Fitness Trails for Continuing Care Retirement Community Residents:
Motivational Cues to Participation

by
Kenneth B. Hall, Jr.

Thesis submitted to the Faculty of the
Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of
Master of Landscape Architecture
in
Architecture and Urban Studies

APPROVED:

Charlene A. Browne, Chairman

Benjamin C. Johnson

May, 1989
Blacksburg, Virginia
Fitness Trails for Continuing Care Retirement Community Residents:

Motivational Cues to Participation

by

Kenneth B. Hall, Jr.
Charlene A. Browne, Chairman
Architecture and Urban Studies

(ABSTRACT)

The motivational elements necessary to encourage use of fitness trails by residents of Continuing Care Retirement Communities (CCRCs) was investigated. Previous research suggested that both the walking and exercise parts of these fitness trails are being used by only a small percentage of the residents. A checklist was used to identify the number of motivational elements that were present in the design of the fitness trails at three CCRCs. A staff questionnaire was used to determine management involvement and fitness program specifics.

This research investigates the extent to which Jane Jacobs' (1961) work with sidewalks in cities can be applied to the fitness trail within the CCRC. The research questions generated for this study were: To what extent is the success of the fitness trail dependent on the "intricate mutual support" given it by its surrounding elements? Does a single activity or amenity contribute to the success of a fitness trail or is a variety of choices necessary for potential users to experience? Is this aspect of choice essential to participant satisfaction?

The analysis identified several elements that may contribute to the use of a fitness trail by older adults. The use of the concept of tangible rewards by one of the CCRCs contributed to a significantly greater percentage of resident use.
Acknowledgements

The completion of this project is the result of the patience of many individuals to whom I owe thanks. Their perseverance and faith allowed me to pursue my investigation at my own pace and produce a product that hopefully will be a contribution to the field of Landscape Architecture.

I am very thankful to the chairman of my committee, Professor Charlene A. Browne for her interest and positive support throughout this endeavor. Her relentless pursuit of educational excellence has had an impact on this study as well as my educational experience at this institution. I am also indebted to the members of my committee, Professor Benjamin C. Johnson and Ms. Elizabeth H. Howze who have encouraged me and helped me to clarify my goals while providing an atmosphere for the pursuit of professional excellence.

I am grateful to of Asbury Village, of Epworth Place and of Arbor Acres who allowed me to visit with them and use their respective retirement communities in the study. Without their interest and assistance, the process would have been more difficult.
I would like to thank several individuals for their supportive role to me personally throughout this process. Thanks to [Name] for the use of your home away from home and to [Name] for your friendship.

I owe my deepest gratitude to my wife, [Name], who has endured this process with patient grace. Her sacrifice and patience during this time have provided an atmosphere in which I could explore my options and expand my horizons. Thank you to my parents for your understanding love and financial support when it was needed. A note of thanks to [Name] for their support and love to their son-in-law.

There is an unseen hand for which I am eternally grateful. Without this abiding presence in my life, and the wisdom and guidance He offers, life would be meaningless. I would like to give all the credit for my achievements and awards to the One who made it all possible.
# Table of Contents

## I. Introduction
- The Goal .............................................................................................................. 1
- Significance of the Study ...................................................................................... 1
- The Issues ............................................................................................................... 2
- Why CCRCs ........................................................................................................... 3
- The Study Group ..................................................................................................... 3
- The Study Focus ...................................................................................................... 3
- Research Questions ................................................................................................ 4
- The Literature .......................................................................................................... 4
- Research Approach ................................................................................................. 6
- Limitations of the Study ......................................................................................... 6

## II. Literature Review ............................................................................................. 8
- Biological Change .................................................................................................... 9
  - Bones .................................................................................................................... 9
  - Muscles ............................................................................................................... 10
  - Heart and Circulation ......................................................................................... 10
### Table of Contents

- **Lungs** ................................................................. 11
- **Stamina** ............................................................... 11
- **Skin** ................................................................. 11
- **The Senses** ............................................................ 12
  - **Vision** ................................................................. 12
  - **Hearing** ............................................................... 13
  - **Smell** ................................................................. 14
  - **Touch** ................................................................. 14
  - **Balance** ............................................................... 15
- **Retirement and Leisure** ............................................ 15
  - **The Perception of Well Being** ................................... 16
  - **Effects of Inactivity** .............................................. 17
- **Exercise** ............................................................... 17
- **Therapeutic Environments** ........................................ 19
  - **Fitness Trails** ....................................................... 19
  - **The Role of the Landscape Architect** ......................... 20
- **Design Issues** ........................................................ 20
  - **Safety and Security** ................................................ 20
  - **Landscape Preferences** .......................................... 21
  - **Psychological Effects of Plants in the Landscape** ........ 23
  - **Challenge and Adventure** ....................................... 24
  - **Control Enhancing Mechanisms** ................................ 24
- **Environmental Factors that Contribute to Motivation** ........ 26
  - **Opportunities to Observe** ....................................... 26
  - **Environmental Change** ........................................... 26
  - **Environmental Conditions** ...................................... 27
  - **Programming for Motivation** ................................... 27
  - **Networking** .......................................................... 28
Summary ........................................................................ 29
Hypothesis and Research Questions ................................ 29

III. Site Analysis Procedure .............................................. 31
   Site Selection Criteria .................................................. 31
   The Selected Sites ....................................................... 32
Methods of Comparative Analysis ................................... 42
   of the Fitness Trails ...................................................... 42
      The Checklist .......................................................... 42
      Staff Questionnaire ................................................ 46
      The Conceptual Diagram .......................................... 47

IV. Comparative Analysis of the Sites ................................. 49
   Asbury Village ............................................................ 49
      Trail Design .......................................................... 49
      Integration ............................................................. 52
      Landscape Setting ................................................... 52
      Environmental Setting ............................................ 52
      Trail Specifications ................................................. 55
      Management Support ............................................. 55
   The Methodist Home for the Aged, ............................... 56
      Trail Design .......................................................... 56
      Integration ............................................................. 56
      Landscape and Environmental Setting ....................... 67
      Management Support ............................................. 67
   Arbor Acres ............................................................... 68
      Trail Design .......................................................... 68

Table of Contents .......................................................... vii
Implications ................................................................. 117

Bibliography ............................................................... 118

Appendix A. The Checklist ............................................ 122

Appendix B. Checklist Results ........................................ 125

Appendix C. Staff Questionnaire ..................................... 127

Appendix D. Results of Staff Questionnaire ...................... 130

Vita ............................................................................. 131
List of Illustrations

Figure 1. Fitness trail layout at Asbury Village .................................................. 34
Figure 2. The Bus Stop ......................................................................................... 35
Figure 3. The Circle Hurdles ............................................................................. 36
Figure 4. Colored arrows mark the way .............................................................. 37
Figure 5. Site plan of the Methodist Home .......................................................... 39
Figure 6. The Fit-Trail Senior System by the Southwood Corporation (1-4) ........ 40
Figure 7. The Fit-Trail Senior System by the Southwood Corporation (5-8) ........ 41
Figure 8. The fitness trail at Arbor Acres ........................................................... 43
Figure 9. The conceptual diagram of Asbury Village .......................................... 50
Figure 10. The dock pond area at Asbury Village. Refer to Figure 1 for context. .... 51
Figure 11. The arbor and gazebo ....................................................................... 53
Figure 12. The duck pond ................................................................................. 54
Figure 13. The conceptual diagram of the Methodist Home in Charlotte. .......... 57
Figure 14. Epworth Place; independent living section at the Methodist Home ...... 58
Figure 15. The right turn ..................................................................................... 59
Figure 16. The route between the apartments ..................................................... 60
Figure 17. Station #3 and the woodlot ................................................................. 61
Figure 18. Station #4 and the newly constructed cottage ..................................... 62
Figure 19. The back side of the park along the entry drive, looking north .......... 63
Figure 20. The entry drive and the flower garden, looking south ....................... 64
Figure 21. Station #7, the service dock and the shuffle board court .................... 65
Figure 22. Station #8 and the fitness trail's end .................................................. 66
Figure 23. The conceptual diagram of Arbor Acres ................................................. 70
Figure 24. An exit door leads to station #1 ............................................................. 71
Figure 25. The duck pond ..................................................................................... 72
Figure 26. The courtyard with resident-maintained beds ........................................... 73
Figure 27. Station #2 in sight of the garden plots .................................................... 74
Figure 28. Station #3 adjacent to the garden plots ................................................... 75
Figure 29. The gazebo ............................................................................................ 77
Figure 30. Picnic tables, barbecue and stations #5 and #6 .......................................... 78
Figure 31. The trail to station #8 ........................................................................ 79
Figure 32. Station #8 in the park ........................................................................... 80
Figure 33. Residential landscape with view to Winston-Salem skyline ......................... 81
Figure 34. Residents may do their own yard work .................................................. 82
Figure 35. The games area at Arbor Acres ............................................................... 83
Figure 36. Stairs leading to an activity area .............................................................. 95
Figure 37. The alternate route with reward ............................................................... 96
Figure 38. Separation of the two trails .................................................................... 97
Figure 39. The two trails: the leisure and challenge routes ....................................... 98
Figure 40. The pleasing environment associated with the challenge area .................... 99
Figure 41. An abundance of plant material creates a lush environment ....................... 100
Figure 42. One must use the stairs to get to the garden plots .................................... 101
Figure 43. The gazebo is adjacent to a challenge area .............................................. 102
Figure 44. One must use the stairs to get to the gazebo ........................................... 103
Figure 45. A section view of the gazebo area ......................................................... 104
Figure 46. Variable routes increase the possibilities ............................................... 105
Figure 47. A waterfall and the lake ........................................................................ 106
Figure 48. A view of the lake from the leisure trail .................................................. 107
Figure 49. A view of the garden plots .................................................................... 108

List of Illustrations
Figure 50. A view into the challenge area is possible ........................................ 109
Figure 51. Surveillance of the challenge area is possible ........................................ 110
Figure 52. The relationship of the challenge and leisure trails ........................................ 111
Figure 53. The user of the leisure trail will see the reward ........................................ 112
Figure 54. Surveillance for challenge trail users ........................................ 113
I. Introduction

The Goal

The purpose of this study is to evaluate the design of three fitness trails within Continuing Care Retirement Community (CCRC) environments. Fitness trails specifically designed for senior citizens are being included in the design of retirement communities, however, there is no literature available that suggests that the trails are used by the residents or that suggests the design elements that should be considered by CCRC planners for incorporation into fitness trail design.

Significance of the Study

The majority of traditional CCRC designs do not apply current gerontological research to construction practice or the design of outdoor spaces for the elderly. The exterior spaces of retirement communities appear to be viewed by design practitioners as left over space to be made "pretty" by the addition of a few trees and flowers. Unfortunately, for this reason, the services of a landscape architect are seldom utilized during the planning process of CCRCs. The landscape architect's role
in this process should be to provide a holistic view of site design which will serve as a guide for the development of the CCRC.

By understanding the needs and preferences of older adults as well as those motivational cues that encourage participation in physically oriented activity, the Landscape Architect can better apply this knowledge in the adaptation of the fitness trail to the Continuing Care Retirement Community.

The Issues

The biological changes associated with aging as well as the concern about psycho-social well-being have been the source of much discussion among gerontologists. Researchers suggest that length and quality of life of older adults may be enhanced by their participation in regular physical exercise. Those degenerative conditions often associated with aging may be better controlled or prevented by regular physically oriented activity (Leslie, 1980). Some CCRCs have included fitness trails that provide both a preventative modality as well as a therapeutic service for their residents. The success of the fitness trail in the CCRC environment has ramifications not only for the physical and psycho-social well-being of older persons, but has the potential to influence such national issues as long term care costs and stereotypical attitudes toward the aged. Catastrophic care is a pressing issue for every older person. Recent national attention has catapulted this issue into every household via the popular media. Considering the enormous costs of long term health care that is provided to residents by the CCRC (according to contractual agreement with the resident), the suggested benefits of fitness activity on the health of older persons should help to motivate the management of retirement communities to discover ways to encourage residents to participate in regular physical exercise.
Why CCRCs

The choice of the CCRC environment as a setting for the study was based on two factors. First, because of their economic base, individual CCRCs are financially able to provide a range of activities including a fitness trail for their residents. Second, the CCRC environment is typically situated on a large enough tract of land to accommodate the space required for a fitness trail.

