mandate, these interests should be
upheld. Any deprivation of coordinative procedures to implement these will reflect future skepticism on the part of citizens toward concepts of citizen participation. Jurisdictional Authority which predicts inefficient, unbinding, negative attitudes works to impede any concepts or theory of planning. Efficient communication, or the lack of it, is often a question of the personalities involved.

Priority activities for a comprehensive planning department seem to stem out of the notion of recommendations currently underway. Planning activities arranged in a priorital order that list the formulation of a comprehensive plan are cited as an absolute necessity in order to tie together the numerous individual projects, planning, and development activities in the various parts of the city. Thus by formulating a matrix index by user criteria as a priorital index of the most deficient supply of environmental considerations by groups, one can begin to focus on crucial areas and not just deal in stupendous aggrandizement of an aesthetic environment.

Community Development programs should begin research and analysis of environmental studies by need according to groups as one index. This calls for economic, as well as physical and psychological planning. Using this information as a uniform data bank service for quick, easy referral, it would also serve as a profile of the service population and delivery system. These studies, while varying, can largely be made possible by funds from Federal Community Renewal Programs for research and planning efforts "to define and analyze problems and purpose solutions" towards physical, economic, and social renewal of the city. It is most essential that work begin for the wheelchaired citizen in our environment. These plans should be done on the neighborhood basis, with alternative design development plans and culminating in a series of housing development plans.
EVALUATION

The visionary notion to be dealt with in planning is comprehensiveness. A planning body should take account of all principle factors that influence land use and the responsibility to provide everyone with the civil rights planning should intend. It should clarify the goals of all community groups, whether issues are physical, social, cultural, etc. It should arrange these according to priorities. Effective planning requires an analysis of four areas:

1. Effects of technology on the pattern of change, its effects on social status in terms of consumer qualities of the physical as well as social nature

2. Concept of public purpose--opportunity, access, self-sufficiency, goal achievement values

3. Fragmentation of urban structure, decentralization--mobility concepts, rapid transit

4. Comprehensive planning must deal with questions such as, How are wheelchaired people to live and work?

We have not shown that we know how to solve many of our social problems, or how to educate slum children, build beautiful cities, or justify physical forms of buildings, basically because we have not comprehensively looked at the pressing needs of these problems, their underlying routes and priorities.
"The role of metropolitan planning is to present in a systematic way the choice that a population can make in guiding the development of the metropolis."3

"Agencies which deal with metropolitan problems are patiently and painstakingly made effective by their members and staffs, not instantaneously, but by brilliantly drafted legislation."4

Area planning agencies have neither funds nor the statutory authority to perform actual functions influencing regional development. They concentrate on population studies, economic analysis, and traditional land use planning. Once their studies have been completed and recommendations have been made and developed they must depend upon public persuasion through public relations to gain acceptance of their views. Agencies must rely upon rival powers to gain acceptance of their plans. Their reviews must be largely informal, and their conclusions aired through their public. Mixed reactions can be found to the implementation power derived by providing consulting services to local planning agencies. Older, more respected agencies view local extension service as a means of obtaining a metropolitan overview in local development decisions. Other agencies, less strongly intermixed, see local services as a source of potential conflict which would rock their tenuous foundations within the metropolitan area's decision-making structure. New agencies, acting on the principle that discretion is better than valor, usually remain silent on controversial issues. Minority group problems, tax questions, and many site location issues are avoided in favor of simple data gathering, the advocacy of more open space, the provision of statistical service to other planning or operating bodies.5 Effective agency provides a
means for local and state leaders to reach consensus on metropolitan issues.

An effective metropolitan planning agency should have responsibility, flexibility, and be able to accommodate to changing circumstances. The agency should prepare metropolitan objectives without smothering existing concerns or legitimate expectations of private interests. The agency's power and role should not be too strictly determined at the time of its formation. The agency should be required to prepare a comprehensive plan as the basic judgment on all major development areas.

The implications to MAPC are found in the basic structure of the agency as a focal element. Sufficiently funded, it should employ a well-trained staff. Its interest should be of local and state concerns, and it should develop effective publication systems and use existing media to emphasize development criteria on regional bases. Lastly, it should develop comprehensive objectives that can be used and measured as a yardstick for success in development projects. Possessing this promising structure, there remains several central issues to be decided at an early date. These are the role and objectives in area development, the nature of issues it should examine, its manner of doing so, and the communication links it should develop with other agencies and the general public to forward its view.

Role and objectives should avoid duplication of other agency functions in order to find a distinct and crystallized place in the community. Many agencies (MDC, DPW, and others), along with many semi-public and private institutions such as utility companies, the Federal Reserve Bank, and instruction corporations are partners in the area's long range development. Yet none of these agencies have both the same broad community representation and the obligation to examine all development issues individually and comprehensively with a far ranging perspective as does MAPC.
An agency devoted solely to information gathering and dissemination cannot be regarded or considered as a responsible decision-making entity where complex problems are studied until their final conclusion meets with apathy. Public information programs must have meaningful context or suffer the fate of non servicability.

Sensitively speaking the most critical issue facing the area is that of civil rights—not only ethnic, racial, or cultural, but physical and social civil rights. The wheelchaired or paraplegic organizations, currently are pressing for free access to urban centers, housing markets, equal job opportunities and the elimination of de facto school segregation. Some leaders argue for establishment of cordial contact with controlling agencies, while others, the more militant, voice suggestions for physical cohesion which will result in an elimination of organized function and political effectiveness. These differences in strategies are reflected in the tepid support or outright difference of various minority group leaders to various movements. A cursory analysis suggests that these differences in strategies within the movement boil down to disagreement over the time schedule for complete integration and varying degrees of skepticism over the acceptance paraplegics might expect in the majority community even if strives were begun.

Obviously MAPC must play a decisive role in these civil rights issues which affects indirectly an area's population and indirectly influences the entire population's present and future economic and social prospects. While this issue cannot be avoided, it can be handled forthrightly and constructively without destroying the Council's growing authority.

