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STRUCTURED EVALUATIONS
OF ATTITUDES TO DWELLING ENVIRONMENTS:

People's Subjective Assessments of Preference
Satisfaction and Meaning, as Indicators of
Architectural Design Performance

by

Peter John Bartlett

A Thesis
Submitted to
The Faculty of Architecture and Town Planning
for the Degree of Doctor of Philosophy

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This Thesis is developed around twin topics. One aspect of the Thesis is an attempt to ascertain the extent to which structured research-techniques from the Social and Behavioural Sciences may be applied to investigations of various man-environment relationships and specifically of the contributions of Architecture in those relationships, - in this case within dwelling-environments. The other aspect of it, is an attempt to ascertain through people's subjective assessments, the preferences, satisfactions and meanings they recognise in various dwelling-environments; and then, to identify the kind and character of architectural components which prompt such recognition.

Underlying the first aspect of the Thesis was a quest for a repertoire of research procedures with which to implement and sustain the Evaluative or Performance Approach to Architectural Design, Research and Education.

Permeating the second aspect, was a quest for evidence of fundamental factors and concerns in people's experience of human settings, which could perhaps be identified as more or less common to a number of culturally or socially-identifiable groups - as it were, a general semantic-agreement, 'socially-contracted' as in other social behaviour and languages, of both the verbal and non-verbal kinds.

Following a brief introductory review of present-day widely felt concerns about recent urban-design and development, seen as an offending environment for human-consciousness, Part 1 of the Thesis develops, against a motivating prospect of urban-crisis related to resource deficiencies, a theoretical framework embracing a commitment to the evaluation of human satisfaction in the designed environment and to appraising and predicting this environment's performance in accommodating that satisfaction.
A discussion of Theoretical Commitments towards the twofold interests of the Thesis - in short, research process and research product - comprises an evaluation of survey techniques and the concepts they measure (such as 'satisfaction'), and a review of the philosophical and methodological consequences of adopting the holistic viewpoints of Phenomenology and Communication Theory in either conceptualising, researching or designing the built-environment. The Theory of Semiology is summarised as a model for the semantic theory of the architectural environment. A series of five Basic Theoretical Assumptions, is drawn from this theoretical discussion and leads to both the General Thesis - Aspect A, which, regarding research processes, anticipates the effective application of research techniques from the Social Sciences to research in Architecture; and to the General Thesis - Aspect B, which, regarding research products, looks towards the nature of environmental satisfaction in dwelling-environments by reference to the theories of Semiology and 'Social Contract', and an anticipated semantic-identity of preferred dwelling idioms.

Part 2 describes the scope of the survey research attempted and presents a discussion of the three concepts: 'Preference', 'Satisfaction' and 'Meaning'.

Part 3, the longest, presents the eight surveys in a series focused on dwelling-environments, each complete with a graphical representation and detailed discussion of results. It is early in this series of surveys that the three subordinate Hypotheses A, B and C are developed, stated and tested against subsequent survey results.

Part 4 draws up a summary of the numerous significant survey-findings about dwelling-environments, reconciles these findings with the research hypotheses, and with both aspects of the General Thesis, develops further inferences and assertions about respondent groups and about housing attitudes, and then proceeds...
to a discussion of their implications for Theory, for Architectural-Design and Planning and for Further Research.

Appendixes include explanatory notes about multivariate analysis of variance, and survey-sampling procedure, a respondent debate about Living-Room semantics, plan and photographs of the full-size simulation studio in which the Living-Room settings were produced, and an application of findings on environmental 'meaning' to the Planning concept of 'Amenities' in relation to a Planning Tribunal Hearing.
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"Any sight we see, any sound we hear, is a compound of vision or hearing and recollection. The longer we live, the more of the canvas is drawn from our memories, and it is these associated reminders of the past that give our daily experiences their emotional tone. We become conditioned very early in life to images of our surroundings as cues to a sense of safety or danger, joy or unhappiness, comfort or distress. I believe that the feeling of security associated with the settings for peaceful scenes of childhood life, unburdened by concerns about the future, retains its healing and restoring powers through the years, so long as there are still sights and sounds in our milieu that can call forth the responses to which we were conditioned long ago. But, when all cues for the release of these happier feelings are obliterated in the path of our material progress, we become strangers in our own country, unhappy and alienated in our milieu. And those who talk glibly of sentimental nostalgia, in defence of untenable positions, had better recognise that the sensations of peace and relief that may settle upon you at the crow of a rooster at dawn, or in a townscape reminiscent of your long ago, are just as real as the spittle of Pavlov's dogs. Let us therefore stop hiding the facts of life behind sloppy words like 'sentimental' and 'nostalgic', just as we have discarded the myth of delivery by stork, and let us try to turn to human advantage what we know and can learn about our emotional attachments to our surroundings".

- Albert Eide Parr,
Problems of Reason, Feeling and Habitat.
INTRODUCTION

This study arose out of two very disturbing realisations about the direction and momentum of modern urban architecture, as it confronted the 1970's, and a world of steadily mounting scepticism towards it.

For one thing, it had acquired a dubious reputation, amongst its inhabitants and others exposed to its abstract forms, its repetitious assemblages and technological scale; a reputation for oppressive banality, especially as it was being experienced in the everyday mass housing and commercial sectors of post-war urban growth.

Secondly, the modern movement, duly systematised and sterilised, had become institutionally established: while it was seldom loved, it had nevertheless become the norm in urban development of the Western World.

Eventually without a cause, without revolutionary notoriety, without needing to be nurtured with artistic or spiritual fervour, as beforehand, it lost its copyright too. Its milestone creations, its powerful international images, were bent and plagiarized into the images of expediency - professional, technological, financial, and commercial expediency. The question of how, if ever, it could be made delightful and humanly satisfying to inhabit or to identify with, for people other than its infatuated designers or proprietors, seemed unasked and unanswered.

Or again, the disloyalist question of whether, if at all, the living and working environments of urban-man should have been the subject of such arrogant, tradition-freed invention, at the scale they had been in post-war politics, planning and architecture, appeared equally to have been ignored.
Modern Architecture and Planning staked claims to socio-cultural healing-powers, pretended an aesthetic responsibleness, but in fact, knew too little of these problems, and far too little of solutions to know when and what to design about.

To identify these very issues, the remedy of Man-Environment Studies and Research evolved in numerous disciplinary quarters, hopefully, to make amends.

Within the broad field of Man-Environment Interactions, which impinge on the Design and Planning Professions, there were a number of provoking concerns, which, at the outset of this research programme already seemed to worry a large public, embarrass and challenge the modifiers and managers of the built-environment, and attract the dedication of a small but burgeoning force of social scientists, urban-designers and architects, who had begun to recognise in such concerns, the fresh interdisciplinary movement now known as Environmental Psychology (but often too, as Architectural Psychology or Urban Sociology, or Design and Building Evaluation, or Environmental Design and Research).

This Thesis drew its commitment and initial motivation from considerations of such provoking concerns as the following:

(i) The impersonal character of much post-war, large-scale, often lettable built-environment.

(ii) The dulling neutrality of that large-scale environment in neglecting its role as a facilitator of inter-personal relationships, as well as communal activities, gestures and customs.

(iii) The visual boredom and even ugliness, attributed by popular opinion, to this built-environment, especially as it is commonly met with in mass housing and commercial development.
(iv) Its technically-biased inappropriateness as a system of public experiences responsible for supporting a livable city life in a culturally defined manner.

(v) An aesthetic abstractness as an underlying cause of its impression of being unfamiliar and uncommunicative in its role as a socially-agreed, non-verbal sign and symbol system.

(vi) The pervasive doubt as to whether or not our artificial urban environment could ever again retrieve recognition as a meaningful sort of non-verbal language-system, especially during times of such growth and diversification of urban life and fabric. In other words: "In our pluralistic society, could 'Architectural Identity' ever again look to 'Social Contract' for its authentication?".

(vii) A lack of community-identity, self-sufficiency or 'wholeness' - i.e., in the broadest sense, 'health' - in typically rapid urban growth, characterised by the abandonment of richly varied land-use and building-use mixes.

(viii) A harmfully slow, feed-back from users or observers, to proprietors, owners or designers of the built-environment, for example, about novel or traditional projects, high-rise living, zoning-effects, commuting and public transport provisions.

(ix) The unfamiliarity of New Zealand Householders with alternative policies and forms of housing design, suburban land-use and subdivision, or even alternative housing finance.

(x) The concern as to where the preferences of New Zealand Householders might lie in matters of dwelling site-layout, density, planning and character, and concern also for what those preferences were based upon.
(xi) A concern for the uncertainty with which meaning or significance is attributed to components of the built-environment - indoors, outdoors, privately or publicly. In other words: "By what means and to what extent, does architecture, for example, symbolise or gesticulate meanings of which people are aware or in need, and, how do Architecture's signifying spatial and formal elements compare in their effectiveness?"

(xii) Finally, overshadowing all of the above issues, the concern for an increasing scarcity of resources - especially now, energy resources - introduces a prospect in New Zealand, as elsewhere, of 'Survival Environments'. These survival provisions are as yet unrehearsed and of themselves seem to involve prospects of great restrictions on corporate dependent behaviour, but on the other hand, perhaps greater liberties in private independent behaviour. However, it is felt that this recent order of concerns about resources, can be expected to erupt in supplement to the longer established concerns cited in paragraphs (i) to (xi) above, and hence it is not expected to supplant them or greatly reduce their urgency. Indeed, the disturbing and examinings which a rehearsing for survival bring upon us, are likely to induce confrontations and appraisals of recognised concerns, that might otherwise have persisted indefinitely if the euphoria of 'success' and 'growth' had actually seemed to become a permanent condition of city-living.

All of the above provoking concerns are clearly problems of great magnitude and durability. It took a world-war and then an undoubted generation's crusading endeavour to create them. It is unlikely that such problems will take any less time or any less upheaval to rectify. This Thesis is intended as but one effort in an inevitable mosaic of similar measures which are necessary to match these problems. Its particular focus is on those concerns which relate especially to
the Auckland dwelling environment, while its emphasis and commitment falls fairly equally upon two primary prospects: on the one hand, the prospect of finding and using methods of investigating architecturally relevant, man-environment interactions, which will contribute effectively to knowledge and theory about these interactions, and, on the other hand, the prospect of deriving useful findings and design-guidance about the local housing environment, by putting some of these research methods into practice. In other words, the objectives of the work are generally grouped under two questions: - "how to acquire knowledge of what should be designed?" - as well as, - "what contributions are made to design by such knowledge once acquired?".

The investigation and reading for this Thesis began in earnest while on study-leave in Britain, and the United States of America in 1970, and continued intensively again in France and Britain in 1975. The associated survey research and experimentation as well as their analysis and writing up, was carried out during the other intervening years while teaching at the School of Architecture, University of Auckland.
PART 1: THE THESIS
PART 1: THE THESIS

1.1 MOTIVATING PROSPECTS:

The commitment of this Thesis to a programme of investigations of our dwelling environment, arises from steadily growing concerns about the limited responsiveness of this home-accommodation to mounting challenges of urban growth and change.

To add to the long anticipated challenge of diminishing supplies of affordable urban land, adequately serviced in conformity with residual engineering standards, and to the further challenge of the increasing segregation of urban activities and their related human communities, there is now, suddenly, the challenge of the non-renewable energy-shortage. This challenge appears to be of such crisis proportions that it is likely to pervade and dominate most of the future policy and action on which urban living depends and, especially that related to the management of its built environment.

Thus, in the following discussion, in which a context for the Thesis Research and Findings is outlined, an over-riding prominence is given to this coming resource problem.
1.11 Housing In Prospective Crisis: a comment about the Context for Research and Design

Gradually I begin to feel less helpless and anxious about the coming energy crisis.

I think that as the problems of this crisis begin to shape up, countermeasures do too, and then one's sense of purpose and urgency takes over a little and brings a settling effect.

There will be hardships, no doubt, and some trying adjustments to be made. Our material well-being will be diminished.

But, on the other hand, it will be refreshing.

We will become a little more the cast-aways we were perhaps beginning to forget we were.

Resourcefulness will be at a premium, and as we uncover it I imagine we will recognise a new morale and self-respect there too.

National stocktaking and renewal is probably good for us, and well overdue. Frequently among nations, the qualifying condition for this sort of renewal is war, or revolution, famine or bankruptcy.

We may well come a lot closer yet to the last condition - bankruptcy - but, longer term, we all know we have plentiful resources, not only for ourselves but also to trade and give aid with.

Knowing this should perhaps make our efforts more patient and concerned - less divisive.

Right now in our cities the slumping pace of investment, and architectural and construction activity, is plainly hurting the
whole building industry.

The stop-down, which we have earned through our persistent private and public over-spending, is dwarfing previous troughs in the history of this "stop-go" industry.

The bitterness voiced is not confined to the 7 or 8% of the nation's labour force employed in "on-site" works, but is shared by an even greater number of workers in the building supply and furnishing industries.

Possibly 15 to 20% of New Zealand's labour force is seriously affected by the industry's crash-dive.

However, this crisis is not really the most disturbing one.

When it passes, as most believe it will, in two or three years, there before us - perhaps only another five years away - will be the energy crisis.

This contemplative opportunity we are passing through must not be wasted. It brings a chance to re-evaluate our values and resources for the sterner times to come.

How will our urban design values and built resources fare?

What will architects and planners be doing?

I believe architects and planners will be indispensable in helping to re-design our revising culture. They are uniquely equipped to help achieve this in numerous ways:

- by conserving our culture's more precious buildings and places;
- by giving form to its changing activity and behaviour settings;
- by devising more natural ways of dealing with climate and comfort;
by helping to guide its use of precious resources;
by helping to identify and shape its increasingly plural expressions of personal, social and cultural life.

In short, in surviving the energy crisis, I believe our society, of necessity, will have had recourse to widely applied architectural and urban design skills and sensitivities, in evolving a fresh order of urban life.

The campaign to lessen energy dependence and wastage by urban communities will bring with it the need for enormous adaptive efforts - as much by inhabitants, in tuning their values, their industry, and their way-of-life, as by owners, designers and managers of the built environment, in converting, improving and extending its existing fabric and services.

As Ittelson et al. (1974, p.5 et seq.) point out, in considering these vital adaptive efforts, man should be seen not as a passive product of his environment, but as a goal-directed being who acts upon his environment and who in turn is influenced by it. In changing his world, man changes himself. This could be termed the First Law of man-environment dynamics! The traditional conception of a fixed environment to which organisms must adapt or perish is replaced by the ecological view that emphasizes the organism's role in creating its own environment.

They also make quite clear that the term 'environment' embraces many points of view: how we perceive and experience it in the psychological sense; how we modify and use it to serve our needs; and finally, how we accommodate our behaviour to a constantly changing ecosystem. It might be well to look at the environment from another perspective too. This can be called 'environmental awareness'; it means, simply, that for purposes of study and investigation we perceive our interaction with the environment in terms that are quite different from anything that existed before.
Out of this environmental awareness a new set of attitudes and values is emerging. Our assessment of the environment—about space and its uses; about the social process engendered by architectural forms; about the ecological message that nature holds for us; about the effects of density; about the influence of cultural norms on our territorial sense; about the importance of urban design; and, not least, about our conceptualization of the environment as a set of identifiable meaningful places—all this presents us with a new way of thinking about man.