The Study Group

The resident population of the CCRC consists of three groups: 1) those who are independent; 2) those who need some assistance with the activities of daily living; and 3) those who require skilled nursing care. The independent population is typically targeted as the potential users of the fitness trail. There is a sufficient level of physical ability within this group to perform the activities of daily living and to participate in a variety of other activities. Sustaining this level of independence is the goal of fitness programs.

The Study Focus

Fitness trails consist of exercise stations placed at intervals along a walking trail. Research suggests that the exercise stations are being used by only a small proportion of the residents (Browne, 1988). Browne suggests that this low rate of participation may be associated with: attitudes of the residents toward exercise; with the amount of attention the management places on residents’ fitness needs; and lastly, the placement and site design of the fitness trail.

Jacobs (1961), in her discussion of the city sidewalk and its effect on the vitality of the city as a whole, suggests that the life of a city sidewalk is dependent on the activities that are associated with it. The more diverse the activity and opportunity found along the sidewalk, the more pedestrians
are likely to use it. Jacobs introduces the concept of networking of activities which refers to the amount of diversity included along the sidewalk, the variety of interest to potential users, as well as how individual activities relate and support one another. Jacobs suggests that "functional mixtures" of activities and uses are essential for encouraging participation in social spaces. A space must not only look interesting; but should include elements that are familiar and stimulating.

**Research Questions**

This research investigates the extent to which Jacob's work with sidewalks in cities can be applied to the fitness trail within the retirement community. The research questions generated for this study are: To what extent is the success of the fitness trail dependent on the "intricate mutual support" given it by its surrounding elements? Does a single activity or amenity contribute to the success of a fitness trail or is a variety of choices necessary for potential users to experience? Is this aspect of choice essential to participant satisfaction?

**The Literature**

Through an extensive literature review, the author has outlined possible motivational cues that would increase the rate of participation among the elderly in outdoor activity.

1. **Safety and Security**—The likelihood of participation by older persons in outdoor activities, specifically fitness activity, is dependent on their perception of how safe they are in that environment (Newman, 1972). Fear of falling and of not being seen (surveillance) and confidence in their own ability to negotiate the environment (accessibility) are important issues to consider in design (ANSI, 1980).
2. **Landscape Preference**—Specific elements recur as popular activities and amenities among older persons such as gardening plots, space for picnicking, seating from which to view active spaces, a path system for walking, etc. (Gignoux, 1987, Rubenstein, 1987, and Strain and Chappell, 1982).

3. **Challenge and Adventure**—Physical therapists suggest that older persons should be given the choice of activities that challenge their physical abilities. This can result in an increased sense of accomplishment as well as the fostering of friendly competition between exercise partners (Vaughan, 1988).

4. **Control Enhancing Mechanisms**—Psychologists suggest that older persons need to feel that they have some control over their life (Langer and Rodin, 1976). Unwittingly, retirement facilities often foster an attitude of dependence by providing all services for their residents (Mirvis and Delude, 1988). Individual control can be enhanced by a supportive management and nursing staff who provide activities that give the resident the choice of responsibility for a task (Langer and Rodin, 1976). In addition, a fitness trail with variable routes can offer the resident with a potentially novel experience on each outing.

5. **Environmental Conditions that Contribute to Motivation**—People are good motivators; seeing people use a space attracts others (Browne, 1988). Seasonal change is a conversation starter and a motivation to “go and see” plant material of seasonal interest (Kroontje, 1988). Microclimate and glare have been suggested as determinants of use of outdoor spaces (Bite and Lovering, 1984).

6. **Networking**—The vitality of a city sidewalk is dependent on its supporting environment (Jacobs, 1961). The placement of the fitness trail in relation to resident housing, retirement community service facilities, social gathering places and site amenities may determine the likelihood of frequency of use.
Research Approach

Three CCRCs with fitness trails were selected and evaluated on the basis of site design and placement of the trail in relation to the surrounding network of activities and amenities. Two communities that reported low rates of participation among residents in the fitness trail and a third community with a higher reported rate of participation were chosen. Data was gathered in three ways.

1. Following the protocol in Browne's study (Browne, 1988), an interview was conducted with the health care professional who was responsible for the fitness trail program at each community. Information was collected on the facility profile, resident population characteristics, management attitude toward the fitness trail and its perception of the percentage of use by the resident population of the fitness trail.

2. A series of questions was developed as a checklist for each site. The number of motivational cues present in the trail design was then compared to the reported rates of participation of the residents.

3. A third means of comparison, a conceptual diagram, was also used to compare the three fitness trails. By visually documenting the physical organization of the grounds and the degree of integration of the three trails into their respective communities, the conceptual diagram permitted comparison of the reported rate of participation with site relationships to other activity areas and amenities.

Limitations of the Study

This discussion of the design of fitness trails in the CCRC environment is an exploration of the issues. It is an attempt to identify elements that may contribute to the level of motivation necessary
to encourage residents of a CCRC to use a fitness trail. It is possible that observer bias influenced the findings. The literature revealed specific elements to explore and certain aspects of the results were anticipated before the analysis was complete. Therefore, this discussion should not be considered as research that has produced authoritative findings. However, it is an exploration and provides a starting point for further investigation.
II. Literature Review

By the year 2000 approximately 12.9% of the population of the United States will be 65 years of age and older (Soldo, 1980). Within this age group, the most rapid growth is among those 85 years of age and older (Brody et al., 1983). To promote optimal physical health and quality of life among those 65 and older involves the concerted efforts of many disciplines. Landscape Architecture as a profession is showing signs of interest in designing for the elderly. It is important, however, that the contribution of individual designers must be based on accurate information as to the specific needs of older individuals.

Opportunities for exercise, particularly in the form of fitness trails, are increasingly under consideration as design elements in retirement communities. It is the goal of the literature review that a clear set of design directives be identified that may be used to increase the likelihood of fitness trail participation among the residents of retirement communities. The prospect of increasing physical activity among the residents suggests positive ramifications with regard to well-being and overall better health.

The first part of this discussion will briefly explore the biological changes associated with aging that can have an effect on a person's ability to negotiate the environment. The section following will discuss the concepts of retirement and leisure and how these two issues can affect participation in...
the environment. Next, specific motivational elements will be discussed that may be used by the landscape architect to encourage older persons to use outdoor spaces.

**Biological Change**

The biological changes associated with aging are important factors for the landscape architect to consider. The following is a brief overview of the physical changes that occur at the later stages of the life span that can have direct bearing on design decisions.

**Bones**

The bones of the human body give it shape, provide a frame for the muscles and provide protection to the internal organs. Crandall (1980) states that bones reach maximum size by the later teen years and their total mass is achieved by the middle thirties. After this time bone mass begins to decrease affecting both size and strength. It appears that this loss occurs at a faster rate in women than in men (Vaughan, 1984), but the results are similar in that, by old age, bones are weaker and more prone to fracture. If fracture does occur the ability of the bone to heal itself is decreased and healing will take longer (Schulz and Ewen, 1988). The decrease in strength and mass is compounded by the loss of cartilage between the joints that can result in stiffness and pain during movement (Hazzard and Bierman, 1978). These skeletal changes have been summarized by the Piedmont Geriatric Institute.

- Narrowing of the joints
- Decreased bone mass
- Loss of height: 1.5" by age 65-74 and 3" by age 85-94
- Center of gravity moves upward, creating a tendency to lean forward
**Muscles**

The system of muscles in the human body can be divided into two groups: voluntary and involuntary. The voluntary muscles are those over which a person has conscious control (i.e., the legs and arms, etc.). Involuntary muscles are those which function without the conscious control of the individual (i.e., the intestines, stomach walls, etc.). The voluntary system, as with other systems in the body, also reaches peak performance and growth by age thirty and then begins to decline (Crandall, 1980). As an individual's age increases, the muscles lose their elasticity and become progressively more stiff. If they are affected by injury, they are slower to recover. Generally, muscle endurance and stamina decrease. Muscle mass also changes in size and make up. Schulz and Ewen (1988) state, "fiber is replaced by connective tissue...resulting in stiffness and muscle is gradually replaced by fat" (p. 58). The involuntary muscles do not decline in the same way that voluntary muscles do. These muscles appear to remain functional until extreme old age (Crandall, 1980).

**Heart and Circulation**

As an individual ages, circulation becomes less efficient because the veins and arteries grow thicker and narrower and the heart itself becomes more fatty. The maximal exertion decreases as one ages as does the ability to recover from physical exercise (Crandall, 1980). While the aging process is credited with this decline, it is more likely a result of the dietary habits in American society. The prevalence of arteriosclerosis in the United States has been attributed to high levels of saturated fat in the American diet (Crandall, 1980). Therefore, those declines actually caused by aging may affect the circulatory system far less than the accumulation of a lifetime of poor dietary habits.


**Lungs**

The ability of an individual to take in oxygen decreases with age. The muscles that are used to breathe become weaker and more stiff, decreasing overall lung capacity (Schulz & Ewen, 1988). The tissue in the lungs becomes more rigid over time resulting in decreased ability of the lungs to utilize the new oxygen that is inhaled. This lack of efficiency results in less oxygen in the blood which affects the functioning of all areas of the body. Studies have shown that the decreased level of oxygen utilization can result in a lower metabolic rate (Crandall, 1980).

**Stamina**

As noted above, the endurance of the older individual is affected by the declines in the circulatory and pulmonary systems. Because of the decreased efficiency of these systems, physical exertion can be more difficult for older persons. However, with proper training, it is possible for older persons to participate in physically demanding activities but recovery time will be longer than for a younger person (Schulz & Ewen, 1988).

**Skin**

Typically, the “badge” of old age is wrinkles in the skin. As skin ages there is a significant decline in the amount of collagen present in the epidermal tissue. Collagen is responsible for the resilience in skin tissue. As collagen decreases, the skin’s level of elasticity decreases and becomes more stiff creating wrinkles (Shultz & Ewen, 1988). Aging of the skin is accelerated if the individual has over exposed him/herself to the ultraviolet rays of the sun (Crandall, 1980). Further, over time, there is a loss of insulating capacity in the skin because of a loss of fatty tissue, a decrease in the number of sweat glands and a reduction in skin pigmentation (Schultz and Ewen, 1988). Consequently, the
older person is more susceptible to hot and cold temperatures and sunburn. Therefore, providing protection from the sun and wind becomes an important design issue (Carstens, 1985).

**The Senses**

The information gathered by the five senses is processed by the brain. Crandall (1980) summarizes the changes that take place in the brain during the aging process.

- Because of the decrease in blood circulation mentioned above and decreased electrical activity in the brain, information is not processed with the same speed and clarity.

- There is cell loss resulting in brain weight reduction and decreased size.

- There is a reduction in the number of nerve cells over the life span which results in slower response to stimuli.

- There is nerve pathway degeneration.

As a result, the ability of an individual to perceive the environment and interpret information concerning it decreases over time and puts the older individual at a disadvantage.

**Vision**

There are a number of changes in the human eye that are manifested during the later years. The pupil becomes smaller and irregular in shape restricting the amount of light that enters the eye.
(Atchley, 1977). The lens loses its elasticity, becomes thicker and yellows, resulting in the filtering out of certain wavelengths of light (i.e., violet, blue and green) (Sekuler, Kline, and Dismukes, 1982). There is also decreased ability of the eye to focus readily from near to far affecting depth perception. The ability to perceive fine detail is hindered and peripheral vision declines (Atchley, 1977). Perception of contrast between like colors becomes a problem especially between dark colors and pastel colors. However, the ability to see warm colors like red, yellow and orange is enhanced. The amount of light needed by older persons to see increases because the older person's eye perceives about one third that of the eye of a younger person (Atchley, 1977). Glare is a problem because the lens of the eye tends to become more opaque with advancing age. This process of change can be compounded by the onset of such eye maladies common in old age as glaucoma and cataracts (Schulz and Ewen, 1988).

**Hearing**

Hearing begins to decline after age twenty, although this loss can remain unnoticed until old age (Atchley, 1977). Presbycusis is the most common loss of hearing during the aging process. Presbycusis is the decline in the ability to hear high pitched sounds. The ability to hear lower pitched sounds remains intact. The result of such a loss is interference with the ability to understand speech clearly and the inability to hear higher tones in music (Crandall, 1980). Some older persons respond to this loss by withdrawing from social contact. They fear they will misunderstand conversation and environmental cues and appear to others to be senile. The consequence may be isolation and depression (Becraft, 1984). The possibility of misinterpretation of environmental cues is also a distinct possibility. The ability to react to stimuli is important especially when immediate response may be necessary to avoid danger (Crandall, 1980).