Another broad issue connected with the aspects of physical and social civil rights is that of transportation improvements. It should include recommendations concerning the sequence of construction or improvements of all major arterials, interchanges and terminals, as well as stipulate guidelines
that meet community needs.

To recapitulate, MAPC effectiveness would require for its policies:
1) forum for debate, 2) clearinghouse for information, 3) calling upon the many public and private operating agencies and the academic resources of the area to contribute facts and investigative talents to the continuing reassessment of developmental trends, policies and their implications.

Over the longrun, MAPC will succeed or fail depending on how it deals with three issues: 1) understanding how the metropolitan area works, 2) finding a means for some control over its growth and its problems, 3) unifying and directing the metropolitan regions. Among the more significant provisions are:

1. Maintenance of a central data service.
2. Analysis of current needs, trends and opportunities and making estimates and forecasts for the future.
3. Formulation of regional goals.
4. Evaluation of current action.
5. Facilitation of agreement among local governments and action agencies on areas of common concern.
6. Preparation of plans for future development.

One may add others that provide such provisions as cooperation between community and local bodies as well as state planning with state programs.

MAPC agencies must lay the ground rules within which program development and competition between programs takes place. It should be a mechanism not for eliminating conflict and competition, but for channeling, controlling, and guiding it, if not at ideal optimization, at least at higher levels of systemization. Thus planning can also help determine higher uses of resources, if not through perfect knowledge of workings of areas and groups, then by cutting the problems to manageable size.
EVALUATION

MAPC has been projected as an agency that should concern itself with area-wide problems, leaving local problems to local jurisdictions. There is an element of legitimacy that agreement for function is the basis for understanding between local concern area-wide planning (state) and mediator between federal.

The basis for determining functions might be along lines of:

1. Central importance to functional efficiency and viability in metropolitan planning
   interrelated functions - utility systems, communications, schools, transportation, power sources

2. Natural resources
   concepts of open space; space consuming functions

3. Specialized service functions
   schools, hospitals
   specialized cultural and recreational activities, area-wide in scope
   vary social groups and physical groups

4. Function of society for efficiency and savings through cooperation
   service agencies
   planning authorities

5. Level of service for equalization of opportunity
   public coordination
   private coordination

The functions, the strategy and the organization of MAPC must aim directly at achieving protection of integrity and promotion of interest on all levels to form a solid governmental structure and citizenry; a cooperative attitude to respond to genuine reality of needs.
REDEVELOPMENT AUTHORITY (RA)

The Redevelopment Authority (RA) in their planning policy reflects a basic dichotomy, manned by a progressive and cooperative staff, but still subject to the decisions and policy of a more traditional board. It is an agency which has not dealt with a total redevelopment plan with which it could try to establish citizen recognition. No set aims or general functions have alienated many of our social groups. With new policy, the RA staff proceeds with old plans, usually encasing a scope much larger than concentrated planning efforts deal with or even allow for.

The RA, as a mobilizer of local resources, is a public cooperation, that is technically an autonomous form of city government. It does not go to the City Council for its operating budget or for funding its projects, but relies on federal aid--HUD (2/3), state and local (1/3). Support from local resources such as individuals, places of business, charitable trusts, foundations, churches, institutions and universities, provide a major source of financial support and new ideas. These policies indicate a futility on the part of the wheelchair user when working within local governing bodies, such as City Council, since financial support will have no effect on the RA's plans, and the curious position of working with a federal system whose concern is not comprehensive enough to establish local need criteria. Thus the wheelchair user must make a plea to private concerns. His environmental needs are left to the priorities of ones fellow citizen, who has his own priorities. Thus casual and informal relationships established by the RA and various local resources and private organizations is good business for business, but not good business for users of different environmental circumstances.
In the interest of coordinated community planning, the RA should be a formal inter-agency, inter-institutional, inter-private, inter-public coordinated mechanism which would pool local resources and form a central sounding board for agency ideas and strategies, working towards more comprehensive planning and a better social service delivery system. Another factor which requires a closer coordination of all concerns is policy motivation of the RA. Their overall plan deals mainly in detailed finite planning and its subsequent implementation. Model Cities Programs, for example, have concern for neighborhood beautification, playground maintenance, shop renovation, street repairs, lighting, and crime control. But the truth of the matter is that none of these programs aims are fulfilling the need of wheelchair users such as curb cuts on streets, parking facilities for their cars, accessible and usable playgrounds for disabled children, or shops functional for everyone's use. Yet the RA's representatives serve on boards of various public and private community organizations (Red Cross, Rotary, Model Cities) to share information and problem solving techniques. Yet true representation is not fulfilled within these organizations--there are no wheelchair citizens being accepted to any of these various roles.

Citizen participation with advisory capacity doing both the planning and execution stages seems to imply an efficient and effective means to meet need demands as well as consent on provision of an expensive technical and professional staff. Citizen groups could be composed of all major need elements and thus could be representative for all communities--all aspects of the physical need environment (wheelchair, blind, elderly, young, deaf), considering the range of man's physical limitation needs. Consistently there would be a cross section of citizens in the representing agency. Also as members of the agency, overseers would be rehabilitation service specialists
such as finance specialists and rehabilitation specialists--landscape archi-
tects and regular architects, working along together to help them in all
aspects of planning and design improvement programs from the procuring of
loans or grants through the execution and completion of plans.

RA programs are in recognition that rehabilitation requires more than
just housing, but health services, recreation and other facilities and ser-

vices and that these should be realized through special efforts for increased
citizen participation--encouragement of positive, constructive forms of in-
volvement in neighborhood improvement.

RA policy should strive for attitudinal change amongst the citizen parti-
cipation policy councils, a move from the anomie that characterizes modern
communities to an awareness that a neighborhood can be made better through
the complete forces of citizen participation (i.e., wheelchair, poor, blind,
etc.). Of course, this policy procedure will only be effective if the citi-
zen groups begin to realize the need for cohesive participation. The slogan
"We want..." must truly come to mean "We, the broad interests which comprise
this community want..." Ross defines this as "inner resources approach to
community development."