Indeed, it presents us with a new man, Environmental Man, whose relation to his world is uniquely different from that of his predecessors throughout history: we have had Mediaeval Man, Renaissance Man, Technological Man, and now emergent, Environmental Man.

Ittelson et al. consider that it is from this perspective that our study of the built environment and behaviour properly begins. For, if technological man is a function of his technological age, it is frequently in the negative sense of being alienated from it; alienated from its social environment and its institutions which have been structured more by technology than by the deeper and more enduring needs of humanity itself. Indeed, as Rene Dubos (1968b) pointed out, human adaptability makes it alarmingly possible for man to accommodate himself to conditions which threaten to destroy the values which are characteristically human. Without the perspective of Environmental Man we are in serious danger. The danger is not that we are unable to adjust to our technological environment, but that we may adjust far too well for our own physiological and psychological good.

But, given the foregoing perspectives of Environmental Man, I think we may feel more at home in the Ecological Age of energy crises, and may even graduate to higher technologies beyond,
with little damage to our humanity or our environment.

Because it is possible to see the birth of Environmental Man and the onset of the energy crisis as linked developments, it is also possible to see the challenge they present as requiring mutually supportive kinds of measures. The great benefits to be had from this approach to the challenge, in New Zealand or anywhere, must be fostered, not squandered in a hasty pursuit of - say - 'energy-expedients' alone.

In the service of Environmental Man in New Zealand, the younger generations of architects, the growing pool of urban designers, and the graduates yet to come, should match this challenge with a balance of skills and interests that is rare in its variety, humanism, and generality.

Among these design skills and interests one can already count:

- problem-solving and decision-making skills,
- a mushrooming understanding of how man interacts with his environment,
- an understanding of social, cultural and economic factors in society,
- a broad range of skills in the building crafts and technologies, in research, and in management,
- a breadth and penetration of vision with which to programme or synthesise designs,
- an artist's sense of aesthetics and poetry in creating places and experiences infused with gesture and symbolic meanings or associations,
- a conceptual mode of thinking, adept at interpreting past and present, but also habitually focusing upon the future.

Indeed, a reassuring range of skills to profess in the face of the approaching demands.
However, a hesitation persists:

Political skills and experience are all too rare amongst architects, perhaps less so amongst planners.

These skills are sorely enough missed now, but they will be mandatory as the crisis grows, if we are determined to realise more wholesome standards of accommodation and environmental design for all levels of the community.

The next few years of recession present us with an opportunity for growing up politically, philosophically and professionally, - but, one must also concede that they present an equal opportunity for losing many of those impressive hallmark skills referred to above, simply through a monumental lack of work and practice, unless designers move into fresh fields and explore new kinds of practice.

With that brief sizing up of challenges ahead, there follows a cautionary look at our city housing habits, in order to assess what might be held on to and what might be changed.

New Zealand's Urban Housing Habits

Because we may now see through our rear-vision mirrors roughly what it is that has earned for the pick of mankind's towns and cities their widely acclaimed popularity, it seems reasonable to look with foresight on our own prospects for joining those ranks. Choice there is - to be popularly made, not defaulted - choice of either a city dedicated to humane ways of serving and delighting the Environmental Man in all of us, or a city more and more exclusive, unapproachable, less and less
accommodating to a richly varied urban life, instead, throwing up aloof 'shrines' to urban property investment and the Lettable-Space-Game; a sort of abstraction of Community place, often made more abstract by its cubist building shapes.

However, there are difficulties.

We have for a generation failed to keep up our awareness of what makes a pleasant friendly city, let alone muster the skill to achieve it amidst the distractions of 'development progress' that business, institutional and residential growth have brought on.

This deficiency may be seen as clearly as anywhere in our suburban world. Here our free-running, faintly experimental domestic environment has, at least in its private family fascinations, temporarily deflected our loyalties from the inner city and offered alternative fulfilments - a kind of home-made occupational therapy. These fulfilments are indeed rich at the level of private and personal goals, but scant - even fictitious - at local communal level. We have thus, in numerous ways, conspired against ourselves by neglectfully allowing the image and the experience of our cities, and what they mean to us, to become an undefined by-product of regional growth - the resultant rather than the common goal of our free-spending, freeholding, highly mobile, pioneer-proud society.

We were wrong. We shouldn't have gone along so gullibly with the idea that what the easy surveys of trends in population growth, in employment, in movement, in spending, in supermarket or pub-patronage, all insinuated about urban growth (especially central area changes), was really what we all communally intended. We failed to survey and take into account the population's attitudes and opinions about suburban life and whether or not, as users, owners, or managers of our urban settings (as distinct from investors in it), we were satisfied with that surburban life.
Alternatives to continual "frontier growth" were neglected at both investment and political levels. In town, with citizenry defaulting and decentralising, the city centre lacked limelight and devotees to sustain its round variety of attractions and services. The 'concrete jungle' could proliferate in its pursuit of profit, commercial exchange and financial self-aggrandisement, without an essential regard for social exchange and enduring kinds of community satisfaction and allegiance.

Withall, I think we live in a rather empty city. It is perturbing that we see fit to consume and then under-use our suburban territory, to over-extend its costly, overspaced services and transport systems, and to condemn ourselves to the inevitable gross energy consumption that the city's dispersion, and our vehicular mobility, together bring about.

Our typical dwelling sites and residential streets are not earning their keep. Their burden of inhabitants and of activities is far too light.

A now chronic shortage of funds for public works and services must mean an abrupt clamp-down on urban sprawl from now on.

The mentality and policies that have profited by promoting "new frontier-suburb-spectaculars" like the North-western and Southern corridors of Auckland, while at the same time, shortsightedly forgetting "old inner throw-away-districts" within 3 or 4 miles of Queen Street, cannot be afforded ever again.

The frontier suburb was all far too draughtly anyway.

Quite simply, I believe, we have got to cultivate new habits of legitimately recognising the vast surpluses of private and public living capacity already present in our subdivisional patterns and street systems.
We have to become intrigued with the prospects of tinkering and improvising with it all, and skilled in taking up the slack in its density, and finding loveable homes and amenities there for the next half million urbanisers we are to receive.

In a quantitative sense this becomes a packaging problem. In a qualitative, energy-conscious, even ecological sense, the problem presents an opportunity for providing for Environmental Man, a richer more sustaining and convenient environment for living, learning and working in:

- a more complex network of everyday facilities: residential, educational, employment, shopping, servicing and recreational areas, to increase the everyday self-sufficiency of the city's natural suburban geographic localities, while still looking to the city centre for its unique services and the bigger rituals of life.

In this way we will become less vulnerable to higher costs of fuelling our journeys to work.

A prime concern of City and Regional management from now on, would seem to be the halting of both our city and suburban development banalities, and their replacement by the fullest architectural translation of our many patterns of preferences, activities and life-styles, in order to humanise the character of our cities and economise in their operation and sustenance.

Even assuming for now that this is all good policy, what resistance do we seem to face?

Mainly, I think, an attitude to suburban housing expansion that allows it a kind of sacred right-of-way. This is an attitude which is fundamental to our urban growth.
The attitude seems to be followed at two levels:

- the social level, and
- the level of institutionalised planning and financing of housing.

Together, they are self-supporting influences.

Looking, then, at some of these influences which contribute to a resistance to change from our traditional suburban pattern:

Firstly, there is the influence of the main pioneering goals like "private enterprise" and "independent family life" in a nation only 150 years old.

Secondly, one can detect the influence of the resulting narrow range of concepts and stereotypes for our town-building, especially regarding land-use, and subdivision patterns, but also as regards standards of roading, housing and commercial development. Our towns are simple. Again, as a result of these few simple stereotypes, our evolving social structures, social identities, and overall social values, have evolved in a way that reflects the simplicity of those accommodation stereotypes.

Thirdly, we have the influence of our society's markedly gradual elaboration prior to the middle of this century. This was the period during which our urban and suburban development and building strategies were politically and institutionally maturing. That period was followed, in contrast, by our society's comparatively rapid diversification since the 1950's, notably in social structure, social norms, and social permissiveness, coupled with a rather grudging admission of awareness of all this social diversification.

As well as this, these changes of the last 25 years have taken place in a period of rapid urbanisation.
Fourthly, I think there is the influence of trying to accommodate this recent urbanisation and social revision within a residual framework of highly institutionalised means of promotion and development of housing and urban growth - especially as far as district planning schemes, ordinances, and money-lending controls on design and building are concerned.

These characteristic influences in society seem to go a long way towards accounting for the urban residential context we have inherited, and continue to provide a lot of resistance to alternative diverse ways of housing people.

In the wake of this enduring policy, it is perhaps as well to note some serious problems to be found in our low-cost housing areas:

Firstly, a modal house type making up the so-called "low-cost" house production over the last two decades, which overcommits very large tracts of fringe suburban land to largely unvaried residential use.

Secondly, the dependence of this fringe low-cost housing upon the motorcar to link up with life-sustaining employment, shopping and amenity centres, is vulnerably high, in view of coming fuel costs and shortages.

Thirdly, its overprovision of both site and floor area (and maintenance problems) in the eyes of a growing number of smaller households and, more recently, households whose way of life is ill-fitted to it, makes it less sought after and hence less valuable.

Moreover, yet another problem confronting low-cost housing policy-makers is the growing predicament facing low to middle income groups - those in the ranks of "Housing-have-nots" -
in our community. Here at least two levels of action seem needed in order to overcome their housing problem:

1. revision of policy and standards in land-use planning, ordinances, and financial controls insofar as they now all act together to prohibit home ownership to the low-income groups. Both smaller sites (or portions of existing sites) at increased densities, and smaller qualifying dwelling sizes for home loans are needed.

2. the design, development and proving of a variety of denser urban and suburban dwelling types and locations for these people - to be continuously evaluated-in-use over several years, possibly to arrive at a range of supplementary new standards which appropriately match the needs of a more diverse range of occupants. In elaborating home types, densities and sites in this way, a break from finite dimensioning of building bulk-and-location in favour of a general move to Design Performance specifications seems inevitable for a satisfying better-tuned living environment.

A 'task-force' approach to these massive problems seems essential, and some of the core skills within it are undoubtedly architectural and urban design ones.

Amongst the several measures called for, one seems to stand out:

The time is surely here for a massive acting-out of that prideful Kiwi slogan: "Do-it-yourself" - for his housing's sake, now, he must.

It is perhaps time for the domestic design and building industry to turn towards large-scale supermarket-type sales of house-components to support such measures.
Indeed, the present difficulties which low-income home buyers face offer an important chance to consolidate new avenues of production like this one. Here especially, there are distinct implications for ordinance and money controls, as well as design and building strategies, which could be expected to combine traditional rigour in providing for core facilities and principal rooms, but leniency for the remaining self-help parts. In an era of reduced job opportunities the investment of owner's time and effort in self-help building and fitting out seems sound therapy.

So much for the problem area of low-cost housing, where - it seems - the energy crisis could render present difficulties insurmountable unless bold measures are adopted. But in examining these we must avoid harsh and segregating ideas - we must look after Environmental Man.

Now, to briefly look at some current pros and cons of suburban living in general.

In suburban growth, there is clearly a great deal of conformity, and for well testified reasons. Some observations by William Michelson (1970) about North American Suburbia, provide striking reflections of our own counterpart. He states:

"Many architects and other vocal intellectuals fail to understand why so many people clamour for postage-stamp-sized lots. Why don't people give up their measly scraps of land, they ask, and combine them into a piece of public open space really worth having?

The answer seems beguilingly simple: Public open space, no matter how large, does not allow activities that people value and want to perform on private open space, no matter how small."
Suburbia clearly caters for these private activities. It is the lavishness and indiscriminateness of this catering in New Zealand that is in question. Suburbia, faced with the energy crisis, seems on a whole new level of luxury.

Michelson further authenticates the suburban home by pointing out that in the suburbs, low density and separation of land-uses are related to a life style emphasizing the nuclear family. Separation from neighbours and access to the outdoors are related to child-raising. These are two distinct factors but they are jointly resolved in a common solution - the suburb.

Yet, here and now in New Zealand, a suburban environment manifestly biased towards child-rearing is about to be mocked by the fallen birth-rate. Our institutionalised, traditional manner of home-making has caught us out. We are party to a national vice that is a mis-match for our times and times to come.

Regarding suburban life-styles, Michelson shows that in North America, suburban 'Community-centred' people tend to be upper middle-class, have a home already and seek easy access to shared recreation and civic facilities, while seeking to protect themselves from unwanted encroachments from undesirable land-use and neighbours. But, 'New-House-centred' people in low-cost homes often tend to be lower middle-class, autonomous in attitude, though not in financial means, withdrawn from community and often over-committed to a 'first' home and first mortgage.

Thus, in prolonging the low-cost fringe-suburb house market, we contribute greatly to the isolation and hardship of the low-income groups. Without generous use of the motorcar these remote groups could be in a future lock-out situation.
However amongst the numerous reasons reviewed here, for suburbia's popularity, none seems more compelling (apart from politically controlled incentives), than that of its great tolerance of elaborate private activities. Michelson summarises:

"People's homes commonly involve more of their time than any other single place in the city. More activities in a man's and woman's life (and in that of their family) begin and end in the home than in any other location .... the home's distinctive provision is the separation of the person and his family from other people and other activities".

The suburban home does this job incomparably well. We have to be sure that this is in fact the job that is always wanted.

Now, I believe that in Auckland a good deal of middle-class suburban family life has self-indulged to a level where it has become marooned in a sort of 'private protectorate': its Massey's, Pakurangas, Mengeres. We have cities that have become unhinged towards privacy. We have shunned the street - the public domain - and can scarcely now blame anyone but ourselves for its incongruence and lack of hospitality or friendliness as an enclosure for convivial, comfortable, or even safe communal use. Notwithstanding an acknowledged socio-cultural backing for the suburban way of life in New Zealand, the experience of the critics of this vice must be heeded. From certain viewpoints within the family time cycle, the overall judgement of suburbia is one of a mixture of two factors: over-stressful adaptation, and boredom. This stress and boredom can be seen to result from an over-supply of one or more of privacy's four basic states: solitude, intimacy, anonymity and reserve. (Westin, 1967).

The fact that our predominantly suburban, and hence biased community continues to promote this suburban pattern does not entitle us to assume it is an optimum form. Anyway, what human basis is there for our choice of this simplistic optimum, so
unreflective of the varieties of people, families and lifestyles?

There is mounting evidence, especially amongst women, that this optimum form is often over-demanding of adaptations in family life. This is serious when it is remembered that human adaptation - even stressful adaptation - can be self-concealing, and does not automatically serve our long-term psychological health. Environmental Man will wish to be selective, not headlong, about suburbia.

Nevertheless, despite some serious reservations about it, and apart from our tendency (like the Sorcerer's Apprentice), to over-supply it, there is nothing wrong with the suburban home for a middle-class family if they have the means to manage their lives in it - energy crisis and all. Moreover, it seems clear that belief in the privacy and freedom of choice it provides in pursuing family life, will persist as its chief attractions.