Hearing loss may have several causes. While hearing loss over the life span is part of the natural aging process, other causes can include drug interaction, exposure to loud noise, improper diet, genetic predisposition or some disorder of the mechanical parts of the ear (Schulz & Ewen, 1988).
It has been suggested that there is a difference in the amount of hearing loss between the sexes. Men typically show more loss than women perhaps because men more often work in high noise environments (Atchley, 1977). Hearing loss in old age also varies across geographic locations. Persons who live in an urban environment tend to show more hearing loss than persons who have lived in a rural environment (Blieszner, 1988). This could be an important issue in the design of fitness trails in an urban CCRC.

**Smell**

There is conflicting evidence that the sense of smell is affected by the aging process. Both Schulz and Ewen (1988) and Crandall (1980) report there is no undisputed evidence that the sense of smell is affected. They do suggest that poor health or drug interaction may be causes of reported decline in this sense. Whether there is decline or not, the sense of smell affects the ability of the individual to interpret the environment. The sense of smell allows recognition of the fragrances that are part of the landscape designer’s palette.

**Touch**

Researchers report similar conflicts concerning the sense of touch (Schulz & Ewen, 1988). Margaret Vaughan of the Piedmont Geriatric Institute (1984) suggests that there is decreased sensitivity in the lower extremities. Crandall (1980) reports similar sensitivity loss. In contrast, Schulz and Ewen (1988) suggest that “tactile sensitivity increases with age because the skin of the elderly adult deforms more easily and exposes more touch spots to external stimuli” (p. 111).
Balance

The ability of an individual to maintain equilibrium directly affects that person's ability to negotiate the environment. The sense of balance is dependent on the level of muscle strength, adequate circulation and proper functioning of the nervous system (Schulz and Ewen, 1988). Muscular strength is affected by activity level (Crandall, 1980). Declines in the circulatory system can affect equilibrium through decreased blood flow to the brain. The central nervous system can thus be affected by the decrease in blood flow and in possible reduction in electrical impulses that control muscles, tendons and joints. As a result of these factors or any combination of them the older individual is more susceptible to dizziness and falls and the complications that arise from them (Schulz & Ewen, 1988).

Retirement and Leisure

Attitudes toward retirement and individual understanding of the concept of leisure can affect participation in later life. For the purpose of this study retirement will be defined as "ceasing full-time employment." There are conflicting attitudes prevalent among the elderly towards retirement and leisure. Retirement may be considered as that time in one's life that is characterized by "easy living;" enjoyment of those activities for which one never had time during the working years. On the other hand, retirement may be viewed by some as a time of uncertainty, a disruption of life's routine. Traditionally, Americans hold to the Protestant work ethic. Work has been equated with survival; it also has intrinsic character building qualities (Roadburg, 1981). For many, the work place is a source of socialization. Interaction with others is possible on a regular basis. Upon retirement, whether willingly embraced or forced, one's opportunities for socializing and for obtaining self-esteem and gratification may be disrupted (Schulz and Ewen, 1988). Retirees must look to other
sources outside the workplace for structure, gratification and social interaction, all of which are important to life satisfaction at any stage of life.

Leisure, which to many is the antithesis or absence of work, has been studied at some length in hopes of identifying people’s attitudes toward it as well as those activities in which they participate and find enjoyment (Nystrom, 1974; Roadburg, 1981, Mobily et al., 1986).

**The Perception of Well Being**

According to Murphy (1986), for some, aging may be characterized by:

- Feelings of non-productivity (in a society that judges individual worth by what they contribute to society)
- Loss of control over one’s life (inability to perform activities)
- Dependency (on formal organizations or family and friends for basic needs)
- Losses of material and personal resources (for cultural and leisure endeavors)
- Lack of feeling of being needed
- Loneliness
- Isolation
- Regrets and unfinished personal business cause anxiety and concern.

Munson and Munson (1986) observe that perceived well being is directly related to health. Further, Jones and Warren (1986), suggest that physical activity can produce a sense of physical and emotional well being. Nystrom (1974) states “The American formula for happiness in old age is to keep active. The value of activity for the elderly is demonstrated in positive relationships between activity and morale and adjustment and health” (p. 337). This formula is pervasive in gerontological literature and is the cornerstone of wellness programs developed for the elderly. In spite of this, studies reveal that the elderly prefer those leisure activities that are both solitary and sedentary (Nystrom, 1974; Roadburg, 1981; Mobily et al.; 1986, Singleton et al., 1986 and Macneil et al.,
1987). Glamser and Hayslip (1985) state "leisure pursuits which involve a high degree of physical activity are most prone to decline over time" (p. 29).

**Effects of Inactivity**

Crandall (1980) suggests that this marked preference for sedentary living has affected the aging process in contemporary American society. The declines in the body normally attributed to the aging process are accelerated by improper diet, little exercise and smoking. Stenbeck et al. (1978) suggest that physical inactivity has a negative effect on the health of persons over 70 years of age. Jones and Warren (1986) posit that inactivity causes premature aging and that "as much as one half of all functional decline is the result of disuse" (p. 93). Strain and Chappell (1982) suggest that the mental and physical decline often associated with old age is more often a consequence of the lack of physical exercise.

**Exercise**

Physical activity in the form of exercise has definite effects on both the physical and psycho-social well being of the individual (Jones and Warren, 1986). If an individual exercises regularly, the effects of age related changes with regard to the bones, muscles, heart and lungs mentioned above can be lessened (Crandall, 1980). Benefits that can be derived from participation in a regular exercise program include:

- Increased oxygen capacity
- Drop in blood pressure
- Improved cardiovascular endurance
- Decrease in tension and stress
- Improved digestion

II. Literature Review
• Decrease in body aches and pains
• Increased muscle tone and flexibility
• More restful sleep
• Loss of fat
• Increased sense of well being and independence
• Decreased fatigue and boredom


Clark (1980) states that physical fitness for the older adult is "most important...because of its role in both health maintenance and mobility" (p. 68). Gissal et al. (1980) states that the physical losses associated with aging "can be reduced or prevented by well planned and appropriately designed physical activity programs" (p. 43). Bausell (1986) reports the findings of a study done by Palmore (1970) that suggests that regular exercise contributed to overall better health and longer life span.

Despite this evidence of the benefits provided by physical activity, a study done by Lambert et al. (1982) concludes that older persons tend to avoid regular exercise while pursuing other forms of health seeking behavior such as proper nutrition. Crandall (1980) attributes the lack of physical activity among the elderly in the United States to societal mores that suggest that old age is a time to be sedentary, that the working years are past and the reward is to "take it easy."

For whatever reason, older persons need to maintain a certain level of physical activity to remain healthy and maintain the ability to perform the activities of daily living. There are a number of strategies used to enhance participation in physical fitness programs. The design of outdoor spaces that enhance motivation for participation in physical fitness activity is an important addition to this list of strategies.

II. Literature Review
Therapeutic Environments

Because of the benefits associated with exercise, outdoor spaces that provide a motivational impetus for this activity have a therapeutic value. The American Heritage Dictionary defines therapeutic as something that "...has healing or curative powers; gradually or methodically ameliorative." This definition given in context with the discussion of the elderly would seem to imply that older persons are "sickly" and in need of healing. However, for the purpose of this study, the term therapeutic refers to activities and environments that have both curative and health maintenance value. As discussed above, older persons can improve their physical fitness through regular exercise. Research also suggests that the degenerative process associated with aging can be slowed by regular exercise (Leslie, 1980, Gissal et al., 1980, Payton and Poland, 1983). Therefore, an outdoor environment which enhances participation in physical exercise has therapeutic value.

Fitness Trails

Fitness trails for the elderly have been discussed by Gissal et al. (1980) as enhancing "the total fitness concept" (p.43). "Flexibility, muscular strength, balance and endurance are improved or maintained via the exercise stations located at intervals along a walking trail. Cardiovascular fitness is enhanced by increasing walking distances and rates of walking according to individual progress" (p. 43). The strength of the fitness trail concept is its emphasis on individual variation. Because physical capability varies among older individuals, personal best is a satisfactory expectation. But, older persons tend to prefer sedentary activities and some have been affected by societal attitudes which suggest that older persons should have an easy lifestyle (Nystrom, 1974).

II. Literature Review
The Role of the Landscape Architect

The landscape architect's role can be to enhance the fitness trail concept which may produce greater participation in health oriented physical activity that contributes to overall well being for the older participant. A substantial amount of information is available to assist in this task. Research suggests that there are certain motivational factors that encourage older persons to participate in specific endeavors (Clark, 1985). Also, service providers specializing in geriatric care are a wealth of knowledge as to specific strategies that encourage physical activity. What is known can be adapted to the design of the fitness trail concept that includes both the exercise alternatives and motivational cues that encourage participation. By combining these, the landscape architect can have a very significant influence on the therapeutic value of this outdoor space.

Design Issues

There are several important factors to consider when designing spaces for the elderly. Translating them into design directives may enhance the fitness trail concept and increase the likelihood of participation among older persons.

Safety and Security

Safety and security are important issues for older persons. For many older people, the perception of adequate security or perceived lack of it, will determine their usage of a space (Newman, 1972). Newman suggests that perceived safety and security will increase the likelihood of the use of a space and therefore further increase both actual and perceived safety factors through the more intensive use. The greater numbers of people using a space lend to its higher level of perceived security. This
concept has been suggested in relation to neighborhood safety in the inner city by Jacobs (1961). Newman's and Jacobs' discussions of the concept of security and safety can be applied readily to the fitness trail. If the fitness trail is located along a walkway that has a specific destination such as a duck pond, gazebo, picnic or other activity area, the increased pedestrian traffic will provide surveillance for all users and increase perceived security.

Because of physical changes in the body such as poor vision, arthritis, osteoporosis, etc., the possibility of injury during physical activity while out of doors is a concern for many older persons. Therefore, barrier free guidelines (ANSI, 1980) should be followed to provide older persons with a thoroughly negotiable, supportive environment in which to concentrate on fitness activity. Thus, safety and security are provided through observation by others and specific site design criteria.

**Landscape Preferences**

The likelihood of the use of any space is dependent on whether or not it meets the needs and preferences of its intended users. Therefore, to encourage older persons living in a retirement community setting to use a fitness trail, it is important to discover what landscape elements and activities are preferred by them. Gignoux (1987), in a study of a small (40 residents) congregate care facility in southwestern Virginia, sought to identify the types of landscapes preferred by the residents in order to suggest appropriate site refinements to the recently constructed facility. Although her sample was small, Gignoux believes the results of her study can be used as a basis for further investigation. Gignoux concludes that the residents preferred a "controlled environment that affords open views, and the chance to understand the site from one vantage point. Safety is a primary concern...along with a well manicured landscape...that is beautiful to look at. Once in the landscape, the paths lead clearly and safely to a destination point set off on a central axis. Yet, the formal landscape offers the beauty and pleasure that is frequently missing from the conventional institutional landscape" (p. 52).
As a result of her study, Gignoux mentions elements that were identified as desirable by the respondents in her study. They include:

1. Path system
2. Park-like area with benches
3. Programmed spaces for activities such as
   - gardening
   - walking
   - games
   - sitting
   - picnicking
4. Duck pond
5. Plant material should
   - be native flowering species
   - include species that have fragrance
   - include bulbs and flowers for cutting
   - include large and small trees for shade canopy
   - be loose in structure around programmed spaces
   - be planted adjacent to hard surfaces
   - be planted in beds
   - be low-growing variety around buildings to insure solar exposure to rooms during winter months
   - provide a balance of sun and shade

As an indication of the generalizability of Gignoux's findings, similar preferences and activities were identified by Rubenstein (1987) in his discussion of outdoor recreation preferences among the elderly in two European countries and by Strain and Chappell (1982) in their discussion of recreation participation among the rural elderly of Canada. Rubenstein (1987) and Strain and Chappell (1982) list walking/hiking, visiting a park/picnicking, gardening, fishing and birdwatching as leisure activities preferred by older adults. Bite and Lovering (1981) also identify walking and gardening as
activities of preference among the elderly of the United States. The similarities evident in the results of these studies suggest common outdoor recreational preferences between the aging populations of different countries.