"...Stress is based on the need to encourage communities of
people to identify their own wants and needs and to work
cooperately at satisfying them...projects are not predeter-
mined but developed as discussion in communities is encour-
aged, proceeds, and focuses on the real concerns of the
people...change comes as a community uses the need for change
and as it develops the will and capacity to make change it
feels desirable...development of a specific project is less
important than the capacity of a people to establish their
projects."
EVALUATION

Members of the RA staff, therefore, should feel that they are in a learning process as well as a planning process. Plans should be developed in a way so that citizen participants may be provided with feedback and consensus reached—such as economic indications and restraints, density demand, innovation in design techniques for further applications to their social planning. Subsequently perception of community needs and the aid of groups such as Mass. Council on Housing (MCOH) planning teams, community capacity through working on one problem as a cohesive unit can be a dream model for professional-citizen participation.
HOUSING AUTHORITY (HA)

On first surveillance, the Housing Authority (HA) and its directors were largely discounted by decision-makers in the community. Only the most tenuous lines of communication existed between the Authority and any of the other bodies concerned with planning for the city. The HA is the typical old-state housing authority, concerned with keeping the various housing projects in the city solvent, impatient with vandalism and social unrest in their projects and generally oblivious to the social needs of public housing tenants. It has been described as a bankrupt institution that operates as if it were in fear of losing something; it seems to have forgotten that it is supposed to serve the people. Contact with the public is minimal.

The kind of change which must affect it is the removal of governing authority over public institutions, or new constitutional attitudes for the HA in general. If the HA is going to have authority for the new types of projects and developments built under its jurisdiction, then new policy toward a coordinating council with other agencies has to be developed. The HA coordinating body should consist of a variety of interest group representatives so that no project becomes shallow in concept or intent of purpose. A prime factor for HA jurisdiction is the role of responsibility. HA should be held liable to local municipalities, not federal statutes. The HA should act as a catalyst to see that quality in representation is put forward. The organization should act as a standard for development procedure by working with varied parties to establish good criteria.

A critical area of need can be furnished by the HA who are in a position to do something about it. The popular word seems to depopularize any con-
cepts or notions with HA for studies and needs of mass housing which can accommodate the wheelchaired citizen. The long struggle to obtain adequate low rent housing that is barrier-free may go down the drain unless public oriented agencies begin to become aware of the needs and problems. Watching people stranded in upper floor rooms by steep stairways rendered unnecessarily helpless by poorly designed kitchens and bathrooms, forced into substandard buildings and damp basement apartments by rentals above their means, makes the need for housing quite apparent.

Beside the usual concept for HA programs to investigate for public priority, we also suggest other ventures for the HA to procure--such as care centers, half-way houses as facilities that serve the public interests. They provide a home, as well as a social, educational, vocational technical and communal environment. Suggestion is being made that the HA investigate new policy on environmental quality which involves understanding of complicated and complex coordination of micro and macro social structures. Public tendency would be served better by an institution which divested itself of the housing market and left that authority to the many other agencies and departments.

The term "housing" seems to infer a structure which encourages life, and serves that life in the best quality and climate available; while "authority" seems to infer the technical capacity to discriminate between qualitative accommodative housing and just plain provisional shelter. The components of housing authority when assembled seem to define a measured need within community structure and fulfillment of this need in whatever terms, concepts, or social technique provided.

There are two means by which the HA might shift. One, a public user-oriented internal and external environment that accommodates groups as well
as singles, and secondly an internally oriented environment that provides services, training, and intermixing, of these same groups only with a more multi-disciplinary and wholesome attitude toward life. The second concept may be provisional, used as a resource facility to more external worlds.

EVALUATION

At present the Housing Authority makes no funds available to alter existing structures to remove architectural barriers. However there are no legal objectives to a HA accepting funds from another agency for their purposes, such as MRC making minor home modifications. The Dept. of Welfare, private groups can engage in removing barriers from churches, libraries, as well as other organizations taking their own initiative.

The Model Cities programs encourage cooperative efforts between public and private agencies. Funds are available for planning such programs and federal agencies have pledged their cooperation. This indicates the possibility of demonstration programs which might produce housing for the physically disabled under mixed auspices. Combined auspices could have additional advantages for the wheelchair since it would allow for a variety of residents under one roof. In this way, a hospital cooperating with the MRC and local housing authority might be able to house transient and long term patients and staff in one building. A university might be able to house wheelchair users and able bodied students under the Work Study Program (U. S. Dept. of HEW, Bureau of Higher Education) to provide supportive services to the wheelchair fellow students.

HA admission policy does not promote a fair policy of ethics regarding the housing dilemma of the wheelchair. They are put in low priority in the housing market. Conceptually, public housing at present would provide the lowest available rent for housing, and potentially be capable of pro-
ducing a suitable type of unit. It would be unrealistic to think that it will solve all the housing problems. Many small towns do not have a public housing program, nor wish to implement one, nor have the ability to develop one. Presently legal means are too shallow to effectively establish cooperation to produce a joint housing project or have a large agency deal with the complicated bureaucratic process. Secondly small ventures tend to be costlier. Often small towns find it easier to develop programs and build their housing through the state program dealing with staff located in Boston, than through the federal program which requires the town meet certain difficult requirements, and has its nearest office in New York. However, the state subsidy is lower than the federal one and has no provision for rising costs of management. This has placed several state-aided programs in jeopardy. 13

Regulations are a latitude of local authorities to set their own admission policies, but there is also some variation in interpretation of the law. Perhaps the Dept. of Community Affairs (DCA) should be put in charge to regulate and clarify the eligibility of the wheelchair and priority procedures, declaring a clear procedural statement to local housing committees and to area housing staff, and changing procedures such as altering the law to make single and middle-aged persons who are wheelchair users eligible for such housing.