But, how does our suburban housing really look in the light of this concern for privacy and freedom-of-choice?

Indoors, most home layouts offer a luxurious plenty of family and individual privacy - this by any world standard. Indeed, there is a surplus of it too in the home's connections with private outdoor space - front, back and sides.

This freedom-of-choice as to where we carry out domestic activities and how we move in and out of our homes is attained primarily by the ample siting and layout tolerances, which are achieved through our practice of subdividing land for detached dwellings so generously.

On the other hand, freedom of choice of movement between the home and the wider community is another story:
We are presented with choiceless access by the 'front' only - no 'backs', no 'mews' nor 'parkways' - via a connective street network merely devoted to grandly conveying utilitarian services such as sewers, gas and water pipes, electricity, telephone and vehicles - to household requirements.

The underlying concept of both street and service networks is a "distribution grid". Hence, there is naturally little conflict between this utilitarian infrastructure and the pattern of road formation in most conventional land subdivision. They are highly compatible and mutually justifying.

But, don't subdivisions and streets owe us more than this? 35% of Metropolitan Auckland is occupied by its dedicated street system. It is our largest urban public resource, one third of the city's surface. Public circulation and service areas within public buildings, at this ratio, would be the subject of scandal!

I consider that our streets are MONUMENTS to the banalities of circulation and services, instead of being ample, habitable and endearing places for inter-person or inter-household relationships as well.

While it is true that old 19th Century subdivisions are mostly denser and cosier than those done since, their pattern is essentially similar.

So that, whereas streets could be expected to offer (as they once did) a satisfying choice of settings for social occasions - public, communal and private - ours seldom do more than cope with utilities. And they do this simple job at a scale that is positively grandiose!

They are vacuous places - except for a handful of old narrow streets, lanes and cul-de-sacs. They dilute any communal or
public life that does occur in them. They seldom offer mystery, or charm - qualities sought and found in other public domains. Nor do they robustly form sheltered settings for either casual or thronging events. They tend to be uneventful, non-gathering places - public and banal instead of public and lively.

And to think that they were built that way, (as if to order) for the automobile era yet to come!

The wheel was - oh so thoroughly - invented; it's the street's turn now to help prevent it! The wheel must face greater friction - from the residential street. Onwards! - Environmental Man - into the crisis with home street-narrowings, not widenings.

Nowadays, our smarter homes, stand off from the street - aloof, disengaged - displays symbolically acting for us.

These displays we hope don't let us down, but often they let the street down. Homes are displayed to the street, but seldom dedicated to it. Self-indulgence takes precedence over communal contribution. Settlement seems oriented towards conspicuous materialism, rather than inter-personal relations, with a frequent result that street-spaces become dispossessed, unembraced - rarely forming outdoor communal 'living-rooms' as they can be made to do.

A new social contract is needed between the private domain of the home and the public domain of the street, as well as an experimental attitude to the question of, what today satisfies our need for belonging and our sense of neighbourhood or community?

It is true that our age of communication and mobility allows us to belong to several "communities" - working ones, social ones, recreational ones, ideological ones, etc. The phone, the car and the T.V. set have seen to that.
But, residential "community" - even with the above constituent dimensions from time to time predominant - is not accountable without its built or natural place identity.

These architectural and geographical constituents are utterly basic ones in residential environments. Moreover, we now know that, in terms of significance and meaning to people - whether they be local inhabitants or visitors - the experience of "identifiable place" is from time to time very keenly evaluated. (Lynch 1960, Jencks and Baird, 1969). In terms of social use, finding one's way, and neighbourhood identity, characterful places always matter!

Unfortunately we have, I believe, a city full of suburbs, full of streets, half-full of dwelling sites that are all mostly reflections of surveying and civil engineering influences in suburban growth. That enormous public and communal resource which is our street network is under-committed in terms of its potential contribution to our residential environments, and there can be little doubt that the energy crisis will hasten its retrieval for more pressing human occupations.

Be that as it may - street and dwelling-site potential apart - one can if one must, stand and survey our suburban scene with colonial pride - certainly a sense of material pride. We have held to our 'new-world' pioneer and welfare principles: 'castles' everywhere - a political and egalitarian triumph!

But are we a nation quite as simple and unimaginative as our suburbs now represent us to be?
The following is a summary of Observations and Suggestions arising from the foregoing comment:

1. Some planning ordinances should be eased to encourage selective increases in residential land-use, and dwelling densities especially, to promote the use of front courts for added accommodation where these courts do not already support significant landscaping or tree growth.

2. Both private sector and Government investment agencies should reform their home lending policies to promote a greater variety of housing size, age, cost and location. Current formulae promote housing which is now too ambitious for low-income families. Policies are evasive of inner-city housing formation and older house renovation. The widely standardised procedures for raising "houses and babies" has for too long been committed to predominantly new housing stock inevitably in outlying suburbs. Consolidation and renewal of older stock has been avoided. Inner residential areas have experienced a run-down, except in Freemans Bay, where a comprehensive Housing Reclamation Area was declared, with ensuing social ordeals.

3. Our thoroughly institutionalised and self-perpetuating house finance and development processes no longer match society's elaborate requirements.

4. Self-help housing should be fostered to encourage "soft" owner additions (or subtractions) and fitting-out work, based on a professionally produced "hard" core of the house. The needs of resource conservation and Environmental Man are both met in this way.
5. More intensive social use should be encouraged in residential streets which carry low to moderate traffic flows:
   - by permitting selective building up to front boundaries;
   - by establishing "great tree" planting zones for pedestrians in conjunction with reduced carriageways for vehicles.

6. A greater range of dwelling types and sizes must be developed for both ownership and rental on an equally wide range of site sizes, situations and densities. There has developed a "preoccupation gap", separating, on the one hand many adults seeking more transient accommodation, convenient for their careers, their mobility or their life-styles, and, on the other, the nuclear family intent on home-making and child-rearing. Their widely different concerns in life should be reflected in their accommodation.

7. For the Design and Planning professions, a major redress of skill applications and consulting prospects can be forecast.

   The role of local General Practitioner who would be devoted to neighbourhood planning and design, effective at local street and community committee levels, will be a vitally important one. Experience at this level in assessing community values and requirements and participating in a sensitive revision of local planning as well as the management, flat conversion, and densification of housing stock, will stand as important credentials for Local and Ad Hoc Authority politics. A prospective spin-off from our mastering of this overall consulting redress just referred to, would be our greater ability to offer aid or service to other 2nd and 3rd world communities.
8. The art of good urban design and management should be seen as essentially a retrospective art, nurturing origins, traditions, and widely accepted meanings and associations in order to convey feelings of familiarity and friendliness to both locals and visitors. Such environments in city and suburb may then become almost as lovable, familiar and delightful to inhabit as those our human natures, and indeed the nature of Environmental Man, would expect at home.

Moreover, stimulated as we are by our present economic recession and confronted even more ominously by the energy crisis ahead, it is perfectly clear that we possess a unique opportunity for realising the sort of urban renaissance suggested here; for not only does such a revised urban environment seem compatible with those crises, but it may well be the only urban environment that could wholly survive at all.

How we might begin to retrieve and modify our suburban surpluses, can be readily imagined in terms of numerous desirable 'experiences', and many alternative functions and forms; but just how preferable, satisfying, or meaningful any of these denser developments might appear to be to their potential inhabitants is not yet known. Present ignorance and unpredictability of user-response to these future prospects of suburban-infilling is holding up political resolution of them. The presence of opportunity, together with the absence of knowledge, thus provides the impetus upon which the research programme of this Thesis is based.
1.2 THE THEORETICAL FRAMEWORK

1.21 Evaluating Human Satisfaction in Design: Strategies for Performance Appraisal

It has been aptly suggested by Wools (1970) that the architect, like the cuckoo, lays his eggs in other people's nests, but then never returns to see what they hatch into. For 'Kiwi' architects the particular choice of bird and deed is especially arresting, and the comment suitably self-critical for use in examining the credentials of the Evaluative, or Performance Approach in Architectural Design.

Canter (1970a) and Markus (1972) argue more explicitly for this more responsible approach in suggesting that many architects fail to learn adequately from their professional experience because they do not systematically review either their buildings or the reactions provoked by these buildings in owners, users or passers-by. Intentions and concepts of designs should be specified in detail so that finished buildings may be examined in use and their performances assessed against those originating intentions. Repeated through a series of projects, these evaluations would provide measures of future design performances, and moreover, would gradually increase designers' understanding of the way in which Intentions, Designs, Building Results, and Human Responses are all inter-related. As a result of this steady growth in knowledge, predictive accuracy in design would grow too.

This growth in predictive accuracy about man-environment relationships would, in turn, build and strengthen the design theoretical framework which must inevitably embrace these relationships, and eventually lead to the adoption of
workable theories and principles of design capable of dealing with a fully humane and integrated array of functional and symbolic requirements for buildings.

The crucial issue in the whole of the foregoing prospect is the one of comprehending the relationship between people's interactions with their built-environment and that built-environment itself. The theoretical possibilities of this issue of relationship have been amply explored by Canter (1970a), but the salient idea to be agreed upon in exploring this sort of relationship is that of the importance of measuring human response to built environment. The ways in which this response can be sought will be discussed in Parts 2 and 3 of this dissertation. That it must be sought is a basic premise of the Thesis; since, while the performance approach requires a statement of performance in terms of function in a fully comprehensive sense, and since buildings serve people, this comprehensive functional basis is necessarily defined by attributes which satisfy human requirements and prompt human response. (The expiring 'biological' and 'mechanical' analogies in which the 'functionalism' of the Modern Movement was rooted, offer no comparable basis for a fully integrated theory of function taking systematic account of the interaction between the built environment and its users' behaviour and attitudes).

No matter how preoccupations with the performance strategy may vary with time and strategist, its philosophy, in essence, is rooted in the quest for the satisfaction of human inhabitants. Thus for Wright (1971), the performance approach firstly identifies human requirements and the functional attributes necessary to satisfy them. Secondly, it undertakes to convert the attributes into criteria, provisions or specifications that can be followed by a designer, builder, or manufacturer. Thirdly, it establishes procedures for measuring and evaluating against those criteria, a material, a component, a system or an entire building.
However, at this uncontentious level of generality, the whole performance package may look like another fair target for Summerson (1949) - yet another claim staked out for Modern Architecture, another beautiful belief-system giving us prescriptions for great architecture but with the stuff itself so seldom to be seen. But while such tonic doubting is appropriate for the vigilance it encourages, the reason for greater confidence in a performance strategy for the immediate future, as typified in Wright's broad view, lies in the theoretical and operational strengths which the new discipline has gained, mainly at the hands of research centres like the Building Performance Research Unit, (B.P.R.U.), University of Strathclyde.

1.22 Performance Objectives

From direct experience of the Building Performance Research Unit's research activities, from its reported field work (1972) and numerous papers on the theory and methodology of performance measurement and appraisal, and from the Unit's dialogues with other similar research centres in the U.K. and U.S.A., it is possible to summarise some of the main objectives underlying the Evaluative or Performance Approach:

1. To make available to designers an increasing supply of increasingly reliable performance data to aid decision-making in design, so that results of this decision-making may be predicted more accurately, and so that a better choice of alternative solutions may be made.

2. To confirm the central evaluative role of performance assessment in the process of generating designs. In this regard, it is assumed that performance measurement and appraisal is applicable to any representation or embodiment of a design. This may range from the most
abstract such as a drawing, diagram or model to the most concrete such as a finished building, and from the most general to the most specific, i.e. appraisal may focus on design models of varying elaboration or, on completed buildings in use, but, wherever its focus lies, its results are crucially important in making design judgements.

3. To reveal how inconsequential must be the outcome of continuing to design without expressed objectives and fruitful hypotheses, and as a corollary, to stress the importance of identifying and stating criteria, constraints, limits, values, goals and priorities as much for the designer in designing as for the appraiser in spelling out the evaluative yardsticks he employs in his appraisals.

4. To underline the importance of stating or finding the relationships which bind the several components of a man-environment system, and again, the relationships between all these components and their costs. The components of this system are, on the one hand the building, its contents, and the environment these provide, and on the other, the activities of the building occupants and the goals of the organisation to which they belong.

5. To draw attention to the development and use of testable models or simulations which permit performance assessment within the design process, and to encourage a more overt reporting of design intentions by designers so that their completed buildings may become testable real-world phenomena.

6. To encourage the perfection of optimisation techniques whereby a 'best' solution is derived from alternatives checked against chosen criteria and constraints. Such
techniques involve sub-optimisation of part-solutions using relevant perhaps different criteria according to the salient functions of each part; and overall optimisation of the whole solution using the single criterion of cost-benefit, i.e., the 'best' allocation of resources for the 'best' benefits.

7. To provide concrete evidence - to verify our tentative theoretical attitudes about design - that man-environment systems are interactive and compounded of both stable and dynamic parts. As proposed by Hillier (1970), this requires a bringing to light of the components which are reasonably stable over time and those which are dynamic and open-ended, and further, in the case of the system's dynamic aspect, a clarifying as to whether it tends towards homeostasis-like a human body does in relation to its immediate surroundings - or whether it develops and constantly evolves new forms and new dimensions of itself as in biological evolution. In the likely event of the system being a mixture of all three conditions - stable, homeostatic and developmental, then we may look to performance appraisal to learn in what respects it is each of these.

8. To evolve in the long-term, qualitative and quantitative norms for environmental performance; performance specifications which reconcile the following five issues:

(i) kinds of human activity and behaviour,

(ii) individual differences and levels of experiencing one's environment,

(iii) specific physiological and psychological attributes of the environment appropriate to both of these issues (i) and (ii),

(iv) specific architectural environments which accommodate, embody or enhance all three issues (i), (ii) and (iii), and lastly,

(v) available resources to act with.
9. By concerning itself primarily with performance provisions, i.e. results rather than means, the performance approach aims to foster innovation in the technology of building.

10. Lastly, by suitable team-work in interdisciplinary research, to expand the body of knowledge among social scientists and designers about man's experience of the built environment and its influences on his behaviour.

If it is reasonable to conclude from the foregoing examination of Performance Objectives, that the broad performance goal consists of the matching of either artifact or environment to human behaviour and attitudes - and to do so by providing for the prevailing variety of human goals, motivations, requirements and individual perceptions and attitudes, all in agreeable measure - then, the complexity of that goal needs no emphasising and the importance can be seen of considering the various functional levels which may be examined in seeking that performance goal in all its aspects.

1.23 Kinds of Performance

A discussion of the various kinds of environmental performance is dependent on identifying the respective functional attributes which require the performance. Vital to the development of useful theoretical tools in the performance approach will be a systematic attention to the differences among human motivations and personalities, to the several levels of functional requirement to be dealt with in designing comprehensive built environments, and, of course, to the performances these entail. The study of these differences should in turn lead, ideally, to the identification of, on the one hand, classifications of
functions and performances, and on the other, classifications of persons motivations and responses. The reliability and utility of such theoretical knowledge and tools will depend, primarily upon their success in predicting differences in environmental response and performance, but also upon their sensitivity to a variety of other influential factors: social, cultural and political. Winkel, Malek and Thirol, (1969) have testified to this challenge.