**Psychological Effects of Plants in the Landscape**

Environments which are rich in plant material have a positive effect on stress and anxiety (Stramm and Barbor, 1978 and Lewis, 1988). Kaplan (1983) and Ulrich (1984) suggest that people prefer environments that include plants. The public park designs of Frederick Law Olmsted were replete with plant material because he believed that interaction with nature produced tranquility and peace of mind (Olmsted, 1870). Gold (1974) suggests that people have a psychological need for plants. Kaplan (1977) theorizes that this need was developed during the evolutionary process. Early man learned that the forest's edge provided refuge while allowing surveillance for possible danger.

Ulrich (1984) reports that hospital patients who had views of well landscaped grounds recovered more quickly and needed less medication for pain than patients who had views to other buildings. Horticulture therapy in the nursing home environment is suggested to produce higher life satisfaction and self esteem as well as greater longevity (Langer and Rodin, 1977, Hill and Relf, 1982 and Breed, 1986).

Relf (1981) hypothesizes that "plants serve as a stimulus for a direct, specific, positive response for which the human perceptual system is specifically developed. Plants are a part of the aesthetically pleasing and perceptually stimulating aspects of the environment to which man responds. By observation of plant growth and change, man learns about life and acquires an understanding that can be applied to other aspects of life" (pp. 149-150).
Challenge and Adventure

The concepts of challenge and adventure have been explored by therapeutic recreation specialists in terms of specific activities that incorporate the element of risk into outdoor recreation (Dattilo & Murphy, 1987; Roland et al., 1987). By giving users the opportunity to choose these activities, the designer is introducing the possibility of personal challenge into the landscape as well as introducing the possibility of competition among walking partners. The concept of friendly competition has great potential to accomplish fitness goals (Vaughan, 1988). Vaughan suggests that if older persons observe one another during physical exercise, personal abilities can be challenged by a state of friendly competition. However, Browne (1988) suggests that this concept to competition does not appeal to all older adults. She reports that some older persons may be self conscious about their fitness level and may prefer to exercise in private. The goal of challenge and adventure activity is to promote independence and self esteem. Therefore, introducing a variety of these types of activities of various degrees of difficulty is important because of the varied abilities among members of the user group. Personal control can be a strong motivator to participation (Langer and Rodin, 1976, Slivinske and Fitch, 1987).

Control Enhancing Mechanisms

Within the retirement community setting, residents are provided with many of the needs of daily living (food, shelter, transportation, etc.) but often may feel they have little control over their life. This type of situation can foster an attitude of dependence on the part of the resident eroding self-esteem (Mirvis and Delude, 1988). Langer and Rodin (1976) discuss interventions that may result in higher perceived control by residents of a nursing home. In their study, two groups were selected. The first group was given a verbal communication from the management that stated that each resident of the home was in control of his/her living situation. Specific aspects of day to day living such as daily schedule and room arrangement were left up to the individual resident. The duty of
the staff was to serve resident wishes. Each resident was given the opportunity to accept a houseplant as a gift of the home to care for as they wished. A special movie was to be shown on two consecutive nights. Residents were given free choice as to which night to attend. The second group was also given a verbal communication by the management recognizing resident control over life at the home. Specific items of control were not identified. Residents were told that the responsibility of the staff was to insure resident life satisfaction and that steps had been taken toward that goal. Rooms had been arranged by the staff and a special movie was to be shown. Nurses would inform each resident as to the night they would be able to attend. Each resident was presented a houseplant, but was told that nurses would be responsible for caring for it. Comparison of the two groups at the end of the study showed the group given personal choice to be happier, more alert and with higher participation rates in social programs than the second group. In a follow-up study 18 months later, (Rodin and Langer, 1977) the personal choice group showed continued high life satisfaction and lower mortality rates than a group not given the control enhanced option. Banziger and Roush (1983) did a similar study with the exception that they offered birdfeeders to the residents to hang outside their windows instead of a houseplant. The residents were given responsibility to let the staff know when the feeder needed to be filled with seed. The group given personal choice showed significant improvement in life satisfaction.

Breed (1986) discusses horticulture therapy as a means of reversing the care giving role. The residents of a nursing home were given the option to participate in a garden class and participate in the care of a small garden outside the home. Also, those confined to their room were given plants for which they had the responsibility of care. The program was expanded to include a year-round schedule of seed nurturing, planting, cultivation and drying for Christmas giving to family and friends. An annual Christmas bazaar followed at which dried and silk flower arrangements were sold. Trips to the metropolitan flower show became a regular occurrence. The results of the program included higher life satisfaction and increased socialization among participants.

These studies suggest that personal choice and the support of retirement community management can affect the participation of residents in programs that have therapeutic value. Fitness trails with

II. Literature Review
the retirement community should, therefore, accommodate the personal preferences of the resident. The role of management may include the provision of a program as well as the encouragement to participate in it.

**Environmental Factors that Contribute to Motivation**

*Opportunities to Observe*

Bite and Lovering (1984) conclude that watching people in the performance of activity and observing environmental changes are important motivators in the use of outdoor space by the elderly. They also state that "exercise for its own sake is not a strong motivation" (p. 80). Aesthetically pleasing areas that do not provide sufficient activity levels are seldom used. As an example, a construction site on the grounds of a nursing home in their study became an area of much interest to the residents but upon completion of the project, the newly created peaceful space was seldom used by residents (Bite and Lovering, 1984).

*Environmental Change*

*Environmental change* is suggested by Kroontje (1988) as another motivator. Residents may be motivated to walk if retirement community grounds reflect the changing of the seasons and provide aesthetic beauty for enjoyment and conversation. For example, when a particular flowering plant is in bloom, it becomes a topic of conversation among residents and a motivator to encourage daily progress checks through visitation. A typical conversation might begin with the question, “Have you seen the dogwoods today?” “No, let’s walk over there and see them.”
Environmental Conditions

The perception of safety and security, as discussed before, could also serve to motivate or inhibit participation in a fitness trail. Visibility and barrier free design considerations can be strong determinants to participation.

Bute and Lovering (1984) and Carstens (1985) suggest that micro-climate is an important factor in participation in outdoor activity by the elderly. As discussed previously, older persons tend to have difficulty regulating body temperature. Therefore, regulation of heat and cold, and sun and shade can contribute directly to usage of outdoor environments by the elderly.

Glare can also be a determinant of use. Glare can cause visual discomfort to the older person. Because of changes in the eye the amount and quality of light perceived can inhibit or facilitate negotiation of outdoor environments. Wind is also a consideration. Wind, or the lack of it, will affect temperature either positively or negatively depending on intensity and time of year. Sufficient steps should be taken to battle strong winds while allowing for adequate circulation.

Programming for Motivation

Clark (1985), in his discussion of physical activity programming for older adults, states that "most older adults feel they have earned the right to choose what they do. Therefore, exercising must be a pleasant experience" (p. 69). He goes on to outline those factors that should be included to accomplish this goal. First, the program should include a variety of activities to insure interest for as many as possible. Second, the setting should be safe and pleasant. Third, the program should be challenging, but provide for individual ability levels. Fourth, the program should provide achievable rewards and encourage social support. Fifth, "an educational base to promote understanding of the principles involved. This will help participants adhere to programs and achieve their goals" (p. 69).
Harris and Frankel (1984) suggest several strategies that could be used by therapists to encourage the elderly to participate in exercise. Their suggestions include:

- Engage the older person not only physically but mentally and emotionally as well.
- The program should be individualized.
- The participant’s basic needs should be met by the program.
- The program should be designed in such a way as to allow the participant the opportunity to make choices.
- The support given by staff, other residents and family should be utilized.
- A measure of individual progress should be taken to show achievement.
- The possibility of change of pace, novelty and improvisation can produce excitement about the program.
- Recreational elements should be included in the program.
- The aesthetics of the exercise environment should be interesting but not distracting.

**Networking**

The single element that has the potential to harness the positive attributes of all the other elements is the concept of networking. Jacobs (1961), in her study of the decline of American cities, focuses on the vitality of the common sidewalk as a microcosm of the city as a whole. She suggests that the life of the city sidewalk is dependent on the activities that are associated with it. Pedestrian use is dependent on the amount and variety of activity associated with the sidewalk. Jacobs introduces the concept of networking of activities which refers to the integration of both the amount of diversity included along the walk and the variety of interest to potential users. How individual activities support one another is referred to, by her, as intricate mutual support. She suggests that a functional mixture of activities and uses is essential to encourage participation in social spaces.
Summary

The process of aging can significantly affect a person's ability to negotiate the environment. There are a host of biological and socio-cultural changes that can limit physical capability and influence self esteem. The effects of these changes can be lessened if the aging individual remains active and participates in physical conditioning routines.

The fitness trail as a means of physical conditioning for older adults is currently being included in the design of many retirement communities. However, the present aging cohort has sedentary preferences and only a small percentage of residents use the fitness trail. This phenomenon suggests that the landscape architect should explore design solutions that encourage older persons to use the fitness trail. Motivational elements have been identified that may increase the likelihood of participation. The functional mixture of elements has been suggested as important in the design of successful outdoor spaces.

Hypothesis and Research Questions

The review of the literature suggests that the number of motivational cues and their relationship to the fitness trail should be reflected in the percentage of use. This research hypothesizes that a high level of integration of a given fitness trail in relation to its network of site amenities, activity spaces and service facilities should correspond to a high level of resident use. Similarly, a low level of integration of a given fitness trail in relation to its network of site amenities, activity spaces should correspond to a low level of resident use.

This research also attempts to address the questions of to what extent is the success of the fitness trail dependent on the support given it by its surrounding environment and does a single activity

11. Literature Review
or amenity or the lack of it contribute to the use of a fitness trail or is a variety of choices necessary to ensure use?
III. Site Analysis Procedure

*Site Selection Criteria*

Three criteria were used in the selection of study sites:

1. The site must be a Continuing Care Retirement Community that offers a fitness trail as an activity option for its residents.

2. The site must be within a five hour driving distance (one way) of Blacksburg.

3. Telephone conversation with the staff of two of the CCRCs must reveal that the trails are being used by a low percentage (0-15%) of the residents. Telephone conversation with staff of the third CCRC should reveal a higher percentage (16% and up) of resident use than was true at the first two sites.

Information about the rate of resident use of the respective trails was initially gathered through telephone conversation with the staff member at each community who was responsible for fitness activity.
The Selected Sites

Retirement communities in two states adjacent to Virginia were chosen. An article appearing in the Spring 1988 issue of the American Association of Housing for the Aging Frontrunner featured two fitness trails at CCRCs that met the driving distance criteria (AAHA, 1988).

1. Asbury Village, located in Gaithersburg, Maryland, was founded in 1926 and encompasses 130 acres. The facility consists of a high rise residential home, an apartment complex and a health care center. Because of its proximity to the Washington, D.C. area, a large percentage of the 1000 residents who reside at Asbury Village are retired government employees and other professionals. An estimated 80% hold college degrees and many hold post graduate degrees. Five hundred residents reside in the independent accommodations; two hundred live in domiciliary housing; and the remaining 285 live in the nursing facility.

The fitness program was developed by the Director of Physical Therapy, Ms. Lois Liggett who designed both the trail route and the eleven fitness stations. The goal of the fitness program was the promotion of health and wellness among the 500 residents who live in the independent accommodations. The fitness trail is a walking path that is approximately one mile in length and leads from the cluster of facility buildings to a duck pond on site (see Figure 1). Along this path are the eleven fitness stations which concentrate on a variety of routines designed to increase flexibility and range of motion. Two of the stations were designed with specific activities in mind that residents would have to perform during the course of daily living. For instance, the Bus Stop station concentrates on the step up required for entry into most city buses (see Figure 2). The Circle Hurdles concentrate on the ability to step over obstacles like curbs on city streets (see Figure 3). The remaining stations concentrate on the following: breathing exercises, hamstring & healcord stretch(Pole Climb), inner thigh stretch, trunk circles,
modified push ups and modified pull ups (Geri-Bars), a stand up/sit down routine, a balance
routine and a heal to toe walk. Because the fitness trail has two starting points (one from the
apartment section and one from the high rise resident home), two different colored arrows are
used to identify the appropriate route from each that equals one mile (see Figure 4). Mileage
is identified in 1/8 of a mile increments directly on the trail surface. The trail surface is asphalt.
The walking segment is designed to be done at a brisk pace for cardiovascular fitness.