Regulation of the Massachusetts Division of Housing restricting the eligibility for low income housing to two or more persons would be changed to permit occupation by unmarried wheelchair individuals. Mass. law governing eligibility for housing projects for the elderly should be amended to conform to the federal law to qualify all physically disabled persons regardless of their age or family status. Such projects should conform to standards of architectural barrier elimination as discussed earlier.
UNIVERSITY ADVOCACY

There is a growing sense of social responsibility on the part of the university as their policy towards the community changes from one of minimization of impact to one of active participation of the university in the life and problems of the city. The university studies must change to meet priorities of community response, whether physical, social or economic. Concentrating first on relations problems, the university needs communication networks both within its structure and without. Coordination to planning facilities operated under university auspices should emphasize conjunctive planning for a smooth transition between them and the surrounding community.

Educational institutions should maintain some informal surveillance of communities as a whole, not just local neighborhood concerns. Development patterns, physical mandates and group responses to environmental needs for housing, recreation, expansion, renovation, rehabilitation, and "blight", all are important factors for coordinated and effective planning and design criteria. University representatives can serve as working members of various committees and in the boards of a wide variety of local, public and private agencies and organizations, Model cities, MCOH, RA, HA, for example.

The university is in a good position to provide a means for housing, social services, and economic feasibility to community projects. There should be a limit of responsibility assessed and represented in an important way in which resources and talents can help solve growing needs for housing which are beyond the concept of neighborhood community housing.

A defined community should make housing facilities accessible, operable and usable by the wheelchair user by planning sessions through executive
committee and representatives of groups such as MCOH or MAP, and discuss zoning, design, and financial aspects of programs in conjunction with the planning team. Institution staff would undertake contact of residents of neighborhoods and seek full participation meetings. Any neighborhood problems would be overcome through slow discussion and clear propositions. The university and clients would act as a design team.

The Wilson report of 1968 on the University and the City 14 argues that the university should seek to the extent that its resources permit, to maintain a diverse and heterogeneous residential community, even though by so doing it encourages the continuance of a degree of community conflict.

The value of university response either by action or coercion is in a most advantageous position to aid the learning experience and encourage cultural interchange amongst the variety of resident groups who can experience economic sanity and self fulfillment in such new aspiring environments. The university at present represents a motivating force for lower rated citizen groups—the wheelchair could find stimulation and purpose in these invigorating environments, the poor, black, white, able bodied, non able bodied could do the same. Stimulation would occur through immediate interaction, increasing social awareness and providing visual continuity in environmental structure. The university seems to be the cross road for implementation of programs which ties together the fragmented structure.

The university is presently coordinated to realize special needs as a function of its provisions. It can show sensitivity to health, sociological and extracurricular needs of groups. It has resources which far outreaching information services. It is significant that housing development under university concern does not believe that its duties of responsibility are through with the last arrival of the last tenant, but it prepares for
ongoing information response. They try as closely as possible to alleviate loneliness and isolation. There is no self rationalization of prescribed plans and they recognize the importance of maintaining a sense of liveability and an avoidance of institutional environments.

**EVALUATION**

The future existence of the wheelchair user in environmental policy will depend on two things:

1. his aggressiveness and strong intent of purpose

2. the ability and willingness of fellow citizens and various institutions to recognize needed policy and work together cooperatively and effectively to preserve a strong sense of value in the socially racially, and physically integrated community that must hold together in the on rush of inner belts, real estate speculation, and escalating land values, as well as declining industry and tax bases

Planning for the wheelchair user is endangered in that no particular agencies or plans within present structural mechanism serves their planning needs either in major public or private enterprises. Considering this uncoordinated state of the art of community development, and rectification or accomplishment of these tasks will be very difficult. Wheelchair users and other citizen groups point out that it will require new levels of cooperation as the various citizen groups strive to define needs and articulate priorities, and determination that will overcome the forces towards paralysis at work in a community that is at once neighborhood-oriented, issue-oriented, organization-oriented and participation-oriented. Community organization defined at diversified user levels requires both community based decision making as well as vertical planning coordination.

We are trying to define a clear atmosphere in which development can occur, where there is an across the board representation of all interests
of neighborhood groups. The university is in a prime position to be coor-
dinator of such a program as their role as a secluded institution has long
been dispelled and their goals and aims tend much more toward neighborhood
participation in their activities. Also, as non property tax payers, and
in many cases as landlords of many residents renting units on their proper-
ty, they have the responsibility to represent and meet the needs of the
neighborhood residents. They are also in the position, with their abundance
of educators and researchers to function for the betterment of housing,
education, social and economic needs of neighborhood concerns, including the
poor, elderly, disabled, and other segregated groups.
Funding inadequacies presented by present mortgage system procedures, and the limited scope in available resources leaves agencies, as profitable as they may be, like Massachusetts Housing Finance Agency (MHFA) searching for new inventories and methodologies to attract new funds for its housing goals. While subsidizing seems to be the only feasible way to presently achieve housing goals at rates accessible to a wide variety of groups, delivery systems are highly ineffective in securing these goals using present policy.

With future demands for housing exceeding subsidy rates at present levels, other forms of revenue will have to be achieved to meet goal levels. These forms will not suitably meet the demand in terms of interest reductions, rent supplements or direct public ownerships, but it must be supplemented through other means. One such route presently under investigation is that of tax shelters. In delivery over these issues, the tax reform act of 1969 clearly reassured the motives of the governmental policy to subsidize low and moderate income housing by provision of favorable tax treatment of depreciation deductions generated by housing units. If MHFA is to have any future, then it will be necessary for the organization, as an agency, to consider the role of the non profit sponsor willing to take advantage of these shelter techniques and depreciation structure to assist in reducing housing rents and overall development cost. Thus we are playing a game where "the rich become richer and the poor become assisted."

While the non profit role is a major focus in subsidizing the housing
market, it is quite apparent that the one missing criteria for future success is their ability to tap resources, especially into the incentive provided by Congress. Quite frankly there are other factors not as obvious, making the merger of non-profit and limited dividend highly justifiable. Allocations to the non profit sponsors in development of housing projects have a very high rating in the MHFA Program.