However, merely to be aware of the desirability of classifying functional levels, performances, people, motivations and responses, is merely to understand the 'interdisciplinary' challenge. Before this challenge can be met, indeed before the first two classifications of functions and performances can be achieved, a commencement must be made, (if indeed it is feasible) with the last three, viz. the classifications of persons, motivations and responses. Here social-psychology has more than one mind. While Behaviourist opinion, represented by Studer (1970) in considering human motivation, tends to reject the notion of 'human needs', preferring instead the concept of 'units (or bits) of behaviour', Canter (1970a) adheres cautiously to an enriched version of this "needs" notion. He insists that if buildings are to be designed to enable people to deal more fully with their world, a more accurate classification of human needs and motivations must be obtained. He regards the psychological literature as inconclusive on the matter, but clearly favours a motivational theory which

"...assumes that individuals always develop both because of, and in spite of, interaction with the world around them. Some psychologists describe this in terms of a gradual flowering of the inner essence of the individual; others see it as a refinement of the mechanisms of human behaviour owing to the nature of adapting and learning processes."
But the result is the same whether the individual is the instigator of his development or is propelled by external forces. As he interacts with people and things, and as his more essential psychological needs are met, he becomes motivated by subtler, less dominating forces."

Canter further explores the typology of human motivation and response by quoting Blai (1964) who states:

"The chief principle of organisation in human motivational life is the arrangement of needs in a hierarchy of lesser and greater priority or potency, and, under conditions of equal deprivation, the more potent needs are more urgent and insistent than the others. The chief dynamic principle animating this hierarchical organisation is the emergence of less potent needs, upon the gratification of more potent ones; and until the more potent ones are relatively satisfied, the others do not emerge as consistent motivators of behaviour. The individual is dominated and his behaviour arranged only by unsatisfied needs. If hunger is satisfied it becomes unimportant in the current dynamics of the individual."

Such a hierarchy of basic needs, drawn mainly from clinical studies and observations has been described by Maslow (1962), and ranks as follows:

1. physiological needs
2. safety
3. belonging
4. respect
5. information
6. understanding
7. beauty

8. self-actualisation

Furthermore, among various identifiable groups of users it should theoretically be possible for social science to identify various 'profiles of deprivation' on several bases: e.g. cultural, social, economic, racial, religious, occupational, educational, etc., and varying also with personality, age and sex. Moreover, such profiles of deprivation would also vary over time. To illustrate this typological concept, Blai's limited study in comparing occupational groups, shows that the less potent needs of 'self-actualisation', 'advancement', 'interesting duties' and 'leadership', were all ranked higher in the professions than in the trades. Conversely, the more potent needs of 'respect', 'job-security', 'congeniality' and 'independence' were selected in greater amounts by lower socio-economic groups.

With good firm data describing fully these need and motivation profiles, we could seriously begin to draw conclusions about functional emphases and performance goals which would generate performance concepts and settings appropriate to specific accommodation needs. Canter considers that the design process we have evolved from professional lore is currently bogged down with an overload of implicit assumptions about human behaviour and that the worst effect of these assumptions is to limit the architect's creative freedom by imposing unnecessary complications on his creative efforts - an overload that the performance approach would rectify.

A process of design based on a need hierarchy such as Maslow's could inject greater pertinence into design efforts, and viewed in relation to the various prospective deprivation profiles discussed above, fears of any possible rigidity
which the 'hierarchy-of-needs' might seem to imply can be ignored. For example, Canter suggests that there is no implication in the list that architects should not consider satisfying the need for beauty before they have helped to satisfy, say, the need for belonging. Rather, they should realise that in any building where many kinds of activity are being carried out, there will be people at different points in the hierarchy and hence, that they will be dominated by needs according to their particular hierarchical level.

The richness of this approach feels right, but presents problems as most refinements do. The diagnostic intricacies which are entailed appear to overtax present research and design resources, so meanwhile one has no alternative but to continue employing coarser analyses while computer-aids and even a new professional consultancy of environmental psychology, are being hatched (with cuckoo's help).

Under these coarser analyses of need and function - what could be termed the 'manual approach' - groupings of needs, functions and performances commonly tend to be generated around key classifying adjectives like 'physiological', 'psycho-physical', and 'socio-psychological'. Thus, for analytical and problem-solving purposes only, a task is examined in this simple three-part manner with cost-effectiveness either dealt with in each part or outside in a fourth economic part. As a result, the pursuit of performance breaks, manageably if somewhat artificially, into a search for various different measures of performance capable of matching:

(i) physiological needs and functions roughly providing for objective standards of safety, protection, stability, durability and objective physical fit;

(ii) psycho-physical needs and functions providing for subjective human requirements of comfort, well-being, health, alertness and task-effectiveness, and,
(iii) socio-psychological needs and functions providing for subjective, emotive and symbolic requirements of experience-enhancement, social significance, cultural meaning, and aesthetic stimulus.

This three-part frame of reference closely follows an analysis of performance categories by Handler (1970) and is probably related to the much earlier orientation model of Parsons, (1951). Canter (1969b) appears to have adopted the same trinity in usefully postulating that the interaction of buildings with people may be analysed as a compound of the three mechanisms of:

(i) inhibitor/facilitator,
(ii) filter,
(iii) stimulus.

However, as the discussion of function/behaviour classifications revealed, the real world situation is a great deal more complicated than such three-part frameworks - in their oversimplicity, - would have us believe. While they are analytically valid, readily actionable, and fruitful as conceptual or descriptive models, they fall somewhat short of operational ideals for predicting performance. As Markus (1967) cautions, ultimately for these purposes, predictive and decision models reflecting all of the previously outlined, rich intricacies of reality are necessary.
1.24 The Appraisal of Performance

If we could imagine 'Architecture', infatuated, hoisting a banner to 'Performance', it might read something like this:

"Performance Appraisal is to Architecture as Comprehension is to Meaningful Language".

But to understand the relationship implied - not to mention the enthusiasm expressed - requires a closer look at what appraisal involves.

Summarised earlier, was an extended derivation of the Building Performance Research Unit's summary of objectives and appraisal activities; the four main appraisal concerns being:

(i) identification of design intentions, including any programme of functional requirements,

(ii) finding relationships between the components of a man-environment system,

(iii) building testable models in order to represent this system in a way which allows any of the design variables to be varied and the consequences measured, and,

(iv) decision making or Optimisation on the basis of the alternative part solutions or whole solutions which may be judged valid. (Markus, 1967)

Activities (i), (iii) and (iv) are concerned with mainly objective factual surveying and simulation techniques. The second appraisal activity, that focused on the man-environment system's component relationships is the one wherein, the greatest difficulties lie regarding both theory and method. This is where the 'interdisciplinarians'
(certainly not cuckoos) breed and hatch, where man and his built environment together with all the disciplines, sensitivities, values, arts, crafts and technologies that link them both, must come to terms - as best they can.

Apprehending the nature of these interface relationships is a rugged conceptual exercise in itself. It is mainly being resolved among anthropologists, sociologists, geographers, ergonomists and psychologists together with a growing body of architects, and planners.

A broad conceptual model of the whole interactive man-environment system was postulated by the B.P.R.U. to test hypotheses, integrate research efforts and to structure their appraisal activities upon. (Markus, 1967)

The model has four main parts:

1. The building system, consisting of all the sub-systems, assemblies and components of which a building is constructed. There are three main sub-systems: constructional, services and contents.

2. The environment - both spatial and physical - generated by the building system and the activity of the occupants. The two-aspect notion here of the environment being only spatial and physical, is a limited one.

3. The activity and behaviour of the occupants which is affected by, and itself affects the environment. Sub-systems within this part include identification, work-flow, communication, informal activity and control. The absorption of Maslow's hierarchy of needs into this part of the model requires considerable elaboration of these sub-systems.
4. The objectives of the organisation to which the occupants belong, and which has decided to build or modify its accommodation. Its four sub-systems, from Organisation Theory, are production, adaptability, morale and stability.

Finally, each of the model's four parts is separately interpreted as a Cost System, namely the cost of provision of the building system, the cost of maintaining the environmental system, the cost of sustaining the activity system, and the value of achieving the organisational objectives.

This model relates faithfully and straight-forwardly, all the more tangible elements of the man-environment interactive system and its sub-systems. It neglects in this instance but can obviously be extended to embrace exterior environments relevant to say urban design. In leaving out, perhaps for later inclusion, some less easily measured and quantified elements such as 'perceptual and cognitive behaviour' in the Activity/Behaviour Sub-system and the 'psychological or semantic environment' in the Environmental Sub-system; this eminently robust model indirectly draws attention to two key areas which have only lately been developed with any theoretical coherence.

The first of these key areas, that of perceptual behaviour, involves an understanding of the nature of building users' perceptual behaviour - its focuses, intensities, constancies and frequencies within various cultural systems, in various situations and settings and according to individual differences and degrees of familiarity with the environment or object.

The second key area, that of establishing the nature of users' psychological environments involves an understanding of the way participant users translate a physical environment, through
their perceptual behaviour in experiencing it, into a subjective psychological environment reflecting their own personality, attitudes, values and judgements.

This participant-centred or subjective view of the environment now joins the more established objective approach which has long supported research findings in the environmental technologies concerned say, with human comfort.

Proshansky, Ittelson and Rivlin (1970b) identify these two basic theoretical approaches by modern psychology to the environment thus:

(a) The physical/objective approach as the one which fragments the physical environment into discrete quantifiable stimuli whose specific functional relationship to behaviour and experience have been sought, e.g. experimental psycho-physics and behaviourism. This is the approach which treats users as scientifically observable objects.

(b) The phenomenological approach as the one whose essence is a concern for the significance of meaning, understanding, and other cognitive processes as influences on behaviour, i.e. seeing the environment not as it is but as it is experienced.

This is the approach which treats users as participants involved in subjective experiences.

"Behaviour springs not from the objective properties of the stimulus world 'out there', but from that world transformed into an 'inner world' or 'psychological environment' by an inherently cognizing organism".
Both approaches are regarded as necessary for a full understanding of the environmental situation, and the major task in any attempt to conceptualise the human environment is seen to include the relationship between the person's physical world and the world he 'constructs' from it, as well as between that 'construct' and his behaviour and experience.

Other important groundwork concerning man-environment relationships has been done by Proshansky, Ittelson and Rivlin (1970b). They propose thirteen basic assumptions covering the influence of the physical environment on behaviour. These present together a comprehensive transactional view of man-environment relationships together with a low-keyed role for 'architectural influence'.

The important confirmations of their assumptions are that:

(i) Man and Environment are part of a Total System, and
(ii) the components of this Total Environment form an Interactive System.

Four of the assumptions will serve to typify this and to reveal leading inferences for the management of the built environment:

"The environment is an active and continuing process whose participating components define, and are defined by the nature of the interrelationships between them at a given moment and over time".

Again, reflecting the above assumption and further emphasising the environments relativity and flux:

"The environment is unique at any given time and place".
In accounting for subjective experience of the environment as a phenomenon, Proshansky et al. consider that:

"Seen from the point of view of the participant in the environmental process, his surroundings typically represent a 'Neutral' world which enters into awareness only when deviations from some adaptation level are encountered". And:

"Although the participant remains largely unaware of his surroundings even when viewed from his vantage point in the environmental process, these surroundings continue to exert considerable influence on his behaviour".

These last two assumptions are the more encouraging ones for architects looking for a point of entry into environmental psychology. They invite us to consider the conditions under which a participant's focus is brought to bear, from time to time, on more or less concrete entities or 'constructs' in the environment such as 'architecture', and its attributes. Accepting this sort of invitation faces us squarely with the central issues of perception and judgement itself.

Marr and Knapper (1968) hypothesise that the perception of environment resembles the perception of people and events. They appear to sustain this hypothesis convincingly but without choosing to differentiate greatly between perception of the environment and that of objects. Their work is primarily concerned with experiences in proving the validity of the Semantic Differential technique of measuring people's subjective judgements about people and events. It is a key work supporting the application of the same technique by Canter (1967), to the objective measurement of people's subjective responses to rooms and buildings, which for architects is of the utmost operational interest.
In Warr and Knapper's assumptions and provisos about judgement, they distinguish usefully between perception, conception, attitude and judgement. They see 'perception' as largely excluding raw sensuous experience - that comprising random, mainly unrecognised sense impressions (sensations) - but rather, made up of mentally understood sensations whose cause the mind attributes to the environment concerned. Moreover, they hold that perception occurs only in the presence of stimulus objects or environment.

On the other hand, they regard 'conception' as able to be sustained in the absence of related stimulus objects. While resembling 'attitude' in being coloured by values held by the individual and actions engaged in, 'conception' appears to be linked with more concrete objects than 'attitude' which is considered to pertain more to ideas, principles and events.

In seeking subjective responses by users of environment we are eliciting their judgements. 'Judgement', in Warr and Knapper's view, may be regarded as the general measuring activity which combines all three of the above aspects of behaviour - 'perception', 'conception' and 'attitude' - in variable ratios. Judgement has itself three further basic components:

(i) The Attributive Component accounting for sensed physical descriptive properties.

(ii) The Expectancy Component accounting for inferred unsensed descriptive properties and qualitative characteristics.

(iii) The Affective Component accounting for direct emotional impact experienced.
It is of interest again to note the similarity between these three basic components and the three basic orientations: 'cognitive', 'evaluative' and 'cathetic', in the Orientation Model of Talcot Parsons which Norberg-Schulz embraces in his 'Intentions in Architecture' (1965).

Two further striking contributions to the subject of environment perception must be mentioned.

Thiel (1964) in analysing environmental experience, postulates an 'Experience Cube' which allows any given experiences to be depicted in terms of:-

(i) the age of the person involved,
(ii) his familiarity with the experience, and
(iii) the degree of abstraction involved in the perceiving.

The most fruitful idea involved here is the one behind the 'familiarity' dimension of the cube. Thiel states:

"The 'Tourist' and the 'Habitue', physically occupying the same space and time, experientially live in radically different worlds. The 'Tourist', by definition operates in an unfamiliar world where physical and psychological survival is continually at stake. He must literally watch where he puts his foot: and if he is in a place where the culture is foreign to his own, he must in addition watch his figurative foot. The 'Habitue', on the other hand, exists in an inner world in which the sensory signals from the environment may sink to mostly unfocused background noise, or may be tuned out altogether, while he ruminates on the nuances of his personal routine affairs, or wrestles internally with abstracted pre-occupations".
With this idea of bi-polar modes of environmental experience, Thiel offers a telling gauge of both the relative receptivity of users within any given situation, and accordingly, of the relevance of any designed stimulus content - e.g. architecture - in that situation.

Finally, on the subject of perception of the environment, and complimentary to the observation; and assumptions put forward by Proshansky, Ittelson and Rivlin, on the influence of the physical environment on behaviour, the views of Ittelson (1970, 1973, 1974) must be considered. He breaks fresh ground by clearly distinguishing between Object Perception and Environment Perception. The four exclusive characteristics which for Ittelson, distinguish environments are:

(i) their surrounding quality,
(ii) their multi-modal sense property,
(iii) the presence of peripheral stimulation, and
(iv) the presence of too much information which is simultaneously redundant, inadequate and contradictory, characteristics which environments necessarily display and which objects cannot or usually do not possess.