Ms. Liggett estimated that of the 500 independent residents, approximately 10% used the fit-
ness trail. Of that number, approximately 1% used the fitness stations. Thus, Asbury Village
met the low use requirement for the study.

2. The Methodist Home for the Aged in Charlotte, North Carolina was founded in 1948 and is
located on a 225 acre track of land. The resident population consists of 188 persons residing
in independent living accommodations, 100 in assisted living and 289 in the nursing facility.
There are three facilities on the campus. Epworth Place provides residential accommodations
for independent residents. The choice of accommodations include private and semi-private
rooms in the high rise facility, one and two bedroom apartments and single family cottages.
Asbury Care Center is the assisted living intermediate care facility. This section houses resi-
dents who need occasional assistance from the nursing staff with daily tasks such as bathing
and medication. The Wesley Nursing Center houses residents who require skilled nursing care.
Ms. Ann Brown, Director of Special Services states that the Methodist Home maintains a
reputation in the Charlotte area as a leader in the field of retirement living. Because of its long
service to the community, the Methodist Home is a preferred retirement option in the
Charlotte area in spite of the construction of more modern facilities elsewhere in the city.
Additional residence facilities for independent persons are currently under construction. A new
198 unit residential tower is presently under construction and is due to be completed in late
1989. Additional cottages have been proposed of which one unit is already under construction.

III. Site Analysis Procedure
Figure 1. Fitness trail layout at Asbury Village
Figure 2. The Bus Stop
Figure 3. The Circle Hurdles
Figure 4. Colored arrows mark the way
The fitness trail consists of a prescribed route laid out along a short portion of sidewalk and continuing along a street located in the independent section of the campus (see Figure 5). Eight fitness stations are located along the route. The fitness stations were manufactured by and donated to the Methodist Home by the Southwood Corporation, also of Charlotte. The *Fit-Trail Senior Walking System* is designed especially for senior citizens, the goal being to increase flexibility, range of motion, cardiovascular endurance and muscle tone. The exercises included in the Fit-Trail system are described in Figures 6 and 7 (Southwood, 1989).

The development of the fitness trail program came about as an attempt by the management to provide an activity option to the independent residents of the Methodist Home who may not participate in other activities. Telephone conversation with Ms. Brown revealed that few residents used the fitness trail route. She suggests that the concept of fitness and exercise have little meaning to the age cohort represented at her facility because, in the residents’ minds, exercise is related to the working years of life and for them, old age is considered a time of rest. Ms. Brown estimated that of the 188 independent residents approximately 14% are walkers that use the various trails and sidewalks throughout the facility’s campus (not the fitness trail route). Of this number, only one resident is known to regularly use the fitness trail. Thus, the Methodist Home met all three requirements of the study.

3. In an attempt to identify the third study site, I decided to contact the manufacturer of the fitness stations used at the Methodist Home. Telephone conversation with Shila Auten of the Southwood Corporation provided me with information concerning the Triad United Methodist Home at Arbor Acres which purchased a *Senior Walking System* similar to the one used at the Methodist Home in Charlotte (Auten, 1988). Arbor Acres is located in Winston-Salem, North Carolina. The 70 acre site was opened in March, 1980. The resident population consists of 253 persons living in independent accommodations, 21 in assisted/intermediate care and 56 in the nursing facility.

III. Site Analysis Procedure
Figure 5. Site plan of the Methodist Home
Figure 6. The Fit-Trail Senior System by the Southwood Corporation (1-4)
Figure 7. The Fit-Trail Senior System by the Southwood Corporation (5-8)

III. Site Analysis Procedure
The fitness trail consists of a one mile route which encircles the facility (see Figure 8). Eight fitness stations are placed along this route adjacent to the various activity spaces or site amenities. According to the Fit-Trail brochure, the goal of the Senior Walking System is to provide a routine which "...takes the user through a series of stretching, flexibility and light muscle toning exercises. It also provides fitness facts which discuss fitness concerns specific to the senior population." Cardiovascular conditioning can be gotten from the one mile walk over the rolling terrain of the campus. A list of the specific exercises of the Senior System appears in Figures 6 & 7. The target population of the fitness trail was the 253 independent residents. The Activities Director at Arbor Acres, Elaine Keener, estimated that of the 253 independent residents, about 20% are regular users of the fitness trail for walking. Of this number, a considerably smaller percentage actually use the fitness stations. Ms. Keener suggests that the rate of participation is due to the walking program begun the day the fitness trail was opened.

Arbor Acres met all three site selection criteria and was included in the study. Because of the higher percentage of fitness trail users, Arbor Acres served as the model for comparison with the other two sites.

Methods of Comparative Analysis

of the Fitness Trails

The Checklist

A checklist was devised for use during site visits (see Appendix A). The elements addressed in the checklist were safety and security, landscape preference, challenge and adventure, control enhancing mechanisms, environmental conditions and networking. The checklist consisted of a series of
Figure 8. The fitness trail at Arbor Acres
questions that could be asked about each trail. (A summary of the results of the checklist may be found in Appendix B.)

1. Question #1 of the checklist dealt with whether the fitness trail was used as an integral circulation route within the retirement community.

2. Question #2 dealt with whether the trail was a destination in and of itself or if it is a process of going to some popular activity space, service or amenity.

3. Question #3 dealt with the adjacency of the trail to popular nodes of activity. The network of supporting uses with relationship to the fitness trail could provide surveillance for active users of the trail as well as surveillance for users of adjacent activity spaces. Also, this network of supporting spaces would increase the possibility of social interaction between residents. The variety of activities adjacent to the fitness trail provides its users with many choices and combinations of activities in which to participate making each outing a potentially novel experience. The more diverse the activity possibilities present, the more vital the fitness trail becomes.

4. Question #4 specifically lists popular activity spaces and amenities that have been identified by senior citizens. The more activity spaces with relationship to the fitness trail, the higher the likelihood that residents would use it. The lower the number of spaces with relationship to the trail, the less likelihood that residents would use it.

5. Question #5 dealt with the landscape preferences of older adults living in a retirement community setting. Landscape plantings that consist of a variety of seasonally significant species have been identified as preferred by residents of retirement communities. The pride with which residents view the environment of the fitness trail could affect its use.

6. Question #6 was concerned with the balance of sun and shade which has been suggested in outdoor spaces used by the elderly. Because of biological changes in the skin of the aging in-
individual, the ability of older persons to regulate their body temperature is lessened. Pigmentation of the skin also declines during the aging process. Prolonged exposure to the sun has more pronounced effects on the skin of older persons (sunburn and increased risk of skin cancer).

7. Question #7 dealt with whether or not wind baffles, shade trees and non-glare surfaces are included in the design of the fitness trail. Wind baffles are suggested to lessen the effects of strong winds during winter months but which allow for cool breezes in the warmer months. Non-glare surfaces are suggested in the construction of outdoor spaces for use by the elderly. Because of changes which occur in the eye during the aging process, the older individual cannot process strong light as effectively as a younger person. To compensate for this, non-glare materials should be used in walking surfaces, building facades and site furniture. Deciduous trees can provide shade as well as reduce glare. Conifer trees can be used as wind baffles.

8. Question #8 dealt with the amount of seating along the fitness trail. There is much variation in physical ability which exists within the independent resident population of a CCRC. Therefore, seating should be provided at intervals best suited for less fit individuals. For this group, seating should be no farther than 150 feet apart.

9. Questions #9 dealt with whether the trail was hard surfaced or not. Barrier free guidelines suggest hard surfacing in order to provide sure footing for the older user (ANSI, 1980). The perception of safety on the trail and the surety that the walking surface is uniform and well maintained can positively affect use of the trail.

10. Question #10 is concerned with the width of the trail. The standard width of a residential sidewalk is 5 feet which allows two persons to pass one another. Because of the use of amigo carts and golf carts by residents of some retirement communities, a maximum width of 8 feet is suggested. In communities where these mechanical modes of transportation are not used on the fitness trail, the 5 foot width is sufficient.

III. Site Analysis Procedure
11. Question #11 incorporated information suggested by physical therapists. The question dealt with whether the trail provided challenge opportunities along its' route. The ability of older persons to perform simple daily tasks such as climbing stairs and the negotiation of environments beyond retirement community grounds which may require side stepping or stepping over obstacles can be practiced along the fitness trail. Barrier free environments are suggested in the design of many public spaces but the older person may still be required to navigate barrier present situations. This opportunity to challenge individual ability can be a motivation for many to remain flexible.

12. Question #12 dealt with the choices of levels of activity available on the fitness trail. The prescription of tasks and the provision of services can foster an attitude of dependence among residents of a retirement community. The opportunity to choose the level of participation on a given outing is an important element in maintaining individual satisfaction in the fitness trail. Daily use of the fitness trail can be promoted through personal variation. Each day can offer a novel routine.

Staff Questionnaire

A brief questionnaire was developed to use as a guide in interviewing the person at each retirement community who was responsible for the fitness trail (see Appendix C). Information was sought on 1)Facility profile, 2)Facility demographics, 3)Specific fitness trail program and 4)Management support of the fitness program. (A summary of the responses may be found in Appendix D.)

Questions #1-#3 identified the facility as a

- Continuing Care Retirement Community,
- its location (city & state),
- and the size of the campus in acres.

III. Site Analysis Procedure
While size of the facility and location were not used as elements to be compared, the designation of CCRC status was a site selection criteria.

Questions #4-#8 identified
- the age spread of the resident population;
- the total number of residents living at each facility;
- the number of independent residents
- the number in assisted living
- the number in nursing care

Questions #9-#15 identified the specific fitness trail program. The term “program” refers to the reason for the provision of the fitness trail at the community and the target population for whom the trail was provided. Information as to the frequency of resident use of each of the fitness trails was asked again in spite of the fact that this information had been given in the initial telephone contact.

Question #16 dealt specifically if the management of the facility was supportive of the fitness program. The value of the management of a retirement community to influence the resident population to participate in community functions was identified by Langer and Rodin (1976). The active participation of management will help set the stage for a successful fitness program. In this case, success would be defined as a high percentage of resident use of the fitness trail. Comparison of each trail on the basis of the level of management interaction with the fitness program should correspond to the reported rate of resident use of the fitness trail at each site.

The Conceptual Diagram

A conceptual diagram was used to graphically identify major elements of the sites and analyze the relationship of each fitness trail to its supporting environment. A site plan containing the route of the trail through the community with the corresponding fitness station layout was acquired at the
time of the staff interview for use in the conceptual analysis of each trail. The conceptual diagrams provided insight into the possible problems as well as positive influences for each of the sites.

The application of this tool allowed comparison of site relationships with perceived rates of resident use. For example, a high level of integration between a fitness trail and its supporting site amenities, activity spaces and service facilities should correspond to a high level of resident use of that fitness trail. A low level of integration between a fitness trail and its supporting site amenities, activity spaces and service facilities should correspond to a low level of resident use of that fitness trail. The analysis of each site in this manner provided a means to substantiate information gained from the comparisons of the checklist and management support inquiry.

III. Site Analysis Procedure
IV. Comparative Analysis of the Sites

Asbury Village

The conceptual diagram of Asbury Village graphically illustrates the relationship of the fitness trail to the community (see Figure 9). While the trail does include certain activity spaces identified in the literature, it is not integrated into the campus as a whole. While certain aspects of good design are present, the integration of motivational elements is lacking.

Trail Design

The trail is located on the back side of the residential cluster and has two starting points leading to a duck pond on the property. The fitness stations are located along the trail several of which are adjacent to the pond (see Figure 10). The exercise stations provide opportunities for the residents to participate in routines that should produce greater flexibility and muscle tone.
Figure 9. The conceptual diagram of Asbury Village
Figure 10. The dock pond area at Asbury Village. Refer to Figure 1 for context.
Integration

A number of activity spaces are adjacent to the fitness trail and the fitness trail is the means of going to these spaces (see Figure 10). The start of the trail at the apartment section is adjacent to the small shuffle board court. The trail is adjacent to the duck pond which provides residents with the opportunity to observe migratory water fowl, and to use of a picnic area, an arbor, gazebo and individually located benches (see Figures 11 and 12). However, the garden plots are some 500 yards distant from the duck pond and fitness trail.