The evaluation of MHFA will be in terms of tables comparing them with the Federal Housing Authority (FHA), appearing after the following section on FHA.
Architectural barrier laws do not respond to the immediate needs of the wheelchair user. While these facilities may be accessible to the physically disabled, they are restricted in the clientele they appeal to—the wheelchair user and the elderly. These types of structures may only be built upon community recognition, and they are limited by new standards to facilities of 25 units or more, and to non-residential structures. Facilities which meet these priorities effectively restrict public housing units to those with families, as apartments are generally 2-story walk-up row house clusters. Legislation of 1970 requires state aided buildings to accommodate the disabled, but no functional plan has been adopted.

While public housing alone, even stretching its rules, cannot supply healthy living and social environments, it still prevents a majority of persons from accomplishing housing goals by personnel policy programs. The program discourages the mixing families with singles which helps build for a healthy social environment. As an authority, their tradition has been simply to function to meet housing demands—social, commercial, cultural amenities are not mentioned.

Fishman believes that the whole area of resident care and activity needs a separate entity set up, an incorporated body able to the responsibility, also free to buy and maintain equipment, establish relationships with facilities and services in the community. Public housing’s present policy programs provide a means to appropriate shelter for low income and the self-
sufficient through direct government funding (at least seed money) from OEO, Model Cities, etc. It could formulate its policies and then attempt to implement them, influencing those making official policy by pressure. As an example, a non-profit sponsor is regarded to provide the earliest cost encountered in the development process—lawyers fees, architectural site investigation and preliminary planning costs, FHA filing fees, etc. These costs can occur as high as $10,000 on a 100-unit, $1.2 million project.  

While there is a body of literature law review journals and elsewhere, there has been very little legal control actually operating, especially in the area of the effectiveness of tenant management in serving tenants' needs, and to what extent it is coupled by the problems and temptations of the landlord's role (they sum up to be a major stumbling block, beyond FHA administrative problems). An evaluation of the impact and operation of existing legal problems in programs is a necessary preliminary step, as is development decisions which are negotiated through a bargaining process between developers and regulating agencies. There is a need for research to understand more thoroughly the trade-offs in a bargaining process that might produce distorted outcomes relative to programmatic aims.

Several state and federal agencies have resources available which could be utilized to provide housing and related services to the physically disabled, such as federal mortgages or state authorized nursing homes. The state housing supervision should be established to provide guidance and information to area housing coordination about all available programs and resources and to assist the area staff in their relationships with the public and private agencies in housing for the wheelchair-bound. Persons concerned with housing for this group do not always understand which housing programs are relevant to the needs of their clients, under what circumstances funds may be available,
or how to apply them.

Liaison coordinators from various departments are needed to supply information to state and local housing coordinators and to facilitate the use of their agency's service by other agencies and by individuals. Such fragmented housing programs and complexity in departments makes such specialization necessary. The Department of Community Affairs could assist in feasibility of utilizing public housing programs, working with local housing authorities on various non profit housing programs for the physically disabled and help in drawing up proposals for funding from federal sources.

Perhaps the Department of Public Health would be beneficial in giving and collecting advice and information on nursing homes and extended care facilities, to use as information in collecting resources to develop special facilities. Nursing homes would have to be authorized and licensed by the Health Department before sponsors could apply for a FHA mortgage and would also have to be licensed by the nursing home division before they could take clients for public agencies such as welfare or MRC. The Department of Mental Health could seek funds for a half-way house or supervised homes, again contacting through the MRC.

Federal subsidy in leased housing programs such as government contracts with the local housing authority will provide funds roughly equivalent to federal subsidy which would be required on an annual basis for "x" number of units of newly constructed public housing. Instead of building new public housing, the local housing authority looks for existing private or non profit moderate rental housing meeting specifications for safe, sanitary, and accessible conditions. The tenant would pay the low local rent fee and the authority would pay the difference. Thus subsidy as a block grant is not required to be the same for each unit. In special cases, such as with the
wheelchair and barrier-free housing, a higher subsidy may be paid. Special-
ly constructed housing may be leased the the housing authority. Small towns
unable to fulfill their housing needs could try implementing such legislation
with leased housing programs. Of course the FHA will have to become more
efficient in their policy and financial commitment. This would mean
new construction would be subject to adopting barrier fee housing codes,
such that where there are no elevators, first levels would be made accessi-
ble and conversely where there is an elevator all apartments should be made
accessible and usable. Federal subsidy would be generated to meet additional
furnishing demands.

Finally, the subject of funds available for remodeling is a subject
necessary of concern. Federal, state and local programs should develop
programs which would utilize and provide assistance for the planning, con-
struction or remodeling of housing for the physically disabled. Federal
assistance should be given to non profit or limited divident housing corpora-
tions, FHA mortgages for the construction of nursing homes approved by the
State Dept. of Public Health, and comprehensive programs planned under the
auspices of Model Cities, provides many possibilities for expanding the
housing resources for the disabled.