To these four characteristics dealing roughly with stimulus properties, Ittelson adds three others to do with the process of apprehending the environment:

(i) the role of action and purpose as defined, delimited and called forth by the environment,
(ii) the presence of meanings and motivational messages carried by the environment, and,
(iii) the concept of ambiance related to the aesthetic, social and systematic qualities of the environment.
In all, Ittelson has achieved a thoroughly convincing characterisation of the environment, and gives some attention to the various differences in users' exploratory perceptual strategies vis a vis these characteristics. He observes that all people, regardless of individual differences, seem to organise their overall perceptual response to the environment around five identifiable component levels of response. These are:

- affective response,
- orientation response,
- categorisation response,
- systematisation response, and
- manipulation response.

Now, the latter three levels of response comprise translation of the environment at large, by exploratory strategies - of which we have seen there is still much to learn - into 'clue objects' for the purpose of making confident judgements and seeking goals. This process may be seen as a tendency to 'correct' the disconcerting character of the environment back into conceptually more familiar objects. This idea would seem to fit into Ittelson's more general remarks that:

"The way we view the environment is thus in a very general sense, a function of what we do in it, including what strategies we use in exploring and conceptualising it. And what we do in it represents in turn a choice from many alternatives, the nature and scope of which are progressively restricted by previous, frequently irreversible decisions. It is not unreasonable to say that the environment is experienced the way it is because we have chosen to see it that way. The environment is in this sense an artifact created in our own image".
And one is tempted to ask whether, in creating such 'artifacts', the experiencer, whether consciously or not, has at certain levels of response, in large measure displaced 'environment perception' by 'object perception' as a simplifying perception strategy. Such perceiver activity depends upon his prevailing relationship with the environment and hence on the mechanisms of his interaction with it.

1.25 Kinds of Interaction Between Buildings and Occupants

Developments in Communication Theory provide useful concepts for the structuring of interaction processes which link buildings and occupants, provided always that these structurings are regarded as flexible and subject to strategic motivations inherent in human perception. Models of this communication theory origin are discussed at length by Warr and Knapper (1968), Dalton (1969) and Canter (1969b).

Canter in examining building/user relationships as a communications concept, suggests three fairly independent 'mechanisms' of interaction to clarify architectural theory building.

He sees buildings

- firstly, as Filtering Mechanisms,
- secondly, as Facilitating and inhibiting mechanisms, and
- thirdly, as Stimuli in their own right.

He points out that the Filtering Mechanism is familiar in the environmental technologies where it has been a useful, if mechanistic way of dealing with comfort and services-systems in buildings. It tends to be a rather simple view of the building, guarding occupants from nasty stimuli like noise and bad weather, and admitting good ones like sunshine and
fresh air. But, generally, it is only when critically extreme and noxious conditions are met with, that users will become aware of this filtering mechanism. In most situations they are able to adapt without becoming conscious of it.

The concept of the Facilitating/Inhibiting Mechanism is based on the need for buildings to gesture as well as to help, hinder, separate and combine in required ratios, the movement of people and their activities. This mechanism is fundamental to planning, circulation and spatial design decisions and, for example, underlies policy on the shape, fixity or moveability of space enclosing and dividing elements of the building fabric.

The third mechanism, the building as a Stimulus in its own right, is the least clearly defined, the most provocative but most exclusively 'architectural' of the three. This mechanism is based on the fact that the building itself presents stimuli to those who use it and become aware of it. By 'stimulus' is meant 'stimulus information' or, that of which participants are aware in experiencing the stimulus objects and stimulus environment. It is accepted that one of the functions of a building is to present information, as well as to offer more general satisfaction in presenting a series of stimuli which confirm the identity and experience of that building. Canter correctly sees this function as the one for which the architect, on behalf of others, is uniquely responsible; as opposed to the other functions for which the architect draws on the help of other disciplines. Canter further regards the understanding of this mechanism as essential to the development of an understanding of the psychological implications of buildings. It is this mechanism which substantiates the 'Psychological Environment'.
If we accept this 'communication'-of-information-and-meaning-from-the-building as architecturally crucial, there can be little doubt that an important property of a good building must be its perceived 'meaning' and hence, largely, its perceived 'satisfaction'.

In summary, this discussion of the Theoretical Framework of the Thesis has examined in general outline, the supporting concepts and theory of the Performance Approach, looked at the various kinds of performance, at the perception of the environment and the expectations of performance from it if it is to cope and interact in a responsive way with man and his behaviour. The mechanisms of man-environment interaction have been examined, and the need has been confirmed, for the attention of architects and psychologists to be directed to the role of buildings as conveyors of architectural meaning, in order to achieve functional balance both in performance specification and completed building environments. Strategies and techniques from architectural psychology which are needed in seeking people's subjective assessments of preference, satisfaction and meaning as these relate to the built-environment, are outlined and discussed in Parts 2 and 3 of this Thesis.

It is firmly believed that the theoretical position presented in the foregoing review, balanced as it must be across the man-environment interface, has revealed the makings of a more authentic interpretation of the interaction occurring between man, his experienced psychological environment, and the physical environment itself. Such a model, when developed in predictive form could deal with the entire functional role of built environment for human purposes - not just with parts of that role, as 'functionalist' and other traditional models hitherto have done.
Furthermore, it is perhaps possible to see ourselves in the '80's at the end of a long makeshift period of development in 'humanist' architecture, when the claims that are staked for it may at last be seen to be within reach, and where the theory-building which explains its authentic functional roles is maturing to the point where we may begin to talk of architecture as a discipline as well as an art and craft.
1.3 THEORETICAL ASSUMPTIONS AND THE GENERAL THESIS

Before considering the theoretical basis of the research undertaken, it should be explained that this Thesis intends two broad outcomes by following two broad approaches. As outcomes, it seeks conclusions about useful research techniques for making Structured Evaluations of architectural designs or buildings-in-use, as well as conclusions specifically about Dwelling Environments, reached by applying those Structured Evaluations to these environments.

As approaches to these outcomes, it involves the investigation and use of various evaluative survey and analysis techniques from the Social Sciences and Statistics, as well as the uses of those techniques in the field or laboratory for finding out people's Assessments of Dwelling Environments in terms of Preference, Satisfaction and Meaning, which, in terms of the Performance Approach, are seen as prime Indicators of Architectural Design Performance.

This loose duality of interest concerning process and product is treated in the Thesis as Aspects A and B, and brings with it under Aspect B a treatment of the General Topic of this research - namely the Dwelling Environment - which, while necessarily limited in its scope of investigation of housing concerns, does take up the challenge of many of those concerns identified in the Introduction, especially as they relate to policies for denser housing development.

However, since under Aspect A, an important emphasis in the work is placed upon evaluative techniques applicable in the Design Professions, neither the significance, nor even the representativeness of the Dwelling Environments under investigation, are necessarily considered to be paramount.
In fact, the importance of these architectural entities is no greater than that of the evaluative techniques being investigated and applied.

The residential building types and designs being investigated, together with their architectural elements or aspects, are primarily the vehicles of study. Yet, at the same time it is hoped that the way they, themselves are illuminated by the results of the research, may provide a strong accompanying line of interest about the prospects for dwelling design in Auckland.

Thus, in this research, both Aspects A and B - process and product - are both means and ends.

1.31 Theoretical Commitments: The General Thesis - Aspect A

In dealing with both the research process and the research product introduced above, commitments are held towards the Evaluative or Performance Approach to Design discussed in Section 1.2. Two of these theoretical commitments are of prime importance. One, as outlined in Section 1.24, is towards the Phenomenological viewpoint of Man-Environment Transactions with its subject-centred interpretation of the world. The other commitment, outlined in Section 1.25, is towards the inclusion of concepts from 'Communication Theory' in the theory of design and management of the built-environment, which is then regarded as a 'communicative system' able to be understood by participants in it.
Acceptance of these two commitments towards the internalised processes of participants' perception and cognition of the environment, leads the researcher directly to the practice of acquiring knowledge of man's subjective experiences of his life-places and as far as possible resolving these into objective, recognisable images which reflect his accumulated existential likeness or identity, and, in addition, his imaginative visions.

Acceptance of the pursuit of this kind of knowledge on an urban scale, in turn leads directly into the quest for the objective measurement of subjective psychological assessments of human feelings and responses towards habitable settings. Such structured techniques of research and evaluation are to be found mainly amongst the resources of Psychology, and have been described in the literature on the methodology of Architectural or Environmental Psychology by Canter (1967, 1968c, 1969a, 1969b, 1969c, 1970b, 1971, 1974, 1975), by Hershberger (1968, 1970, 1972), by Ittelson, Proshansky, Rivlin and Winkel (1974), by Bechtel (1975), by Lynch (1960), and with notable initiative by Osgood, Suci and Tannenbaum (1957).

In discarding the highly credited techniques of first-hand observation, interview and long-term assimilation already successfully practised in the field-work of Social Anthropology, it was recognised that some comprehension of the richer detail of phenomenological reality would be sacrificed, especially in regard to human consciousness and cultural definition. The reasons for this initial bias are twofold:

Firstly, the rate of acquisition of information by these methods was considered too slow;

secondly, the geographical limits of any study location were expected to be too small for ready generalisation of findings;
thirdly, the necessary intensity and duration of the assimilation procedure was thought to be too time-consuming; and hence inappropriate to the scope of concerns and of research tasks contemplated.

fourthly, it was uncertain that such unstructured research methods would lend themselves adequately to the desired intensive evaluation of the designed and built components of the man-environment settings under study.

By contrast, the literature cited above provided ample evidence that at least two techniques from Psychology in particular, offered comparatively swift and widely-sampling means of carrying out Psychological Appraisals of subjective responses to human settings. One of these techniques, the Repertory Grid for the evaluation of human constructs, was developed from the work of psychologist Kelly (1955), and applied by Bannister and Mair, and Canter (1970b). The technique, which requires subjects to self-determine a series of 'constructs' or descriptive aspects of a given environment, and then to rank against these constructs, a series of typical examples of the environment being studied, was tried out in a pilot survey of Student Housing preferences early in this research programme. It was found to provide much more elaborate and subtle findings than did normal preference ranking questionnaires, and offered richer interpretation. But, because of its demanding complexity and length (some nine alternative environmental options were required to be rank-ordered on twelve 'constructs'), it proved to be too exhausting for respondents and too slow to administer in this particular research programme, and was dropped in favour of using the Semantic Differential technique. This second technique is probably the only method from Psychology for measuring and
Objectifying subjective responses to concepts such as architectural environments or their elements, while at the same time allowing the investigation of 'Meaning' and 'Satisfaction' in relation to both the attitudes and values of respondents, and the objective characteristics of the physical setting they are asked to judge.

In this regard, it is considered that the investigation of 'Meaning' and 'Satisfaction' is a strategic commitment of the research, arising from the earlier stated theoretical stance towards the two related viewpoints: 'Phenomenology' and 'Communication Theory'. The concepts of 'Meaning' and 'Satisfaction' are discussed more fully under Section 2.4. 'Satisfaction' especially, is here considered to be a concept of great importance in its capacity to subsume 'Preference' and represent criteria relating to 'goal-constructs' or 'ideals' which are both disclosed and undisclosed in any assessment.

Accordingly, it is Basic Assumption Number 1 of this Thesis that the concept 'Satisfaction' represents a basic measure of 'Worth' and permits the assessment of concepts more comprehensively, more nearly absolutely than does the concept 'Preference'.

Adapted from its applications in the work of Osgood et al. (1957), the Semantic Differential has had wide and prolific application in Environmental Psychology. This attitude-scaling technique is discussed more fully in the later Sections 2.4 and 3.83.

It is Basic Assumption Number 2 of this Thesis that, irrespective of any known or unknown disadvantages inherent in the use of the Semantic Differential technique, it possesses such rare advantages for investigating the Semantic environment as to make it an irresistible research technique.
Coupled in a more preparatory role with this powerful technique, are a handful of probing and opinion gathering processes which may be employed to measure people's basic preferences. These processes may involve interviewing, observation-of-behaviour, or questionnaires intended to elicit rank-orderings of preference for simple arrays of concepts. They typically bring to light basic priorities and preferences, often for the signposting of more intensive investigation either by attitude-scaling or in-depth interviewing. However where the more elaborate forms of preference questionnaire are designed to acquire data on respondents' demographic characteristics, they may be used to do interpretative statistical tests of associations between those respondent or group characteristics and their recorded concept-preferences. A fuller discussion of both the advantages and the disadvantages of this class of research technique together with a related statistical check, is given in Sections 2.2 and 2.3.

From the assortment of applicable structured techniques introduced in the foregoing discussion of research processes, it is considered that there exists a sufficient repertoire to effectively investigate the dwelling environment as proposed.

Accordingly it is possible to generalise further than in the above primary basic assumptions concerning 'Satisfaction' and the key attitude-scaling technique known as the Semantic Differential, and to posit The General Thesis - Aspect A, that:

**Evaluative Techniques from the Social Sciences**

(a) **Offer means of extending and deepening our knowledge and interpretation of man-environment interrelationships, that are swifter, more thorough, and more faithful to human aspirations, than the traditional means used by the design professions or building agencies, and hence,**
(b) FACILITATE BETTER, MORE COMPREHENSIVE CONCEPTS AND PREDICTIONS IN THE DESIGN OF THE BUILT-ENVIRONMENT.

The numerous outcomes of proposing this Aspect of the General Thesis are discussed theoretically and strategically in Part 2 of the work, and in turn, lead to a series of eight research surveys described and discussed in the major portion of the work, Part 3. A reconciliation between the survey findings and this General Thesis - Aspect A, is offered in Part 4.

1.32 Theoretical Commitments: The General Thesis - Aspect B

As revealed in the discussion of Evaluative or Performance Strategies for Architectural Research - in Section 1.2 and notably in Section 1.25 - the theoretical commitments arising from both the Phenomenological and Communication Theory viewpoints, induce in any study of Dwelling Environments, an overwhelming concern for those man-environment interactions which are perceived, thought and felt about by individuals; that is the interactive 'mechanism' accounted for by Canter as the one which links the participant with his environment by its 'Stimulus Information' content. Attention here is focused upon the connotative or allusive or affective evidence of the environment's capacity to function, to endure, to protect, to accommodate social occasions, to provide an aesthetically pleasing milieu and to offer both gestured and symbolised meanings. It is, in this way, taken as something
to be read and evaluated. From the foregoing observations, Basic Assumption Number 3 can be stated; namely that: the concern of this Thesis should not be for quantitative matters such as building-construction, the technologies of environmental control and services, or matters of utilitarian function. Rather, the concern should be for the qualitative matters outlined above: the 'psychological environment'.

The literature of Architectural and Environmental Psychology contains a predominant body of findings related to the theoretical stance defined by the above assumption.