Landscape Setting

The trail is landscaped with a variety of small flowering trees, but does not include shrubs or beds for flowering perennials. There are no social gathering spaces provided and no views to active areas other than a single residential street which parallels the site. Seating is not provided at the suggested 150 foot intervals.

Environmental Setting

The trail was sited in an open field without protection from the wind. The site visit for this research took place in mid-February. It was a sunny afternoon but windy and very cold. The wind was blowing at a constant rate of 15-20 miles per hour. Because of the openness of the environment, the experience of the trail itself was quite uncomfortable.

The trees along the trail are of flowering rather than shade varieties. They are small and do not provide shade to trail users. There are some shade trees on the northwest side of the duck pond along with a group of mature evergreens.

IV. Comparative Analysis of the Sites

52
Figure 11. The arbor and gazebo
Figure 12. The duck pond
Ms. Liggett reported that dissatisfaction had been expressed by some residents that the trail surface "was not good enough." The edges of the walking service were perceived by some of the residents to be unsafe producing fear that they might fall and break a leg or hip. There was also concern among some residents about the use of the fitness trail by non-residents of the community. Since the trail is in a open field and is visible to the residents of an apartment complex just off the site, non-residents occasionally use the fitness trail. Also, non-residents are accustomed to crossing the open field as a short cut to a shopping center on the other side of the site.

**Trail Specifications**

The trail is approximately 5 feet in width with grass along the edges. It is asphalt surfaced and no appreciable glare was evident. A thirty foot change in elevation occurs between the residential cluster and the duck pond. Although the trail was constructed to limit the amount of slope along the trail, the steepness could present a challenge to the less fit. The slope is approximately 7 percent along some areas of the trail, well above ANSI standards.

There are no steps other than those found at the Bus Stop exercise which uses a series of 12", 16" and 18" high step-ups to simulate stepping up into a city bus (see Figure 2). The Circle Hurdles provides hurdles of 8", 10", 12", 14", 16" and 18" high to provide the user with practice in stepping over obstacles (see Figure 3).

**Management Support**

The attitude of the management is generally supportive, not unlike the support given to any activity offered to the residents. Although each residential facility has its own activities director, there seems to be a lack of cohesive organization of promotion of the fitness trail.

IV. Comparative Analysis of the Sites
The Methodist Home for the Aged,

Epworth Place

Trail Design

The conceptual diagram shows the route and relationship that the trail has within the community (Figure 13). The trail is part of the circulation system connecting community amenities, but it does not lead to a specific location. The trail is a destination in and of itself, in that the beginning and ending points are at opposite ends of the Epworth campus.

The Fit-Trail Senior System fitness stations, are placed along a route that begins at the park area adjacent to the main independent living tower. The instructional sign as well as stations #1 and #2 are located here (see Figure 14). The route then turns right and proceeds around the one story apartments section along the street (see Figures 15 and 16). Stations #3 and #4 are set along the right side of the street opposite the apartment section (see Figures 17 and 18). The route proceeds along the main entry road, around the back side of the park area (see Figures 19 and 20). Stations #5 and #6 are placed along the back side of the park area (see Figure 14). The route passes a small, resident kept flower garden, the service dock of the independent living tower and a shuffle board court. Station #7 is adjacent to the shuffle board court (see Figure 21). The route ends at the opposite end of the independent living area (see Figures 14 and 22).

Integration

The route of the trail leads through the center of the independent living section of the campus. Even though it passes the park-like community green area, a small flower garden and the shuffle board court, it bypasses two significant amenities on the campus: the azalea garden and the lake. Within the park area which serves as a community green are two opportunities for residents: a
Figure 13. The conceptual diagram of the Methodist Home in Charlotte.
Figure 14. Epworth Place; independent living section at the Methodist Home
Figure 15. The right turn

IV. Comparative Analysis of the Sites
Figure 16. The route between the apartments

IV. Comparative Analysis of the Sites
Figure 17. Station #3 and the woodlot
Figure 18. Station #4 and the newly constructed cottage
Figure 19. The back side of the park along the entry drive, looking north
Figure 20. The entry drive and the flower garden, looking south
Figure 21. Station #7, the service dock and the shuffle board court

IV. Comparative Analysis of the Sites
Figure 22. Station #8 and the fitness trail's end
small flower garden and an area suitable for picnicking, if picnic tables were provided. The garden plots are off the fitness trail route, in an as-yet undeveloped section of the property, but can be reached by another trail. The street along which the fitness trail is located is part of the main vehicular thoroughfare of the community. Both automobiles and golf carts use this street throughout the day. The use of the street as the trail presents possible pedestrian/vehicle conflicts.

*Landscape and Environmental Setting*

The landscape of the fitness route lacked a variety of flowering species. Indeed, the landscape is quite mono-cultural in that it appears in context with the residential street. While large trees provide shade to the route adjacent to the park area, the route around the apartments section is devoid of shade. No seating is provided along the route other than the benches provided as part of exercise stations #1, #5 and #8. As stated before, the route is located predominately along the street. However, stations #1 and #2 are adjacent to a sidewalk. There is a soft surfaced trail available to resident use which encircles the lake. There is a hard surfaced trail leading to the azalea garden and garden plots from the residential cottages. Neither of these two trails intersects the fitness trail route. There is ample surveillance of the route from residential buildings.

*Management Support*

The Director of Special Services for the Methodist Home, Ms. Ann Brown, is principally in charge of the fitness trail. When asked if the management was supportive of the fitness trail program, Ms. Brown replied in the affirmative. However, there is no active promotion of the fitness trail and no tangible system of rewards for those who use it other than the proposed value of fitness posited on the instructional signs at the stations. The initial donation of the *Fit-Trial* system was publicized by the media and served to improve public opinion within the community.

IV. Comparative Analysis of the Sites
The only resident who uses the fitness stations regularly was interviewed during the site visit. For the purposes of this study, she will be referred to as Ms. Smith. Ms. Smith enjoys walking but is stricken with arterial disease in her legs. She has always enjoyed taking a brisk walk, but now is unable to do so because of her condition. She has found that use of the fitness stations is a good substitute for the walking she is unable to do. She is very health-conscious because heart disease is very prevalent in her family's history. She is frustrated at the lack of motivation among her neighbors to use the fitness trail. She frequently asks if anyone would join her in her daily exercises, but, as yet, has not been able to get any of them to do so. When asked why she thought other residents did not use the fitness trail, she suggested that the problem lay with a lack of promotion by the management. Because of recent personnel changes within the management hierarchy, emphasis on fitness seemed not to be a priority. Whether or not Ms. Smith's perception is accurate about problems with the management, she did express disappointment that the lake was not used as the location of the fitness stations.

**Arbor Acres**

**Trail Design**

The conceptual diagram shows the integration of the fitness trail within the community and the relationship that exists between it and the services, activity spaces, and amenities (see Figure 23). The *Fit-Trail Senior Walking System* exercise stations are located adjacent to activity areas and popular social nodes. Station #1 is located at an exit door which services both the administration wing and one of the residential towers (see Figure 24). The duck pond, which is also used for fishing, and the community flower gardens are nearby (see Figures 25 and 26). Station #2 is a short walk away and is adjacent to a parklike area with a single picnic table (see Figure 27). Station #3
is on the south side of the garden plots (see Figure 28). Station #4 is on the north side of the garden plots. Stations #5 and #6 are located within the community games area which provides horseshoes, croquet, shuffle board, a golf driving range, a gazebo with a view of the Winston-Salem skyline and a barbecue grill with picnic tables (see Figures 29 and 30). The stations are adjacent to the grill and picnic tables. Station #7 is located adjacent to the single story apartments which are bordered by a small park. As a convenience, a covered walkway is provided from these apartments to the administration wing. Station #8 is located in a park like area which is adjacent to the parking area servicing the administration wing (see Figures 31 and 32).

**Integration**

The one mile trail encircles the campus connecting the activity spaces, amenities and facility services to one another. The trail begins and ends at the administration wing which is at the center of the campus. Three residential towers adjoin the administration wing. Community services such as the central dining facility and mail boxes are located here. A community duck pond and resident flower gardens are also located directly adjacent to this area. As stated above, the trail passes and the stations are located adjacent to the garden plots, picnic areas, duck pond, games area, future swimming pool (now under construction), flower gardens, nature observation areas (view to pastures and wooded areas---the Winston-Salem area is a Bluebird sanctuary during the winter months), small gathering spaces and spaces set aside for solitude.

**Landscape Setting**

The trail is landscaped with a variety of plant material. Since the majority of the route passes through residential sections of Arbor Acres, the landscaping associated with this section provides an aesthetically pleasing atmosphere (see Figures 33 and 34). The number of large shade trees was limited to the park areas. The remainder of the trail was landscaped with small flowering trees.
Figure 23. The conceptual diagram of Arbor Acres
Figure 24. An exit door leads to station #1
Figure 25. The duck pond
Figure 26. The courtyard with resident-maintained beds
Figure 27. Station #2 in sight of the garden plots
Figure 28. Station #3 adjacent to the garden plots
which afforded no possibility of shade. The sidewalks were of concrete construction. The color of the concrete mixture is such that on sunny days the reflection of the bright light would be quite uncomfortable to the residents.

**Trail Specifications**

The walking path is hard surfaced throughout and is predominantly typical 5 foot concrete sidewalk. Although the route coincides with a portion of the street it does not present conflict between pedestrian and automobile because the cul-de-sac is not a thoroughfare. A positive attribute of this coincidence of street and fitness trail route is the increased opportunity for social interaction. The masonettes and cottages allow residents to tend to their own small yard. Interaction between neighbors working in their yards and users of the fitness trail may serve to enhance the sense of community at Arbor Acres.

Although the fitness trail at Arbor Acres has many positive attributes and a higher rate of use by residents than the other two CCRCs studied, it also has some deficiencies. There is a distinct lack of seating. Only two areas had benches: station #2 adjacent to a park area which had a picnic table and stations #5 and #6 at the games area (see Figure 35).

**Management Support**

The management of Arbor Acres is actively involved in the fitness program. The Activities Director, Ms. Elaine Keener, focuses this support within a walking program and provides the energy and excitement that has resulted in the involvement of the residents.

The day the fitness trail opened, she began a walking program for the residents that encouraged them to use the trail. A journal was kept in which each resident who used the trail recorded his/her
Figure 29. The gazebo

IV. Comparative Analysis of the Sites
Figure 30. Picnic tables, barbecue and stations #5 and #6

IV. Comparative Analysis of the Sites
Figure 31. The trail to station #8
Figure 32. Station #8 in the park
Figure 33. Residential landscape with view to Winston-Salem skyline
Figure 34. Residents may do their own yard work
Figure 35. The games area at Arbor Acres
total miles per day (the complete route was measured to be one mile). The journal is kept in Ms. Keener's office where she tallies the total mileage every two weeks. This allows residents to see how far they have walked during that period.

After a time, Ms. Keener noticed that the number of miles walked by the group was beginning to add up. She decided to start a program by which the mileage could be attributed to a trip across the United States (this program is used in public school systems to promote fitness among students). The first prominent destination to be reached was New Orleans, Louisiana. Ms. Keener purchased a world map from the National Geographic Society on which to record the mileage for all the residents of Arbor Acres to see. She placed the map on a bulletin board adjacent to the dining room and mail boxes where it would receive maximum visibility. As the mileage totals approached that which corresponded to the distance from Winston-Salem to New Orleans, Ms. Keener planned a social gathering with a Mardi Gras theme to celebrate the accomplishment. She enlisted the help of the dietician to make the celebration complete with authentic foods. Decorations were readied and on the appointed day, they held their party.

The success of this initial special event sparked interest in residents who were not participating in the walking program. The next destination was chosen by the residents. Hollywood, California was set as the next goal for the residents. Ms. Keener stated that the number of residents who were participating had risen to the point that the mileage necessary to reach their goal was being attained very quickly. In fact, she had to re-route the trip and add more miles to it in order to have enough time to adequately prepare the celebration. The festivities included a classic film festival of silent and black-and-white films and a black tie dinner.