EVALUATION OF MHFA AND FHA

In general, financing is obtainable with less effort and lower cost in
the MHFA program than through comparable FHA program. The MHFA is also able
to avoid rigid FHA specifications, as a federal guarantee is not necessary
to obtain financing. A comparison of MHFA and FHA is found in the follow-
ing tables which give as examples the MHFA Rolling Green project in Amherst
matched against the FHA Bay Village Project in Fall River.
<table>
<thead>
<tr>
<th>PROGRAM CRITERIA</th>
<th>MHFA</th>
<th>FHA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DELIVERY TECHNIQUES</td>
<td>DELIVERY TECHNIQUES</td>
</tr>
<tr>
<td>Housing development</td>
<td>good quality development program</td>
<td>no quality in development program</td>
</tr>
<tr>
<td></td>
<td>lower development costs</td>
<td>poor quality even though development</td>
</tr>
<tr>
<td></td>
<td>lower costs without recourse to govern-</td>
<td>costs are at the same rates as MHFA</td>
</tr>
<tr>
<td></td>
<td>ment subsidies (assistance still</td>
<td></td>
</tr>
<tr>
<td></td>
<td>desired to reduce tenants share of rent</td>
<td></td>
</tr>
<tr>
<td></td>
<td>payments</td>
<td></td>
</tr>
<tr>
<td></td>
<td>responsibility to motivate developers</td>
<td>FHA development costs exceed provisions</td>
</tr>
<tr>
<td></td>
<td>into such projects</td>
<td>by MHFA which reflects increased rents</td>
</tr>
<tr>
<td></td>
<td>incentive practices (crisp mortgage terms,</td>
<td>per unit</td>
</tr>
<tr>
<td></td>
<td>tax relief, public sector involvement)</td>
<td></td>
</tr>
<tr>
<td>Goal oriented objects</td>
<td>socio economic household integration</td>
<td>housing the poor in isolated ghettos</td>
</tr>
<tr>
<td></td>
<td>higher quality developments</td>
<td>minimum specifications</td>
</tr>
<tr>
<td></td>
<td>adequate facilaties</td>
<td>poor delivery system concepts</td>
</tr>
<tr>
<td></td>
<td>site amenities</td>
<td>homogeneity</td>
</tr>
<tr>
<td></td>
<td>program context</td>
<td>limited scope in facilities and site</td>
</tr>
<tr>
<td></td>
<td></td>
<td>amenities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>non contextual programming</td>
</tr>
<tr>
<td>Policy program</td>
<td>association with the group, community,</td>
<td>requires a 24 month loan period</td>
</tr>
<tr>
<td></td>
<td>or organization of housing problems,</td>
<td>bureaucratic procedures (local and state</td>
</tr>
<tr>
<td></td>
<td>needs, perspectives</td>
<td>reviews, federal approval)</td>
</tr>
<tr>
<td></td>
<td>3 month processing of mortgage loans</td>
<td>time lags, inefficient operation</td>
</tr>
<tr>
<td></td>
<td>speedy processing reduces overall cost</td>
<td>results in increased production costs</td>
</tr>
<tr>
<td></td>
<td>production</td>
<td>and rent appropriations</td>
</tr>
<tr>
<td></td>
<td>oriented to user</td>
<td>oriented to developer</td>
</tr>
<tr>
<td>MHFA</td>
<td>FHA</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>-----</td>
<td></td>
</tr>
<tr>
<td><strong>Site policy</strong></td>
<td>site is secondary depends heavily on assistance strips minimum standards</td>
<td></td>
</tr>
<tr>
<td>amenities for social, economic, psychological and cultural variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>user concern</td>
<td></td>
<td></td>
</tr>
<tr>
<td>quality theory in physical and social aesthetics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>delivery system allows for marketable competition production techniques</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Finance</strong></td>
<td>heavily subsidized by government</td>
<td></td>
</tr>
<tr>
<td>discrimination in allocation of sufficient funds to run all its housing programs</td>
<td>Section 236 interest reduction rent supplement leasing program lead to reduced tenant share of rent payments</td>
<td></td>
</tr>
<tr>
<td>establishes many projects to subsidies of many sizes and natures allocations are:</td>
<td>Section 236 subsidized housing still requires further assistance to be plugged into program</td>
<td></td>
</tr>
<tr>
<td>1. 50% through 236 interest reduction payment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. 25% leased housing through housing authority</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. 25% open housing market units</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tenant policy</strong></td>
<td>promotes a dicotomy between tenant and management spheres</td>
<td></td>
</tr>
<tr>
<td>promotes desirable management and operation service</td>
<td>management is not a provision because of expense rates</td>
<td></td>
</tr>
<tr>
<td>promotes interaction between staff and management</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>236 puts a ceiling on tenant paid rents</td>
<td></td>
</tr>
</tbody>
</table>
### COMPARATIVE ANALYSIS OF MHFA AND FHA DEVELOPMENT

<table>
<thead>
<tr>
<th>Name of Project</th>
<th>MHFA</th>
<th>FHA</th>
<th>DIFFERENCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rolling Green Amherst</td>
<td>Bay Village Fall River</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td>Number of Units</td>
<td>205</td>
<td>205</td>
<td></td>
</tr>
<tr>
<td>Total Project Cost (Replacement Cost)</td>
<td>$3,600,000</td>
<td>$4,432,400</td>
<td>$832,400*</td>
</tr>
<tr>
<td>Equity Investment 10%</td>
<td>360,000</td>
<td>443,240</td>
<td>83,240</td>
</tr>
<tr>
<td>Loan Amount 90%</td>
<td>3,240,000</td>
<td>3,989,200</td>
<td>749,200</td>
</tr>
<tr>
<td>Loan Per Unit (÷ 205)</td>
<td>15,800</td>
<td>19,460</td>
<td>3,660*</td>
</tr>
<tr>
<td>Type of Construction</td>
<td>2 &amp; 3 Stories</td>
<td>2 &amp; 3 Stories</td>
<td>Town Houses*</td>
</tr>
<tr>
<td>Composition of Units</td>
<td>64 1BR @ 735 SF 137 2BR @ 966 SF 2 3BR @ 1152 SF 2 4BR @ 1550 SF</td>
<td>60 1BR @ 588 SF 99 2BR @ 810 SF 46 3BR @ 1045 SF</td>
<td>Larger Units* in all cases</td>
</tr>
<tr>
<td>Average No. of Bedrooms</td>
<td>1.7</td>
<td>1.93</td>
<td>0.22**</td>
</tr>
<tr>
<td>Average Sq. Ft. per Unit</td>
<td>1071 SF</td>
<td>911 SF</td>
<td>160 SF*</td>
</tr>
<tr>
<td>Total Sq. Ft. in Project</td>
<td>219,700 SF</td>
<td>186,800 SF</td>
<td>33,900 SF*</td>
</tr>
<tr>
<td>Cost of Construction Per Sq. Ft.</td>
<td>$13.25</td>
<td>$18.28</td>
<td>$5.03*</td>
</tr>
<tr>
<td>Construction Time</td>
<td>9 months</td>
<td>21 months</td>
<td>12 months*</td>
</tr>
<tr>
<td>Construction Cost at Commitment Jan. 1970</td>
<td>$2,344,920</td>
<td>$2,165,384</td>
<td>Completed 9/70 To be Completed 9/71</td>
</tr>
</tbody>
</table>