The philosophical science which links this literature is Semiology (or Semiotics) - literally the Theory of Signs - postulated amongst its originators like Barthes (1964), as the fundamental science of human communication. Thus the great relevance of an understanding and application of Semiology in Architecture lies in its central importance in the study of the 'Meaning' of the built-environment. The case for such an application of Semiology has been argued along with Barthes, by such 'structuralist' anthropologists as Saussure and Levi-Strauss. Its tentative interpretation as a theory of purpose and experience in the design of the built-environment, has been vividly proposed, rejected and debated by Jencks, Baird, Choay, Broadbent, Bunham, Pawley, Van Eyck and Norberg-Schulz, among others, in their combined writings (Jencks and Baird, 1969).

The subject of Semiology is complex, and as yet somewhat contentious in its detailed terminology and mechanisms. A full discussion of it is not intended in this work. However, a brief summary of the way it impinges on Architectural Theory is here outlined:
The Semiological approach to the environment, requires that the elements of a setting - either human or non-human - be considered as Information Vehicles, which, to varying extents, dependent on their information content and the expectancies with which a participant recognises them, may be assumed to communicate information.

The vehicles or elements which may communicate information are generally taken to consist of either Signals, Signs or Symbols. These three media are recognised as forming a notional hierarchy in which Signals hold the lowest rank in terms of information content, and Symbols hold the highest. This order also holds for both the relative independence and abstractness of each concept: Signals having the lowest independence and abstractness, and Symbols the highest.

A central issue in turning to the manner in which such information vehicles are interpreted, is the dual concept of 'Signifier/Signified'. Jencks (1969) describes the Signifier as a representation of an idea or thought which is Signified. He suggests that in verbal language, the sound would be the Signifier and its idea the Signified; whereas in Architecture, the form would be the Signifier and its content the Signified. He calls this double identity 'double articulation'.

Jencks summarises two basic ways by which an information vehicle achieves meaning: both through 'Context and Metaphor', i.e. both by its relation to all other information in a context, and through its association or similarity with the other vehicles of information for which it has become a metaphor.

A final and crucial assertion by Barthes and other French proponents in the Semiology movement, is pointed out by Jencks in saying that all the signs, or information vehicles, in a society, taken together constitute the 'Langue' or 'Language' and is a total resource. Each selection from this totality,
each individual act, is the 'Parole' or 'Statement'. Thus the 'language' is collective and not easily modifiable, whereas the 'statement' is individual and malleable.

It is from this last precept about Semiology that Broadbent (1969) and Baird (1969) develop the compelling concept of 'Social Contract' as the guiding principle which firmly prevails over the use and abuse of culturally defined languages - allegedly as firmly for non-verbal languages, like the built-environment, as for written and spoken ones. The vital power of this concept of 'Social Contract' derives from the essential fact in Semiology that, the Interpreter of the information conveyed in any communication experience must be capable of recognising information vehicles and differentiating between them. In other words, Information is always relative to the Interpreter.

In the light of this assertion about 'continuity' in language development, the stark futility can be appreciated of either attempting to devise or modify a culturally agreed 'Language System', or to invent underived, and unrecognisable 'statements' within it. It is therefore Basic Assumption Number 4 of this Thesis that: the communicative value of the built-environment - and hence its perceivable 'meaning' and 'satisfaction' to any community, varies directly in proportion to its legibility and common assimilation as a non-verbal language.

As to findings from the literature which support and are supported by the Semiological Model, a growing body of work may be referred to, and especially those mentioned below, for their relevance to this investigation of Dwelling Environments. The theoretical viewpoints which these findings support, are assumed valid for the purpose of developing this General Thesis - Aspect B.
Evidence of an apparently predominant awareness and concern for 'Dwelling Character' and various meanings thereby communicated is provided by Middleton (1967) who found support for the hypothesis that

"choice of home is based on the capacity of that home to sustain self-respect, within the limits of the family's minimum convenience, and of its budget, and in extreme cases, outside these limits".

This predisposition to maintain self-respect inclines the householder to expect and manage a display role on the part of his dwelling which is seen as capable of signifying or symbolising to others, his own preferred role and image. Joiner (1971a and 1971b) has testified to similar tendencies in occupants' arrangement of office territories and in settings for public rituals. Niculescu (1975) found limited evidence that

"dwelling environments are perceived as 'meaning' the people who live in them, and that people choose dwelling environments, other things being equal, according to their concept of the kind of people they are".

Pawley (1969) argues a strong case for the home as both an encloser and exposor of the 'private realm', insisting on the encouragement of a tangible existential place, providing rich evidence of a family's values, life-history, and ambitions - all a sympathetic extension of the profound and pioneering theories of Albert Eide Parr (1969).

There is convincing evidence and reasoning for the primarily communicative role expected of the home, in the findings of the above four researchers. It is solidly based on such earlier theorists as Goffman (1959) who showed, through his theories of role-play, and - of greatest relevance to Architecture - his
symbolic-interactionist theory, that the role of the home and its settings is to symbolically act out a desired representation of its owner on his behalf, and often, in his absence. It is a widely recognised truism that an Englishman's home is his castle, moreover Lord Raglan (1964) has traced its origins to the primitive temple, while Michelson (1970) has explained the home in terms of the sanctuary-needs and concepts which permeate family life and its attitudes towards others and the outside world. Lastly Rapoport (1968, 1969) has been widely influential in putting forward his thesis that traditional and vernacular dwelling environments, far from being visibly influenced by functional or local climatic and resource factors, are largely determined by culturally-defined norms of spatial arrangement and symbolic meaning.

Thus, for this Thesis, it is proposed on the basis of the foregoing evidence from studies made in New Zealand, North America, Britain and the Third World, that Basic Assumption Number 5 should be that, in defining dwelling needs and dwelling character, the criteria of judgement exercised by Householders are likely to be dominated by the tendency to express and communicate household and dwelling identity, rather than to provide utilitarian fit in the most practical and economical manner.

This assumption was a major underlying factor in the devising of all of the Surveys except the first. It was particularly crucial to Surveys II and IV dealing with Dwelling Preference and to Surveys II/2 and VIII dealing with Meaning and Satisfaction in Dwelling Environments.

Other theoretical assumptions about Satisfaction and Meaning were purposely construed while considering the surveys of satisfaction and meaning and are briefly summarised in Section 4.32. They are in the form of subordinate hypotheses related
to the Primary Assumptions of this Thesis - Aspect B, but were not testable by the surveys undertaken.

On the basis of the three preceding Basic Assumptions - Numbers 3, 4 and 5 together with their supporting theory of Communications and Semiology, it is again possible to generalise further and to posit the General Thesis - Aspect B that:

IF THE PRINCIPLE OF 'SOCIAL CONTRACT' IS PERTINENT TO THE SIGNIFICANCES OF THE BUILT-ENVIRONMENT, AND HENCE, IF THE THEORY OF SEMIOLOGY THEN HOLDS FOR THE PHENOMENON 'ARCHITECTURE', AS IT IS ASSUMED TO DO FOR OTHER SOCIALLY-CONTRACTED LANGUAGES, THEN, EVIDENCE SHOULD BE OBTAINABLE OF INHABITANTS' TENDENCIES TO SEEK DWELLING-ENVIRONMENTS WHICH EXPRESS MAINLY TRADITIONALLY-EVOLVED AND UNDERSTOOD IMAGES, VALUES, SATISFACTIONS AND MEANINGS, RATHER THAN ENVIRONMENTS WHICH EXPRESS MAINLY NOVEL OR UNFAMILIAR ONES.

Again, the various outcomes of proposing this second Aspect of the General Thesis are evident in many of the Surveys described in Part 3, especially in Surveys II, III, IV, VI, II/2 and VIII. These surveys, in turn introduce three hypotheses subordinate to the General Thesis - Aspect B and are explained as they arise. In addition to these hypotheses A, B, and C, a series of eight general predictive correlations, closely related to this General Thesis, is posited in Section 3.81. Finally, a reconciliation between the various survey findings and this General Thesis - Aspect B, is offered in Part 4.
1.33 Research Intentions

The foregoing five Theoretical Assumptions, the two-aspect General Thesis which arises from them, and the Strategies discussed in the earlier Theoretical Framework together form the bases and guiding interests of the survey research programme which follows.

However it is the twelve provoking concerns which are briefly outlined in the Introduction to this Thesis, partly expanded upon in the discussion of Motivating Prospects which have provided the chief impetus to this research programme. Of those twelve concerns cited, three of them: numbers (vii), (viii) and (xii) are briefly dealt with in Part 1 in a theoretical manner, while the nine other concerns: numbers (i), (ii), (iii), (iv), (v), (vi), (ix), (x) and (xi), are all influential to varying degrees in setting the character and course of each survey investigation and thus are subjected in discussions of results, to some measure of empirical examination.
PART 2 : THE SCOPE OF THE RESEARCH
2.1 LIMITING FACTORS

In confronting an issue as extensive and as ambivalent as Housing and in beginning to draw out lines of fruitful enquiry, early decisions were needed, both about ends and about means. Research objectives became prescribed by the capacity and the array of research methods which could be implemented. These methods were themselves independently confirmed according to whether they constituted an effective and applicable range of instruments of a structured, evaluative kind. In turn, these methods were ranked and given emphasis by their apparent relevance to primary research objectives.

Closely interlinked with these strategic reconciliings was the tactical issue of whose judgements were to be sought in amassing significant evaluations of domestic environments?

An inevitable sample would be a random one of Auckland metropolitan households. This would not be representative of other New Zealand populations but, given the size, growth rate, stage of development and cosmopolitan nature of Auckland, findings from it would be perhaps usefully prognostic for the futures of several other urban communities. Because this prospectively elaborate and conveniently available Auckland domestic sample could not be expected to be representative in terms of geographic region, age group and perhaps life-style, other sample populations were considered necessary.

One of these further populations to be enlisted was the purely rural one of the New Zealand-wide farming community representing the country's non-urban regions.

The other population sought was the student community attending Auckland University. It was assumed that samples of this student population would introduce a number of additional levels of representation.

Firstly, representation of the opinions and attitudes of young, articulate, self-conscious adults which were not expected to be revealed in suburban household surveys.
Secondly, representation of a generation whose discernments could be related with some confidence to their intellectual capacities as students.

Thirdly, representation of opinions and attitudes which would generally be those of a large proportion of the community's future professional, political, technological and managerial populace, - a sort of pulse group - all potentially influential in the general formation and management of our urban life and environment.

A fourth incentive for surveying student opinions and attitudes was the longer-term prospect of a future gauging of their opinion and attitude shifts through later stages of their life-cycle and thus, by retrospective plotting of trends, enabling predictive models to be developed which would be useful to housing policy makers.

But the greatest advantage in surveying the student population was that of their availability at each progressive stage of the research programme.

Moreover their judgements at different course stages could be analysed for expected effects due to the accumulations of those cultivating and conditioning influences inherent in their University education.

The outcome of these early resolutions about sample populations was the decision to carry out a sequence of preliminary objective-probing and instrument-proving surveys involving solely student group samples.

At the same time, it was decided to employ initially simple survey instruments, easily administered and capable of quickly revealing the broad outlines of student opinion and choice related to housing.

These initial surveys therefore restricted the respondent's judgements to simple rank ordering of preference, some YES-NO responses, and a fairly full recording of demographic data.
2.2 MEASURING PREFERENCE

In wishing to know a democratic community's assessment of the way it is housed, it is clearly desirable to learn, inter alia, its preferences from amongst a choice of significant and widely recognised housing stereotypes. Depending upon a respondent's characteristics, values and goals, some of these widely recognised housing stereotypes will be perceived as familiar and experienced, while others may merely represent or symbolise future, as yet unexperienced accommodations and life-styles to which the goal-seeking respondent aspires. The concept of human goal-seeking adopted in Section 1.21 is important here.

A consequence of assuming that the behaviour and responses of a respondent are goal-seeking (as well as experience-conditioned) is that his preferences are decided from an available selection of items present, by reference to an array of goals and criteria which his perception and cognition - transacting with the items for selection - recognise as crucial to the judgements before him. Thus, while preferences are revealed, the goals and criteria remain unknown to the researcher unless follow-up studies are done to discover them.

Another important constraint prevails in preference ranking surveys. Choice is limited:

Firstly, by the need to confine the range of alternatives offered to those that are widely recognisable by the sample population who are to rank them, and

Secondly, by respondents' limiting capacity for sorting a given choice of alternatives under survey conditions, into a rank order of preference which feels convincing.

This limitation on choice in preference surveys clearly disciplines the researcher. His precious range of items under survey - here the independent variables - must categorically represent all of the major families of issues which may be implicated by any of his motivating hypotheses or research objectives. At best, even with a valid, representative range
of items, a sample population's response is confined to those issues presented for ranking. Issues which the researcher is unaware of, or unimpressed by, but which may be of some importance to a respondent, remain unmeasured. Canter (1975, pp.168-72) has stressed these and other reservations. The finiteness of the choice offered by the researcher must always limit the horizons of discovery. Consequently his good judgement of the relevance and inclusiveness of surveyed issues is paramount.

On the other hand, from the point of view of a respondent this very finiteness of choice is a factor which tends to simplify and focus his judgement in ranking his preferences. Thus the inherent restriction of his assessment task is conducive to a reliable and full response to the issues involved in the task.

Concerning the data obtained from surveys of preference, an important disadvantage and an important advantage, usually associated with the method, together tend to relegate the data to the level of preliminary findings.

The disadvantage contributing to this relegateing effect on the data is that of its lack of explanatory content. A "snapshot" of current opinion is extracted by the preference survey. Neither the durability of that opinion nor the reasonings or feelings underlying it can be known without further research involving retests, interviewing, or more intensive forms of attitude survey. Without such further research, interpretation of the data is restricted and hence also its predictive and theory-building value.

On the other hand, the advantage contributing to the relegateing effect on the data is that of its comparatively swift availability. Given that any preference survey embodies a usefully wide and relevant set of issues, then its data can be of great value in revealing, even if grossly, the significant preferences of the day as well as likely lines of enquiry to be taken up in future research. If the survey extends to a large population sample and if demographic information is obtained in conjunction with preferences, then statistical tests of association can reveal significant correlations between expressed preferences and respondent or group characteristics.
Together these advantages contribute to the preference survey's importance as an early signposting and later re-testing instrument in the general research armoury.

Accordingly, a sequence of preference surveys was undertaken aimed at revealing a broad span of data relevant to housing layout, design and identity. Initially, sample populations of students at Auckland University were the respondents in these preliminary preference surveys. Later, a sample population of Auckland households would be matched with the students, in order to test the Hypothesis A:

THAT STUDENT HOUSING REQUIREMENTS FOR NEW ZEALAND URBAN UNIVERSITIES CAN BE MET SATISFACTORILY BY THE LOW TO MEDIUM-RENTAL DWELLING FORMS AND ARRANGEMENTS OF MEDIUM-DENSITY, INNER-SUBURBAN HOUSING, ESSENTIALLY SIMILAR TO THOSE PREFERRED BY THE POPULATION AT LARGE.

The sequence of preliminary preference surveys undertaken was:-

I. **Modes of Student Accommodation**, in which the preferences of Auckland full-time students for various existing and proposed life-styles, degrees of independence of housing, and density of housing were surveyed and described.