With each party, the celebration has become more extensive. Since the trip to Hollywood, the group has walked the equivalent mileage to Honolulu, Hawaii and Bei Zing, China. Celebrations provided residents who had visited these cities the opportunity to share traditional clothing, artifacts, souvenirs and slides with their fellow residents. For the Hawaiian celebration, Ms. Keener was able to find a group of Polynesian dancers to perform at the traditional Hawaiian luau. For
the Chinese New Year Celebration, she was able to schedule a professional Chinese dancer. The next destination, Dehli, India, is scheduled to be reached in the Spring (1989).

**Summary of Findings**

There are several factors which emerged from the analysis of the sites. The integration of the trail into the community as a whole and its relationship to community activity spaces, amenities and service facilities appears to affect the use of the trail. The trail was a process of going to specific destinations within the community at both Asbury Village and Arbor Acres. However, unlike Arbor Acres, the trail at Asbury was not an integral circulation path between community facilities. Environmental factors like microclimate and perceived safety were suggested as deterrents to use at Asbury and Epworth but not Arbor Acres. Management support and a strong fitness program corresponded to higher reported use of the fitness trail at Arbor Acres but the concept of attainable goals and tangible rewards was suggested as the key element in this success.
V. Discussion

The prescription of tasks that have therapeutic value is the cornerstone of the fitness trail concept. The results of the analysis of the three sites suggest that new thinking is in order concerning fitness trails for older persons, for at present, utilization of fitness trails by older adults is minimal. While a successful walking program is a positive start to the increased fitness of residents of a CCRC, the principles behind the exercise stations are important enough to contemplate revision of their format in order to increase their use.

Programming for Use

The development of alternative concepts for the design of fitness trails in the CCRC environment should be based on proven motivational strategies. These strategies should be designed to meet the various needs of the user group. The program should include the following elements:

- Choice of activities and personal control serve to individualize the program with greater likelihood of positive outcome.

- Design of fitness and challenge activities encourage personal best.
- Frequency of use and centralized location allow for social support system development and foster friendly competition.

- Variable courses strengthen individualized program concept and also encourage creative opportunities. This is further accomplished by the possibility of participating in a novel routine each day through a change of pace or improvisation on the course.

- The use of recreational activities along the fitness course provides more options on any given outing.

- Aesthetics of the fitness trail environment should be in keeping with landscaping preferences of older adults determined through a review of the literature or questionnaire of residents at the specific site. Plant material should be used in abundance to create lush environments.

- Management should assume an active role in promoting fitness trail use by residents.

**Fitness Trail Specifications**

The design of fitness trails for senior citizens must engage the participant on a variety of levels:

1. **Physical**—Fitness stations should be evenly spaced along the walking trail and include a wide range of activities including warm up/cool down routines, upper body/lower body flexibility exercises, and strength building routines. The walking loop should accommodate varying levels of ability and daily personal choice. Variable courses strengthen the individualized program concept and encourage creative opportunities. Participating in a novel routine each day is possible through change of pace or improvisation on the course. There should be a choice of challenge course options adjacent to the trail at periodic intervals for advanced users. Because of changes in body physiology that regulate body temperature, there should be an equal
amount of sun and shade along the trail. Seating and resting spots should be provided at regular intervals of 150' along the trail and should conform to barrier free design standards.

2. **Educational**---The educational opportunity afforded within the environment of the fitness trail is unlimited. The motivational aspect of environmental change associated with a variety of plant material offers residents the opportunity to familiarize themselves with plant, animal and habitat types that are included in the community. Identification plates along the trail can be helpful in identifying elements of interest. This can be supplemented with an educational program offered as a social activity of the retirement community. This mentally challenging aspect of the fitness trail is a means to acquaint residents with their surroundings and develop attitudes of stewardship and responsibility toward the environment (Krootje, 1988). By creating a continuous awareness of the surrounding elements associated with specific parts of the trail, the wayfinding abilities of the residents may be enhanced. A path that turns out of view can produce a sense of mystery and provoke interest (Kaplan, 1977).

3. **Mental and Emotional**---The opportunity for social interaction is an important concern for retirement community residents. Because of the susceptibility of older persons to depression and loneliness, the provision of opportunities for social interaction is an important task of the fitness trail designer. Older persons should be given the opportunity to interact with their peers on a variety of levels. Carstens (1985) suggests that programmed social spaces provide the potential user with the opportunity to preview the space before entering. Therefore, the trail should not pass through a space but should pass adjacent to it to allow for personal choice to occur before entering.

The viewing of activity is specified as a motivator for using outdoor space. Passive use is a consideration that allows the individual choice to participate or not to participate. However, the opportunity to preview the participation of others in activity could encourage a passive user to join in with others in an activity. The passive user may contribute to perceived safety by

V. Discussion
providing surveillance for the active users of a space. Solitude is a viable alternative on occasion for every individual but by providing a hierarchy of spaces, emotional health can be positively encouraged. Choice of activities and personal control serve to individualize the fitness program with a greater likelihood of positive outcome. Increases in self esteem and independence can be achieved as the resident is challenged and encouraged to his/her personal best.

Interaction with plant material may be psychologically beneficial by contributing to peace of mind, promoting self esteem and self worth and lowering stress and anxiety (Stramm and Barbor, 1978, Ref. 1982 and Lewis, 1988).

The Networking of Spaces

The concept of networking can be used in the design of the fitness trail in the CCRC environment. A cohesive balance of function and amenity can be achieved among spaces adjacent to the trail. If the fitness trail is located between prominent destinations within the community, it will become a well traveled pedestrian artery. The placement of a hierarchy of social gathering spaces adjacent to or bisecting this artery will further enhance its popularity in the community. A variety of amenities can accentuate the walking path. Bird feeders, garden plots and raised planters can provide a choice of activities for both active and passive users by providing a pleasant environment that is full of visual diversity and change year round. These elements and others like them can be orchestrated in such a way to provide a pedestrian thoroughfare that offers the potential of a novel experience on each outing. The functional mixture of mutually supportive activity spaces may increase their use by residents. How can the landscape architect contribute to the design of fitness trails in which the fitness aspect is overshadowed by something more rewarding? To begin with, the designer should identify the primary activities in which every resident of a CCRC is involved either frequently or on a daily basis.

V. Discussion
Primary Elements: Points of Destination

The three sites of this study were denominational retirement communities. Chapel and other religious services would be a regular activity. Residents who take at least one meal a day in the community dining facility would need to walk there. A daily routine of many residents is checking the mail box. Not only does this serve the obvious function of getting one's mail but it also provides an opportunity to visit with friends and watch the "parade" of individuals passing by going to the various activities within the community center. A beauty shop is an important element of the community. Residents also receive many visitors. A centrally located reception area may be easier for visitors to find and provide a formal sense of entry to the CCRC. A well designed entry can also foster pride among residents in their home.

Secondary Elements: Activities and Amenities

Those elements of secondary importance to residents of a CCRC are the activities and amenities that the community offers. This list can include game areas (i.e., shuffle board, horse shoes, croquet), vegetable flower garden plots, outside group presentations, club meetings, films, nature observation, parties, picnic areas, a park-like atmosphere of the campus, walking exercise programs, a swimming pool, well landscaped grounds and opportunities to go to cultural events and on site-seeing tours. These activities are offered because they have obviously been found to appeal to many older people.

Tertiary Elements: Programming

Tertiary elements are programmed activities that will enhance the physical health and well being of older persons. The use of the fitness trail as a tertiary element in the CCRC setting is the is the focus of this study. Because of sedentary preferences identified in the literature and cohort-specific...
attitudes towards physical exercise, older persons tend to prefer those activities that provide enjoyment and rewards. The task of the landscape architect, therefore, is to integrate the tertiary elements with those activities that appeal to older persons. The integration of these activities and amenities into the fitness trail can enhance the prescriptive nature of the walking path and provide increased impetus for use, even if, as in the case of Arbor Acres, the route is only used as means of getting to various activity areas. The use of the fitness trail on a daily basis is the goal to be achieved. The use of the trail in the performance of daily tasks such as retrieving one's mail, eating a meal, visiting with friends, etc. is the ultimate form of integration.

The fitness trail at Arbor Acres successfully integrates tasks performed on a daily basis as well as activities and amenities that are suggested in the literature as preferred by residents of a retirement community. However, the fitness stations, while strategically located adjacent to activity spaces and amenities, still inspire little use among residents. Even with a strong program of support, the fitness stations are used by a small percentage of residents. The fitness stations at both Asbury Village and Epworth Place were located adjacent to some of the site amenities but were not part of pedestrian circulation nor did they have a strong program to encourage resident use. With this in mind, one could conclude that the present fitness trail concept does not meet the needs of senior citizens.

Recommendations

The original hypothesis was that the level of integration should directly correspond to the rate of resident participation. Although all three trails included some of the motivational elements, only one trail was supported by a comprehensive program of fitness which had tangible rewards. The use of this concept of rewards in the design of fitness trails for residents of CCRCs is an innovative recommendation. In order to explore this alternative design concept a re-emphasis on fitness goals is necessary.

V. Discussion
**Fitness Objectives**

There are a number of tasks identified by physical therapists that should be practiced by older persons in order to retain a certain level of skill proficiency. The old saying "use it or lose it" is quite accurate. The Director of Physical Therapy at Asbury Village, Ms. Lois Liggett, identified two important skills necessary for the older individual to maintain: the ability to climb steps and step over obstacles. These two tasks are required on any outing beyond the retirement community. Steps and curbs are a reality in many public spaces and a step up is required in order to enter most public transportation. Margaret Vaughan of the Piedmont Geriatric Institute recognizes the need of older persons to practice side stepping obstacles. This skill can be required on a busy city sidewalk, in a shopping mall or in a cluttered department store. The ability to walk serves the obvious function of negotiating one's environment but it also contributes to flexibility and cardiovascular endurance. Maintaining the ability to walk can be important to perceived independence and participation in various social activities.

The problem is motivating older people to do exercises that practice these skills. The comparison of the three sites suggests that the integration of the trail into the retirement community as a whole as well as a strong program of rewards are necessary to promote physical fitness in the CCRC environment, but the format of the typical exercise station is both uninviting and no rewards are associated with it.

*The New Concept*

A new concept of exercise presentation is in order. It is possible to redesign the fitness trail and its exercise stations eliminating the signs and wooden apparatus while providing for some of the more important tasks. This new concept stresses the importance of the integration of the trail into each
unique setting, while providing exercise opportunities that are designed into the trail rather than imposed on it. But, rather than focus on the fitness tasks, the focus is attaining a reward. Thus, the fitness activity becomes a hidden agenda in the walking trail.

**Trail Design**

The design of a walking trail with a hidden fitness agenda can be accomplished by providing a walking trail that has variable lengths and challenge options which are disguised within landscape elements. For example, a set of stairs which leads to an activity area may be challenging to users of the walking trail (see Figure 36). If using stairs is necessary in order to get to an amenity, activity or social space, the fitness aspect is obscured by the reward of getting to the space (see Figure 37 and 38).

The trail should be an integral circulation route within the community. However, it should be divided into a longer, more leisurely walking trail and a shorter, more difficult trail (see Figure 39). Individuals who wish to use the longer trail will benefit from the increased distance it provides. Those who choose the shorter trail will benefit from the various challenge obstacles.

**Rewards**

To encourage the use of the shorter trail, rewards should be placed adjacent to the challenge areas which provide special opportunities for the user. The rewards may include, but are not limited to, a small water feature, a sculpture garden, a bed of colorful flowers or shrubs, a pleasing view of a picturesque landscape, a view to an area of activity, access to a site amenity such as a duck pond, lake or gazebo, or the opportunity to observe wildlife. The challenge areas should be well landscaped providing a pleasing environment and should be located within areas that are unique to the specific site (see Figures 40-45).

V. Discussion
Opportunities for Interaction

The two trails should intersect periodically at community nodes allowing for social interaction and the opportunity for users to “switch” routes. This will increase the variation possible and provide the possibility for a novel experience on each outing (see Figure 46). The two trails should pass adjacent to one another at the challenge areas providing views from one trail to the other (see Figures 47-51). The user of the longer, more leisurely trail may be encouraged to use the challenge trail if he sees others using it, but more likely, will see the rewards and want to investigate (see Figures 52-54). The leisure trail user will also provide surveillance for the challenge course user and increase the perceived security of the challenge area.