* = merit for MHFA

** = merit for FHA
<table>
<thead>
<tr>
<th></th>
<th>MHFA</th>
<th>FHA</th>
<th>DIFFERENCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Construction Fees</td>
<td>$526,680</td>
<td>$600,557</td>
<td>$73,877*</td>
</tr>
<tr>
<td>Total Builders Overhead &amp; Profit</td>
<td>$396,000</td>
<td>$455,355</td>
<td>$59,355*</td>
</tr>
<tr>
<td>Total Carrying Chg. &amp; Financing Fee</td>
<td>$368,400</td>
<td>$521,515</td>
<td>$153,115*</td>
</tr>
<tr>
<td>Total Project Income (Rents)</td>
<td>$501,240/yr.</td>
<td>$578,360/yr.</td>
<td>$77,120*</td>
</tr>
<tr>
<td>Total Project Income (less 5% Vacancies)</td>
<td>$476,178/yr.</td>
<td>$549,442/yr.</td>
<td>$73,264*</td>
</tr>
<tr>
<td>Average Rent per unit/Mo. w/subsidies</td>
<td>$193</td>
<td>$223</td>
<td>$30*</td>
</tr>
<tr>
<td>Subsidies/yr.</td>
<td>$51,000</td>
<td>$362,346</td>
<td>$311,346**</td>
</tr>
<tr>
<td>25% = 51 units</td>
<td></td>
<td>100% - 205 units</td>
<td>154 units**</td>
</tr>
<tr>
<td>Average Subsidy per Qualified Unit Household</td>
<td>$83/mo.</td>
<td>$147/mo.</td>
<td>$64**</td>
</tr>
<tr>
<td>Total Annual Project expense</td>
<td>$233,240</td>
<td>$188,139</td>
<td>$45,101*</td>
</tr>
<tr>
<td>Administration/yr.</td>
<td>$27,000</td>
<td>$17,000</td>
<td>$10,000*</td>
</tr>
<tr>
<td>Operating/yr.</td>
<td>$67,000</td>
<td>$50,124</td>
<td>$17,516*</td>
</tr>
<tr>
<td>Maintenance/yr.</td>
<td>$26,000</td>
<td>$18,717</td>
<td>$7,283*</td>
</tr>
<tr>
<td>Replacement Reserve/yr.</td>
<td>$12,500</td>
<td>$15,525</td>
<td>$3,025**</td>
</tr>
<tr>
<td>(0.005%) (0.006%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Taxes/yr.</td>
<td>$78,500</td>
<td>$62,838</td>
<td>$15,662**</td>
</tr>
<tr>
<td>Return on Equity Investment 6%</td>
<td>$21,600</td>
<td>$23,935</td>
<td>$2,335**</td>
</tr>
<tr>
<td>Expense Ratio</td>
<td>49%</td>
<td>34%</td>
<td>15%*</td>
</tr>
</tbody>
</table>

* = merit for MHFA
** = merit for FHA
What should be minimum standards of housing which is designed for such a wide cross section of cultural, physical, racial, social and economic lines? Every local community imposes a set of standards implicit in its zoning ordinances, building codes, and health ordinances. If we are unwilling to compromise modern standards for nineteenth century standards, further discussion is superfluous. The decision in how far to compromise involves a large element of subjective judgment and public values. The aim today concerns the quality of housing which should be provided, as it cannot be assessed apart from the total quality of the surrounding environment.

Lack of uniformity is due to the multiplicity of objectives of various standards. The Dept. of Housing and Urban Development (HUD) policy to support housing programs focuses upon the physical material parameters and the construction costs of the product. This results in the need for new housing units for low income people of all groups, with units at rental levels commensurate to those most in need. The public and private development agencies approach these programs with a technical, business-like attitude. Thus, this affects more stark reports of social misfortune in the area of public housing. This is partly due to neglect of pre-construction behavioral science consultation or post-construction social performance evaluation for publicly supported housing programs.

Building code deals primarily with buildings as buildings, concerning themselves with materials (strength), equipment (function) methods of construction (precast, post and beam) and fabrication, etc.—primarily in view
of structural safety. Use-and-occupation housing code standards deal with
dwellings as dwellings (as places of human abode), and deal with such matters
as height, ventilation, room volume and orientation, installed facilities,
sanitation, vermin, fire protection.

"An amendment to the pending housing and urban development legis-
lation should be considered to set aside annually a percentage of
housing subsidy funds to finance post-construction evaluation re-
search on the social effects of the planning and design of Feder-
ally-assisted housing on the lives of its residents. The research
would lead to modification of existing Federal Housing Administra-
tion Minimum Property Standards and creation of new ones, and pro-
vide housing officials and designer professionals with improved in-
formation for the planning, design, and operation of housing and
related facilities."26

HUD issues technical standards for the construction of housing for the
elderly and disabled, but the aspects of these requirements that have been
most emphasized in practice relate to structural details that will serve to
reduce cost and affect physical safety of occupants.

Efforts should be made to encourage further development needed for adop-
ting the performance criteria concept as a possible alternative to design
specification-type building codes. Housing standards may be geared to all
levels of accomplishment.

1. Absolute minimum to safeguard health and welfare

2. Desirable standards for existing structures, geared not
   only for human needs, but to provide for human comfort
   and eradicate deficiencies in living and contribute to
   the value of the dwelling.

Standards should not be considered static, but as an evolutionary pro-
cess. Research recommendations should be geared at "how do people, especially
in wheelchairs use spaces? how do they live? what do they like?" Design
criteria is a means for evaluation at human need levels. Unlike a standard,
it carries no connotation of authority other than fairness and equity.

Fishman points out: 27
"Lacking appropriate building codes, those seeking barrier free housing must either convince local builders to remove barriers in new constructions or seek to have units constructed which meet the special needs of the handicapped. It seems, as a body, unlikely that the developers will respond to the generalized housing needs of disabled persons."

EVALUATION

The constraints and barriers imposed on planning residential units and community spaces reflects two attitudes. The first being restraints on physical factors and second, restraints on the economics. Naturally the second has some influence potential on the first.