II. **Existing Student Housing Preferences**, in which the preferences of two distinct groups of Auckland full-time students for the interior and exterior character of houses and flats occupied by students at the time, were surveyed, described and compared. This survey also involved attitude scaling techniques which in a subsequent stage of analysis, provided preliminary findings about respondent judgements of satisfaction and meanings.

III. **Existing Auckland Residential Streets**, in which the preferences of Auckland University Hostel Students from a variety of regional domeciles, for a typical selection of Auckland suburban streets, were surveyed and described.
IV. Proposed Medium-density Housing Layout, Housing Identity and Interior Design, in which the preference of two Auckland sample populations for an extensive range of housing layout and design variables were surveyed, described and correlated with the respondents' demographic characteristics. The first population surveyed was Auckland Full-Time Students, the second was Auckland Suburban Households.

V. The Use and Design of Outside Spaces in which the preferences of a random population sample of Auckland Suburban Households, for various kinds of domestic outdoor activity areas, were investigated and compared with existing patterns.

Four surveys of the above sequence of five, - Surveys I, III, IV and V, - involved preference rank orderings of a choice of living or housing alternatives. Of these, Surveys I, III and V were relatively simple in their content and administration, whereas Survey IV was, by contrast, complex, and intended as a major investigation in the field research, especially for the extensive data it was to furnish.

One survey of the sequence of five - Survey II - involved rating a selection of student housing alternatives on bi-polar adjectival scales. Preferences were obtained by calculating and ranking the mean response scores on individual scales and across all scales. These preference rankings from bi-polar scales formed Stage 1 of Survey II. The later Stage 2 of this survey, discussed further in Section 2.4, and identified as Survey II/2, was the more dominant part of that survey, involving, through its attitude scaling, respondent judgements of satisfaction and meaning perceived in the housing alternatives represented. While the limited findings about student housing obtained from both Survey II and Survey II/2 were expected to contribute to the testing of Hypothesis A, the principal interest lay in the methodological experience of devising and administering a relatively complex survey of two distinct groups of students who were required to respond to a sequence of colour slide representations of aspects of Student Housing, by rating them on a set of seven-point bi-polar scales.
2.3 TESTING FOR CORRELATIONSHIPS

Of the five preference surveys I, II, III, IV and V outlined in Section 2.2, the major one was Survey IV.

Survey IV incorporated two elaborations not common to the other surveys.

Firstly, it was administered not only to an Auckland student sample population, but also to a random sample of Auckland Suburban Households. A comparative analysis of the two sets of responses was expected to provide data with which to test Hypothesis A, as well as to reveal any general differences in assessment of Medium-Density Housing by the two groups - the one as yet uncommitted to Suburban living, the other already invested in it.

Secondly, Survey IV was elaborated by supplementary statistical tests of association. The Null Hypothesis and Chi-squared tests were applied to contingency tables in the data printouts to establish the occurrence and significance of correlations between the respondents' expressed preferences for the numerous housing design variables and a series of respondent characteristics recorded through the demographic section of the survey questionnaire. These correlations were expected to permit a more refined testing of Hypothesis A, as well as to confirm or refute a number of sub-hypotheses linking Housing preference with respondent classifications.

This second elaboration of Survey IV, to investigate correlations, is a profitable adjunct to the basic findings about preference. In any larger, heterogeneous, random sample of respondents, there should occur normal distributions of numerous respondent characteristics. To the extent to which these characteristics are defined by and recorded in the survey process, they may be analysed for the census type of information they contribute. But more importantly, such data allows the recorded raw aggregate preference rankings to be qualified and interpreted according to as many classes of respondent characteristics as were pre-determined in the demographic section of the survey. An
examination of the distribution of preference across these classes of respondents can reveal their positive or negative bias in the rankings of the variables. This process, classified as Inferential Theoretic Explanatory Comparison, is used to compare the actual observed distributions of preference with distributions which theoretically would have been expected under a Null Hypothesis. The statistical test which compares these observed and expected distributions and which, by reference to the table of degrees of freedom, tests the statistical significance of the derived comparisons, is known as the Chi-squared test. See, for example, Toyne and Newby (1971).

The benefits achieved by this examination of the distribution of preference rest mainly with its ability to qualify the aggregate rankings of preference with a more detailed and meaningful explanation of how biased various classes of the respondent population were in their preferences. Furthermore, depending upon the classes of respondent information obtained, trends may be broadly interpreted, and elementary predictive knowledge about respondents gained from the survey findings.

In expecting to reconcile the findings from Survey IV with Hypothesis A, the analysis of preference bias gained from the Chi-squared tests promised to be of crucial assistance.
2.4 SATISFACTION AND MEANING

To amplify the surveyed findings from the foregoing survey research, studies and surveys of Satisfaction and Meaning were carried out. Thus, as a second phase programme, Surveys VI, II/2 and VIII were planned to measure respondents' subjective feelings and responses towards aspects of housing design in terms of the satisfactions and meanings these aspects mediated.

Survey II/2 developed as Stage 2 of Survey II. Survey VI evolved as an exercise in administering phase 2 instruments, and, Survey VII grew into a major experimental series derived from findings in Survey IV.

2.41 MEASURING SATISFACTION

A disadvantage of surveying Preference is its inability to establish the ranking of any of the alternatives offered in relation to either the best possible or the worst possible case or, indeed, in relation to the ideal case. Preference surveying basically places a limited choice of alternatives in rank order - no more. By contrast, the surveying of Satisfaction overcomes these Preference Survey deficiencies. It requires the recording by respondents of their assessments of the alternatives offered against a selection of measuring scales which allow each alternative to be rated scale by scale, according to where it is judged to lie on each of the scales. The scales are normally bi-polar, adjectival ones divided into seven equal rating spaces. These scales define various descriptions of the alternative objects or environments being surveyed. The descriptions are made by means of pairs of adjectives, each of opposite meaning to the other, placed at the two extremities of a scale. Alternative Concepts being judged are then rated by respondents on these bi-polar scales with the extremities implying the 'most satisfactory' etc., and 'least satisfactory' etc., and the other five scaled positions affording graded shades of meaning lying between the extremities. Furthermore, either by incorporating a hypothetical 'Ideal' construct in the alternatives offered, or, by including an
'Ideal-------Non-Ideal' scale in the selection of measuring scales, a succinct profile of respondents' assessments of the relative 'idealness' of all the alternative constructs offered can be obtained. Such scale measures can also reveal distinctions between the meanings of the scales being judged, as well as between any of those scales and the 'Ideal-------Non-Ideal' scale.

These evaluative scale techniques are derived through more than a decade of adaptation in the research fields of Environmental and Architectural Psychology, from the Semantic Differential technique developed by Charles Osgood et.al. (1957). Researchers who have contributed their adaptations of it since are Kasmar (1970), Canter (1967 and 1971), Wools and Canter (1970), Hershberger (1970), Bechtel (1975), Sanoff (1974) and the Building Performance Research Unit (1972). The latter (B.P.R.U.), in its published research findings about building performance, presents the most complete summary as yet of the issues and philosophical justifications involved in the concept 'satisfaction', together with a description of its application and use in seeking design and building evaluations by users. Thus, much in accord with the B.P.R.U. (1972) and Canter (1974) it is held that a central characteristic of human satisfaction is the subject's goal-orientatedness. A subject's assessment of his satisfaction with any given situation - including any man-environment interaction, is basically a measure of the relationship he judges that situation to bear to any relevant goals, criteria, or ideals by which he is motivated and of which he is aware. Consistently in their assessments of satisfaction, as in all evaluations, people invoke these goals, criteria and ideals, but seldom do they reveal them to others. In single-purpose consumer goods marketing, for example, ignorance of such consumer standards could seriously hamper attempts at consumer satisfaction. However in designing and providing the multi-purpose built environment, the need to manage limited resources in order to provide for a synthesis of optimal satisfactions across the many variables of a man-environment system prevents the absolute attainment of goals, criteria or ideal states.
These ideal states are pursued, related to, approached but never quite matched. Accordingly, these conditions of ultimate satisfaction may be approximately insinuated, but can never actually achieve material identity or recognition, despite their origins in shared socio-cultural experiences and expectations. Nevertheless their influence is highly pervasive in people's evaluations of designs and buildings. If their influence is unstable this is because ultimate satisfaction and its supporting goals, criteria and ideals, are very largely culturally defined and hence, in modern Western societies, are unstable too.

In any case, this pervasive influence of the conditions of ultimate satisfaction, - if not its substance - can be recorded, measured and analysed by means of repeated satisfaction scalings, and hence its material identity, however unstable, may be able to be foreshadowed by insinuation after all. This prospect of somewhat elusive and elastic conditions of ultimate satisfaction presents problems to the would-be-absolutist who may be seeking measures of absolute satisfaction in which the poles and the units of the measuring scale hold finite constant values. But the philosophical viewpoint underlying the assumptions about respondents and survey methods in this thesis is one embracing the school of Existential Phenomenology and Transactionalist Psychology. As such it is tolerant of the indeterminacy, instability or relativity of any knowledge about environmental satisfaction appraised by the use of bi-polar adjectival scaling methods.

2.42 MEASURING MEANING

Other primary uses of these bi-polar adjectival scales require attention.

Apart from indirect measures of preference which they make available (as noted in the discussion of Survey II in Section 2.2), their unique and most widely upheld contribution lies in the study of 'Meaning' as Osgood's original naming of the technique - 'Semantic Differential' - implies.
It is the sole instrument available from psychology for the objective measurement of subjective attitudes, satisfactions or meanings. This undoubtedly accounts for its recent intensive use and adaptation in Environmental Psychology research - including these surveys - even in the face of criticisms about its abuse.

The Semantic Differential technique was first applied to this research programme in 1972, when Survey II was conducted, to examine Student Housing preferences and to explore the use of this scaling technique. During the following two years and while supervising Venter (1974), the technique was examined and tested through a sequence of exploratory experimentations using interior and exterior environments. The interior studies were conducted in the specially built full-size room simulator at the Architecture Laboratory of the School of Architecture, University of Auckland. This simulator was systematically developed so that by 1976 when Survey VIII on Living-room Designs was carried out, a comparatively sophisticated level of Simulation and Semantic Differential response measurement, as well as audio/video recording of settings in it, was being achieved.

Following on from the commitment this Thesis bears to Meaning, and to Semiotics, as discussed in Section 1, the need to measure meaning and hence to employ its sole measuring instrument - the Semantic Differential - was inevitable.

In developing the Semantic Differential, Osgood, Suci and Tannenbaum have attempted to devise an instrument which objectively measures subjective judgements of meaning. While acknowledging the many meanings of 'meaning' (Ogden and Richards, 1923), it is still possible to recognise in the basic mechanism of the Semantic Differential, a neutrality to the various shades of meaning. However, in practice, the selection of adjectival scales used by experimenters has tended to presume a prior concern for the connotative meaning of either the persons (Osgood 1957), the events (Warr and Knapper 1968) or the environments (Canter 1967, Wools and Canter 1970, Hershberger 1972) being studied. Except
for the scales developed by Kasnar (1970) and Sanoff (1974),
the denotative shades of meaning have been ignored in these
semantic studies. If one accepts the Semiotic model for the
comprehension of environmental meaning, then it is clear that
the communicated meaning of any part of that environment is
not restricted to its objective physical identity or denotation,
but includes meanings that may be symbolised, inferred, associated
with, or connotated by it, through a long-term culturally and
personally defined process. Thus it seems appropriate that
experimenters have shown a preoccupation with adjectival
scales which measure mainly the quality and connotation of
the environments they have investigated. This part of the research
programme concerned with Meaning in Architecture is strongly
biased in this direction. A broader investigation and measurement
of the full range of environmental meanings identified by Hershberger
(1974) is clearly warranted but is not undertaken here.

An appreciable body of work by Canter (1967, 1969b, c & d), Canter
and Wools (1970) and Canter and Thorn (1972) is based on the
Semantic Differential aimed at assessing what architecture and
urban environments mean to people. From early studies of the
large vocabulary of adjectives used by the British in talking
about buildings, their interest moved to analysis of the underlying
factors or 'dimensions' of meaning this vocabulary contained.
Their concept of 'dimensions' in the meaning of words, stems from
the fact that language has a great deal of redundancy built into
it - especially in the case of descriptive adjectives, many of which
are synonymous. Once rated repeatedly, by many respondents in making
judgements with semantic differential questionnaires composed of
them, these adjectives can be factor-analysed into clusters in such
a way that all the words in any one cluster tend to be synonymous
as used by the respondents. These clusters or 'dimensions' are
named after the adjective with the strongest relationship with the
others in the cluster. Thus each dimension can be held to be a
principal concern to that population in its thoughts and feelings
on whatever was judged.
When the dimensions isolated in six studies of various types of accommodation conducted by the B.P.R.U. were compared (Canter 1967), a pattern emerged. Four main dimensions were isolated whose size and relative importance showed some measure of consistency - even following cross-cultural checks with them. These four main dimensions were termed 'Pleasantness', 'Comfort', 'Friendliness', and 'Coherence'. (These dimensions concerning accommodation, show no significant resemblance to Osgood's dimensions concerning people, viz. 'Evaluation', 'Potency' and 'Activity'). From their studies the B.P.R.U. were able to draw three tentative conclusions:

(i) There are likely to be some dimensions common to all people, buildings and modes of concept representation. Two of these are likely to be 'Pleasantness' and 'Friendliness'.

(ii) Each building type is likely to generate some dimensions which are unique to it, or to building types similar to it. Examples of these could be 'Comfort' in schools and 'Privacy' in offices.

(iii) Differences in attitude between individuals and between ethnic groups are likely to be revealed in the relative emphasis placed on the different key dimensions rather than on their presence or absence.

While these diverse experimentations by Canter and the B.P.R.U. were first exploratory efforts, their tentative findings about key semantic dimensions were sufficiently encouraging to adopt them in this research for inclusion in the semantic differential instruments for the surveys of satisfaction and meaning.

These key dimensional adjectives were supplemented in Survey VIII's questionnaire by others from Kasmar's 'Lexicon of Environmental Descriptors' and by still others, subjectively determined by the writer, specifically for the planned experiments.
Thus, in these surveys all of the semantic differential questionnaires are composed of a priori adjectival scales. Since none of the surveys were directed at the more linguistic interests of identifying basic environmental vocabularies or identifying specific 'dimensions' of population response, this procedure was considered satisfactory.

Rather, the surveys were oriented towards a more architectural matter - that of relating these already emerging 'dimensions' of respondent concern and building meaning, to tangible elements or characteristics of designed or completed buildings, i.e. to the architectural correlates of these 'dimensions'. It was hoped to discover for example: 'Precisely what makes a 'friendly' setting or a 'pleasant' house?'

As a result of this sort of appraisal procedure, the satisfaction and the meaning of both the architectural components and the architectural totality of a particular environment can be identified as to their effectiveness and the significant ones identified for attention in future design work.