While these options could not be considered as “barrier free” all steps necessary should be taken to make them safe. The concept of the fitness trail can be radically altered through the use of landscape elements. The intrigue of the challenge options and the rewards associated with them can be powerful motivators to users of a walking trail. The disguising of fitness-oriented activity in landscape elements is the next logical step in the design of fitness trails for the residents of the Continuing Care Retirement Community.

Limitations of the Study

The exploration of the use of fitness trails as mediums of physical fitness for residents of retirement communities is focus of this study. The methods for the initial study were dependent of perceptions of the management of each CCRC concerning resident use of the fitness trail rather than on data collected from the residents themselves. Therefore, there is not a clear understanding of why residents use or do not use a fitness trail.

The analysis of the literature and existing data has suggested key elements that may influence residents to use a fitness trail. However, the interpretation of this data may be influenced by the bias.
Figure 36. Stairs leading to an activity area
Figure 37. The alternate route with reward
Figure 38. Separation of the two trails
Figure 39. The two trails: the leisure and challenge routes
Figure 40. The pleasing environment associated with the challenge area
Figure 41. An abundance of plant material creates a lush environment
Figure 42. One must use the stairs to get to the garden plots
Figure 43. The gazebo is adjacent to a challenge area
Figure 44. One must use the stairs to get to the gazebo.
Figure 45. A section view of the gazebo area
Figure 46. Variable routes increase the possibilities.
Figure 47. A waterfall and the lake
Figure 48. A view of the lake from the leisure trail
Figure 49. A view of the garden plots
Figure 50. A view into the challenge area is possible
Figure 51. Surveillance of the challenge area is possible
Figure 52. The relationship of the challenge and leisure trails
Figure 53. The user of the leisure trail will see the reward
Figure 54. Surveillance for challenge trail users
of the observer. Definitive conclusions cannot be drawn until further research identifies the relative importance of each element and those elements that are most crucial to resident participation.


decomendations for Future Research

Further research is necessary to accurately determine the reasons why residents of a CCRC use or do not use a fitness trail. Resident perceptions are necessary to clarify the relative importance of the elements identified in the present study. There are questions which remain to be answered. Does a single activity or amenity contribute to the success of a fitness trail or is a variety of choices necessary for potential users to experience? Is this aspect of choice essential to participant satisfaction?
VI. Conclusions

Gerontologists agree that physical fitness is an important issue for older persons. Yet, the provision of fitness trails in the CCRC environment has not yielded the rate of resident participation that was thought would occur. This research and that done by others (Browne, 1988) suggests that both the walking and exercise parts of these fitness trails are being used by only a small percentage of the residents. The goal of this study was to understand some of the basic motivational cues that encourage older persons to use the exercises routines that are provided by a fitness trail. With this understanding, an evaluation of three fitness trails located within three CCRC environments was completed.

Integration

The results of the evaluation and subsequent comparative analysis of the three trails revealed that site design and placement of each trail within their respective communities positively correlated with the rates of resident use. At each community, the percentage of residents who used the fitness trail corresponded with the level of integration that that particular fitness trail had within the community. The networking concept of supporting activities and the functional mixtures theory posited by Jacobs (1961) may apply to the design of fitness trails within the Continuing Care Retirement
Community setting. However, another element was identified that seemed to be essential to high rates of resident use.

**Role of Management**

The active support of management through a key facilitator seemed to be essential to provide focus for the fitness program. Attainable goals and the promise of tangible rewards seemed to have a positive effect on resident participation. This suggests that conventional fitness trail design can be improved.

**Trail Design**

The present design of fitness trails focuses on the use of wooden apparatus with instructional signs providing both graphic and written explanation of fitness principles and routines. The inability of this design to inspire participation among the residents of CCRCs is suggested in the results of both the present study and that done by Browne (1988). The identification of important skills that every older person should maintain is one step in determining which routines to included in a fitness trail for senior citizens. These skills are at the basis of current fitness trail design, although the format seems to be unmotivating to older persons.

**Rewards**

Aesthetic rewards may be used by the landscape architect in conjunction with fitness routines which are disguised within landscape elements. The concept of using attainable aesthetic rewards as motivation in the performance of prescribed fitness routines may be used to encourage use of the fitness trail. Aesthetic rewards may be used as effectively as organized social events for motivational im-

VI. Conclusions
petus. This alternative fitness station concept coupled with the strength of the concepts of networking and functional mixtures suggest that more successful fitness programs within retirement communities are possible and therefore more physically fit residents.

**The Designer**

The role of the landscape architect in this process is to provide solid design alternatives based on an accurate profile of the needs and preferences of older persons. The adaptation of motivational cues in the design of fitness trails within the CCRC setting may be accomplished through a cooperative effort by the active input of residents, a supportive management and a sensitive and informed designer.

**Implications**

The results of the study have potential application in the design of outdoor spaces other than in the CCRC setting. The success of walking and exercise trails that are used in subdivisions, apartment complexes and public housing projects may be enhanced through the use of the principles identified in this research. Those elements that motivate and provide satisfaction to older adults are perhaps the same ones that do so for all ages.


Auten, Shila (1988) Telephone conversation seeking information about possible sites for the study, December.


Gignoux, Leslie (1987) The Landscape Preferences of Older People Blacksburg, VA VPI&SU


Kroontje, W. (1988) Interview with Director of Warm Hearth Retirement Community Blacksburg, VA.


Liggett, Lois (1989) February 9th interview with the Director of Physical Therapy at Asbury Village, Gaithersburg, Maryland.


Vaughan, M. (1988) Interview with Director of Nursing at Piedmont Geriatric Center, Burkeville, VA.

Appendix A. The Checklist

1. Is the trail an integral circulation route for pedestrian traffic between community facilities?
   Yes____  No____

2. Does the fitness trail lead to a popular destination within the retirement community?
   Yes____  No____

3. Are the fitness stations sited adjacent to popular nodes of activity?
   Yes____  No____

4. Does the fitness trail pass other community nodes or popular amenities?
   1. Garden plots____
   2. Raised planters____
   3. Picnic area____
   4. Water feature____
   5. Game area____
   6. Large gathering spaces____
   7. Small gathering spaces____
   8. Spaces set aside for solitude____
9. Swimming pool  
10. Flower gardens  
11. Nature observation area  
12. Community green  
13. Covered sitting area  
14. View to active spaces  

5. Is the fitness trail landscaped with a variety of flowering plant material and species of seasonal significance?  
   Yes  No  

6. Does the fitness trail provide a balance of sun and shade?  
   Yes  No  

7. Are precautions taken to moderate extremes in temperature through  
   Wind baffles  Shade trees  Non-glare surfaces  

8. Is seating provided at intervals of at least 150 feet along the fitness trail?  
   Yes  No  

9. Is the fitness trail hard surfaced?  
   Yes  No  

10. Is the walking surface 5-8 feet in width?  
    Yes  No  

11. Does the fitness trail present challenge oriented variable routes?  
    ___ Side step obstacles  
    ___ Steps provided as an option to a ramp at a grade change  
    ___ Step over obstacles  

Appendix A. The Checklist
12. Does the fitness trail offer variable routes which encourage personal variation on each outing?
   Yes____  No____
Appendix B. Checklist Results

<table>
<thead>
<tr>
<th></th>
<th>Asbury</th>
<th>Epworth</th>
<th>Arbor Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Trail integrated?</td>
<td>0</td>
<td>( )</td>
<td>X</td>
</tr>
<tr>
<td>2. Lead to amenity?</td>
<td>X</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>3. Stations at nodes?</td>
<td>( )</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>4. Nodes/amenities/trail?</td>
<td>0</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>- Garden plots</td>
<td>0</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>- Raised planters</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>- Picnic area</td>
<td>X</td>
<td>( )</td>
<td>X</td>
</tr>
<tr>
<td>- Water feature</td>
<td>X</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>- Game area</td>
<td>( )</td>
<td>( )</td>
<td>X</td>
</tr>
<tr>
<td>- Large gathering space</td>
<td>0</td>
<td>( )</td>
<td>X</td>
</tr>
<tr>
<td>- Small gathering space</td>
<td>0</td>
<td>( )</td>
<td>X</td>
</tr>
<tr>
<td>- Solitary space</td>
<td>X</td>
<td>( )</td>
<td>X</td>
</tr>
<tr>
<td>- Swimming pool</td>
<td>0</td>
<td>0</td>
<td>( )</td>
</tr>
<tr>
<td>- Flower gardens</td>
<td>0</td>
<td>( )</td>
<td>X</td>
</tr>
<tr>
<td>- Nature observation</td>
<td>X</td>
<td>( )</td>
<td>X</td>
</tr>
<tr>
<td>- Community green</td>
<td>( )</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Item</td>
<td>Asbury</td>
<td>Epworth</td>
<td>Arbor Acres</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>--------</td>
<td>---------</td>
<td>------------</td>
</tr>
<tr>
<td>Covered seating</td>
<td>X</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>View to activity</td>
<td>0</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Well landscaped?</td>
<td>( )</td>
<td>( )</td>
<td>X</td>
</tr>
<tr>
<td>Balance sun/shade?</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Microclimate?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind</td>
<td>0</td>
<td>X</td>
<td>( )</td>
</tr>
<tr>
<td>Shade</td>
<td>0</td>
<td>X</td>
<td>( )</td>
</tr>
<tr>
<td>Non-glare</td>
<td>X</td>
<td>X</td>
<td>( )</td>
</tr>
<tr>
<td>Seating 150'°?</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Hard surfaced?</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Width 5-8'°?</td>
<td>X</td>
<td>( )</td>
<td>X</td>
</tr>
<tr>
<td>Challenge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Side-step</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Step/ramp</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Step-over</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Variable routes</td>
<td>( )</td>
<td>0</td>
<td>( )</td>
</tr>
</tbody>
</table>

X = Yes
0 = No
( ) = Some
Appendix C. Staff Questionnaire

Facility Profile

1. Is the community a CCRC?
   Yes____  No____

2. Location
   ________________________________

3. What is the size of the community in acres?
   ____

Resident Profile

4. What is the age spread of the resident population?
   __________________

5. What is the total population of the community?
   __________________
6. Number in independent living?

7. Number in assisted living?

8. Number in nursing care?

9. What was the development program for the trail?

10. Who was the target population?

   ___Independent residents
   ___Assisted residents
   ___Nursing care residents

11. What type of fitness system is used?
12. What is the fitness station layout?
   (Ask for a site plan on which to draw it)

13. Is the trail used?
   Yes____  No____

14. How many residents use the fitness trail?

15. How many use the fitness stations?

Management Attitude

16. Does management support the fitness trail program?
   Yes____  No____
   If yes, how?
### Appendix D. Results of Staff Questionnaire

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Asbury</th>
<th>Epworth</th>
<th>Arbor Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CCRC status</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>2. Location</td>
<td>MD</td>
<td>NC</td>
<td>NC</td>
</tr>
<tr>
<td>3. Acreage</td>
<td>130</td>
<td>225</td>
<td>70</td>
</tr>
<tr>
<td>4. Age range</td>
<td>65+</td>
<td>69+</td>
<td>65+</td>
</tr>
<tr>
<td>5. Total population</td>
<td>985</td>
<td>577</td>
<td>330</td>
</tr>
<tr>
<td>6. Independent</td>
<td>500</td>
<td>188</td>
<td>253</td>
</tr>
<tr>
<td>7. Assisted</td>
<td>200</td>
<td>100</td>
<td>21</td>
</tr>
<tr>
<td>8. Nursing</td>
<td>285</td>
<td>289</td>
<td>56</td>
</tr>
<tr>
<td>9. Trail target group</td>
<td>independent</td>
<td>independent</td>
<td>independent</td>
</tr>
<tr>
<td>10. System type</td>
<td>own design</td>
<td>Fit-trail</td>
<td>Fit-trail</td>
</tr>
<tr>
<td>11. Trail used?</td>
<td>some</td>
<td>some</td>
<td>yes</td>
</tr>
<tr>
<td>12. % of use</td>
<td>10%</td>
<td>14%</td>
<td>20%</td>
</tr>
<tr>
<td>13. % who use stations?</td>
<td>1%</td>
<td>1 resident</td>
<td>1-2%</td>
</tr>
<tr>
<td>14. Management support?</td>
<td>some</td>
<td>some</td>
<td>yes</td>
</tr>
</tbody>
</table>
The vita has been removed from the scanned document