1. The preparation of a given site may consume so much of total cost that constraints are placed in the allowable structural and unit design options that otherwise might have been behaviorally superior.28

HUD in conjunction with local housing authorities (MHFA) should not grant site approval until reasonable service can be accumulated from the site, such as utilities, accessibility, reasonably level in contours, transportation linkages, commercial service located near a main vehicular circulation, stable ground, no bedrock.

2. Spatial limitations of federal programs and local-state goals for annual volume of units under construction tend to constrain the architect from exploring unit design which might be more satisfactory to the needs of both elderly and disabled. This appears to be a serious regard to the behavior needs (mobility and transfer).29

The obvious solution is to recall unit capacity and derive a standard for allotments such as neighborhood densities. Industrial sector will not offer the same people-relationship as an urban core. Security and privacy shall also be financial determinants. The sponsor early in the planning should understand design commitments. Local authorities should be willing to establish a differential commitment in these situations. Perhaps units could be developed under HUD, while community facilities would be a leased
housing approach.

3. Unit designs are relatively minimum and design features have placed an economic constraint on unit standards of quality. Flexible height cabinets maintain the cost differential and restricted the potential between units of the disabled and all other units.

Conversely, inefficient design in units and overall seclusion to the entire nature of projects have resulted in these concerns. As architects add to the basic philosophy (such as kitchen storage requires 24 lineal ft.) they will promote varying attitudes to these obviously hasty judgments on poor architectural designs. Most architects, planners, or designers will get around this hardware cost with lack of quality in their developments—no paint or plaster finishes, bare and ragged edges. It is imperative that such skimping be avoided when designing for the safety of residents.

4. Limited time and required private investment for the competitive planning phase
   a. restricts the alternatives that can be considered and encourages the use of virtual danger templates
   b. disallows adequate exploration of the particular needs and life styles within the community of concern
   c. initiates against the use of consultants on social and behavioral issues
   d. discourages design risk taking
   e. length of period elapsed results in significant below actual cost restraints

The competitive issue still warrants fairness and less politics. Investment in any one firm would automatically show bias; the same fees that could be spent to promote good design, can be used to implement good design. A good design team presented with the behavioral aspects of the proposal can solve 90% of the problems without consultation. Flexibility should be built in the design in the first instance with the same floor ratios, only distributed on a more functional way. Thinking must be done in plan and section. The design will reflect the same liberty that all people who desire safe, clean, and comfortable housing desire.
footnotes


5. Ibid.


12. Ibid.

13. Ibid.


16 Cullingsworth, J. B. "Housing needs and planning policy." A restatement of the problems of housing need and overspill. Unpublished paper.


18 Fishman, P. L. "Adaptive housing for the handicapped." Study carried out at Tufts-New England Medical Center, Boston, October, 1971.

19 Ibid.


21 Ibid.

22 Ibid.

23 Fishman, P. L. "Adaptive housing for the handicapped." Study carried out at Tufts-New England Medical Center, Boston, October, 1971.


26 Ibid.

27 From Fishman, P. L. "Adaptive housing for the handicapped." Study carried out at Tufts-New England Medical Center, Boston, October, 1971.


29 Ibid.
Information on major components involved in site selection should be collected and rated according to the criteria and rating system. The major components should be established on an evaluation index and rated as high, medium, or low, with corresponding points 3, 2, or 1. Designation of 1 indicates a rating which represents a deficiency, while 3 indicates a plus, and 2 is a middle status. After each item has been rated, a subtotal should be made for each of the components. From these subtotals, a profile can be drawn for each site (see site evaluation index, Table 1 and sample site profiles, Table 2) and profiles for two or more sites can be compared. The final choice of site will be dependent on how the group ranks each major component of the Index. The Site Profiles of the various sites will have to be rigorously compared and the significance of each weighed in order to determine which site would best meet the needs of low or moderate income families and also serve the interests of the community as a whole. This site evaluation index and sample site profile is based on research done by architect Robert Lynch.
Table 1. Site Evaluation Index. (From Lynch)

<table>
<thead>
<tr>
<th>MAJOR COMPONENTS</th>
<th>DESCRIPTIVE INFORMATION</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Site Characteristics</strong></td>
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<tr>
<td>Size of Site</td>
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<tr>
<td>Topography</td>
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<tr>
<td>Subsoil Conditions</td>
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<tr>
<td>Other</td>
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<tr>
<td><strong>TOTAL RATING</strong></td>
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<td><strong>Availability of Utilities</strong></td>
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<td>Water</td>
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<td>Sewer</td>
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<td><strong>TOTAL RATING</strong></td>
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<td><strong>Location Characteristics</strong></td>
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<td>Accessibility to collector</td>
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<td>or arterial street</td>
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<td>Availability of public transit</td>
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<td>Access to job concentrations</td>
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<td>Convenience to retail shopping</td>
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<td>Convenience to public schools</td>
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<td>(not relevant where students</td>
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<td>are transported by school bus)</td>
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<td>Convenience to community and</td>
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<td>regional facilities—churches,</td>
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<td>library, recreation, clinics,</td>
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<td>inexpensive restaurants, sheltered</td>
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<td>workshops, and other public uses.</td>
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<tr>
<td><strong>TOTAL RATING</strong></td>
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<tr>
<td>Character of Surrounding Area</td>
<td>Presence of traffic hazards</td>
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<tr>
<td>Presence of nuisances -- odor, excessive noise</td>
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<td>Incongruent land use</td>
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<td>Existence of obstacles</td>
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<td>Other</td>
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<td>TOTAL RATING</td>
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<td>Impact on Surrounding Area</td>
<td>Appropriateness of development for neighborhood</td>
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<td>Traffic</td>
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<td>Adequacy of recreation -- open space</td>
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<td>Other</td>
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<td>TOTAL RATING</td>
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<tr>
<td>Costs</td>
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<td>Site preparation (including demolition if required)</td>
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Table 2. Sample Site Profiles, (From Lynch)

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