For the present, the Semantic Differential continues to be a widely used measuring instrument in the field of Architectural and Environmental Psychology and, indeed, Bruvold (1973) believes that the application of such an "attitude scale" to the built environment has more validity than when applied to judgements of people and their behaviour. While it is clearly an instrument of great potency, it nevertheless can cause distortions like all structured instruments - it pre-determines a finite range of judgemental scales, and hence, the issues and concerns against which the concepts being surveyed, must be examined. Provided the research design achieves an appropriateness of selected scales to the concepts being surveyed and to the population who are to respond, serious distortions may be avoided. Moreover, the technique affords gains in the body of knowledge about human response to the built environment, which are spectacular in relation to the ignorance which has hitherto prevailed.
Amidst the many researchers who have adopted the Semantic Differential technique, the cautionings of Bechtel (1975) and Lowenthal (1972) are to be heeded, but no doubt the most effective antidotes to any immoderate use of the technique, are alternative, less structured measures, like objective behavioural observation and especially, open-ended-interviews-in-depth.

By way of exemplifying the feasible application of findings about 'dimensions' of meaning, which have been identified by means of the Semantic Differential, Appendix 5 is included. Appendix 5 is a Statement by the writer for a Planning Tribunal Hearing in the matter of the Town and Country Planning Act 1953 and Amendments. It refers to the Nauranga Park Redevelopment, Wellington and is an interpretation therein of the Town Planning concept of 'Amenities' and its three component attributes of 'Pleasantness', 'Harmony' and 'Coherence'. 
PART 3 : THE SURVEYS
3.1 SURVEY I: MODES OF STUDENT ACCOMMODATION

3.1.1 Objectives of Survey I

This was an extensive but preliminary survey of current and preferred accommodation modes of Auckland University students in 1971. From the information gathered through this survey, hypothesis A and its sub-hypotheses relating student housing to housing in general, were developed. This information about student housing was keenly sought by local and national Students' Associations and the University Authorities in order to better define their intentions and policies regarding the provision of student accommodation for New Zealand's urban Universities.

Such accommodation had become increasingly scarce to students as well as to other low-income groups, partly through the steady growth of student and migrant populations and partly because of a depletion in low-rental inner-suburb housing stock which accompanied motorway construction and a commercial development boom. Whereas the demand for accommodation in traditional Halls of Residence remained only steady, the total demand for student accommodation and especially for that in flats and older houses, had never been so great. The student accommodation services were firmly convinced of this trend in student demand and of its economic advantages.

The primary objective of this preliminary Survey I was thus simply to define, in detail, the relative strengths of preference for the main categories of student dwelling accommodation and ancillary amenities together with details of preferred life-style, household group size, and ownership of housing. A modest secondary objective to this informational one, was to identify any significant bias in this preference by recording respondents' currently-occupied-accommodation and comparing this with their surveyed preferences. It was felt that with assumed student desire for novel experiences, there could be significant associations between current and
preferred accommodation.

The kinds of student accommodation for which respondents were asked to indicate their preference were:

(a) House  
(b) Hostel  
(c) Block of Flats  
(d) Village-type complex

Of these alternatives, (a), (b) and (c) were commonplace and widely known and it was therefore assumed that respondents would respond confidently in their assessment of these accommodation modes, depending on their experience and stereotyping of them. Alternative (d), a Village-type complex, was a vaguer concept, imageable and much discussed, but known, if at all, only in the form of rare experimental projects, (in Dunedin and Auckland) and likely to be idealised by respondents into possessing characteristics lacking in the other choices, especially where these were judged deficient in any way.

3.12 Method of Survey I

The method used to acquire the data from the student respondents consisted of the administering of Instrument No. 1, a structured questionnaire, to a random sample of full-time Auckland University students. The questionnaire was devised, administered, and analysed during the 2nd term of 1971 with the participation of a small study team of Architecture students in their 3rd Professional year.

The Questionnaire

The structured questionnaire was a simple single-part instrument comprising sixteen questions of two kinds in a blended sequence. Eight of the questions refer to the respondent's prevailing mode of accommodation and some of its related activities. The other eight questions seek his preferences for a nominated choice of alternative accommodation modes and some basic functional and management characteristics.
Instrument No. 1
Survey I Questionnaire:

Modes of Student Accommodation

Student Housing is being studied by Third Professional Year Architecture Students. This questionnaire is intended to establish basic data on current and preferred student accommodation in Auckland. Please encircle the appropriate answers:

Firstly, please designate the type of accommodation you live in:
(a) Flat  (b) Private Board  (c) Home  (d) Hostel

Question 1:
Which would be the main reason for your living at home if this were possible?
(a) finance;  (b) family;  (c) lack of alternative accommodation;
(d) access to amenities etc;  (e) other reasons;

Question 2:
What sort of specifically student accommodation would you prefer?
(a) house;  (b) hostel;  (c) block of flats;  (d) village-type complex;

Question 3:
How do you travel to University?
(a) own car;  (b) own m/cycle;  (c) public transport;  (d) walk;  (e) other;

Question 4:
What rent do you pay? (if applicable)
(a) under $4.50;  (b) $4.50-$5.50;  (c) $5.50-$6.50;  (d) over $6.50

Question 5:
Where do you do most of your day-to-day shopping?
(a) local shops;  (b) central shopping areas;

Question 6:
Would you find the existence of outside spaces such as a garden or terrace a major asset of a flat?
(a) yes;  (b) no;

Question 7:
Where do your social activities occur? (a) mainly in the area in which you live;  (b) mainly in the University area;  (c) neither;

Question 8:
In any group accommodation scheme you occupied, whom would you prefer the other inhabitants to be?
(a) students only;  (b) young people only;  (c) low income people only;
(d) anyone;
Question 9:
Whom would you prefer to own and administrate any housing scheme in which you lived?
(a) Govt. per University; (b) Students' Association; (c) City Council; (d) private agent;

Question 10:
What number of occupants do you prefer for a flat?
(a) 1; (b) 2; (c) 3; (d) 4; (e) 4+;

Question 11:
Would you mind sharing a study-bedroom? (a) yes; (b) no;

Question 12:
Which type of flat do you consider the most suitable?
(a) self-contained old houses; (b) self-contained modern houses;
(c) block of flats; (d) houses converted to two or more flats;

Question 13:
In any village-type complex what amenities would you like to have?
(a) cafeteria; (b) shopping; (c) sports facilities; (d) common rooms; (e) none;

Question 14:
Do you study mainly at: (a) home; (b) University; (c) elsewhere;

Question 15:
If flatting, is there a meal cooked in the flat:
(a) at least once a day; (b) several times a week; (c) rarely;
The tentative and relatively modest fact-finding intentions of Instrument No. 1 account for its elementary level of design, administration and analysis.

Statistical testing of the questionnaire results was to be limited to testing the Null Hypothesis that:

"Respondents' category of current accommodation was not important in the frequency distribution".

The Chi-squared test was to be used for this comparison as well as for checking the significance and confidence level of any effects revealed.

**Sampling Method**

Survey I was administered to a sample population of full-time students randomly selected by the Auckland University Students Association from their current register of full-time students. The representativeness of this sample, with respect to age and sex, was not considered in the random selection, nor was verification made possible by the questionnaire itself since no demographic data were sought in it, other than prevailing accommodation modes.

The prepared questionnaires were issued to the Students' Association. They were distributed to and received from the selected respondents by Students' Association representatives. Five hundred valid and completed questionnaires were returned for analysis by the study team.

**3.13 Results of Survey I**

The results of Survey I are summarised in Table 1.

This Table shows the percentage frequency distribution expressed by the sample in response to the alternatives offered in each question, tabulated according to the four categories of current accommodation occupied by the respondents. For each question, the surveyed frequency distribution is compared with an inferred theoretical distribution - expected
if the Null Hypothesis were true - by applying the Chi-
squared test and from this, a test of the Confidence level
that any effect due to the categories of accommodation is
significant.
TABLE 1: SURVEY I

Frequency Distribution for each question. Responses are tabulated under the four types of accommodation currently in use. Responses to question alternatives are given as percentages of the totals for each accommodation type. Sample size = 500 of whom 28% then occupied flats, 7% private board, 55% own homes and 10% University hostels.

Question 1
"Which would be the main reason for your living at home if this were possible?"

<table>
<thead>
<tr>
<th>Reason</th>
<th>Flat Dwellers</th>
<th>Private Boarders</th>
<th>Home Dwellers</th>
<th>Hostel Boarders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finance</td>
<td>43%</td>
<td>42%</td>
<td>50%</td>
<td>44%</td>
</tr>
<tr>
<td>Family</td>
<td>20%</td>
<td>19%</td>
<td>25%</td>
<td>28%</td>
</tr>
<tr>
<td>Lack of alternative</td>
<td>12%</td>
<td>23%</td>
<td>6%</td>
<td>12%</td>
</tr>
<tr>
<td>Access to amenities</td>
<td>9%</td>
<td>9%</td>
<td>11%</td>
<td>0%</td>
</tr>
<tr>
<td>Other reasons</td>
<td>15%</td>
<td>7%</td>
<td>7%</td>
<td>16%</td>
</tr>
</tbody>
</table>

χ² = 27.80 p = < 0.01

Question 2
"What sort of specifically student accommodation would you prefer?"

<table>
<thead>
<tr>
<th>Accommodation</th>
<th>Flat Dwellers</th>
<th>Private Boarders</th>
<th>Home Dwellers</th>
<th>Hostel Boarders</th>
</tr>
</thead>
<tbody>
<tr>
<td>House</td>
<td>42%</td>
<td>19%</td>
<td>35%</td>
<td>35%</td>
</tr>
<tr>
<td>Hostel</td>
<td>1.5%</td>
<td>4%</td>
<td>4.5%</td>
<td>7.5%</td>
</tr>
<tr>
<td>Block of Flats</td>
<td>3.5%</td>
<td>26%</td>
<td>15.5%</td>
<td>7.5%</td>
</tr>
<tr>
<td>Village-type Complex</td>
<td>53%</td>
<td>51%</td>
<td>45%</td>
<td>50%</td>
</tr>
</tbody>
</table>

χ² = 26.89 p = < 0.005

Question 3
"How do you travel to University?"

<table>
<thead>
<tr>
<th>Mode</th>
<th>Flat Dwellers</th>
<th>Private Boarders</th>
<th>Home Dwellers</th>
<th>Hostel Boarders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own car</td>
<td>15%</td>
<td>16%</td>
<td>18%</td>
<td>4%</td>
</tr>
<tr>
<td>Own motorcycle</td>
<td>10%</td>
<td>12%</td>
<td>17%</td>
<td>11.5%</td>
</tr>
<tr>
<td>Public transport</td>
<td>41.5%</td>
<td>58%</td>
<td>52%</td>
<td>7.5%</td>
</tr>
<tr>
<td>Walk</td>
<td>29%</td>
<td>13%</td>
<td>2.5%</td>
<td>74%</td>
</tr>
<tr>
<td>Other</td>
<td>4.5%</td>
<td>10%</td>
<td>10.5%</td>
<td>4%</td>
</tr>
</tbody>
</table>

χ² = 170.36 p = < 0.0001
Question 4
"What rent do you pay?"

<table>
<thead>
<tr>
<th></th>
<th>Flat Dwellers</th>
<th>Private Boarders</th>
<th>Home Dwellers</th>
<th>Hostel Boarders</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Under $4.50 per week</td>
<td>18.5%</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>(b) $4.50 to $5.50</td>
<td>23%</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>(c) $5.50 to $6.50</td>
<td>30%</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>(d) Over $6.50 per week</td>
<td>28.5%</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

Note: This question is not relevant to the Null Hypothesis test.

Question 5
"Where do you do most of your day-to-day shopping?"

<table>
<thead>
<tr>
<th></th>
<th>Flat Dwellers</th>
<th>Private Boarders</th>
<th>Home Dwellers</th>
<th>Hostel Boarders</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Local Shops</td>
<td>78%</td>
<td>70%</td>
<td>NA</td>
<td>58%</td>
</tr>
<tr>
<td>(b) Central Shopping Areas</td>
<td>22%</td>
<td>30%</td>
<td>NA</td>
<td>42%</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 7.46 \quad p = < 0.025 \]

Question 6
"Would you find the existence of outside spaces a major asset to a flat?"

<table>
<thead>
<tr>
<th></th>
<th>Flat Dwellers</th>
<th>Private Boarders</th>
<th>Home Dwellers</th>
<th>Hostel Boarders</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Yes</td>
<td>83%</td>
<td>73%</td>
<td>86%</td>
<td>92%</td>
</tr>
<tr>
<td>(b) No</td>
<td>17%</td>
<td>27%</td>
<td>14%</td>
<td>8%</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 6.26 \quad p = < 0.1 \]

Question 7
"Where do your social activities occur?"

<table>
<thead>
<tr>
<th></th>
<th>Flat Dwellers</th>
<th>Private Boarders</th>
<th>Home Dwellers</th>
<th>Hostel Boarders</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Mainly in residential area</td>
<td>23%</td>
<td>28%</td>
<td>35%</td>
<td>45%</td>
</tr>
<tr>
<td>(b) Mainly near University</td>
<td>32%</td>
<td>50%</td>
<td>20%</td>
<td>24%</td>
</tr>
<tr>
<td>(c) Neither</td>
<td>45%</td>
<td>42%</td>
<td>45%</td>
<td>31%</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 15.05 \quad p = < 0.025 \]
Question 8
"In any group accommodation scheme you occupied, whom would you prefer the other inhabitants to be?"

<table>
<thead>
<tr>
<th></th>
<th>Flat Dwellers</th>
<th>Private Boarders</th>
<th>Home Dwellers</th>
<th>Hostel Boarders</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Students only</td>
<td>36%</td>
<td>30%</td>
<td>41%</td>
<td>61%</td>
</tr>
<tr>
<td>(b) Young people only</td>
<td>22.5%</td>
<td>19%</td>
<td>30%</td>
<td>15%</td>
</tr>
<tr>
<td>(c) Low-income people only</td>
<td>6%</td>
<td>5%</td>
<td>3.5%</td>
<td>0%</td>
</tr>
<tr>
<td>(d) Anyone</td>
<td>35.5%</td>
<td>38%</td>
<td>25.5%</td>
<td>23%</td>
</tr>
</tbody>
</table>

χ² = 20.55 \hspace{1cm} p = < 0.025

Question 9
"Whom would you prefer to own and administer any housing scheme in which you lived?"

<table>
<thead>
<tr>
<th></th>
<th>Government per University</th>
<th>Students Association</th>
<th>City Council</th>
<th>Private Agent</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>13%</td>
<td>28%</td>
<td>26%</td>
<td>18%</td>
</tr>
<tr>
<td>(b)</td>
<td>74%</td>
<td>60%</td>
<td>52%</td>
<td>52%</td>
</tr>
<tr>
<td>(c)</td>
<td>4%</td>
<td>0%</td>
<td>0.5%</td>
<td>0%</td>
</tr>
<tr>
<td>(d)</td>
<td>9%</td>
<td>12%</td>
<td>15.5%</td>
<td>30%</td>
</tr>
</tbody>
</table>

χ² = 33.36 \hspace{1cm} p = < 0.0005

Question 10
"What number of occupants do you prefer for a flat?"

<table>
<thead>
<tr>
<th></th>
<th>Flat Dwellers</th>
<th>Private Boarders</th>
<th>Home Dwellers</th>
<th>Hostel Boarders</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) One</td>
<td>4%</td>
<td>4%</td>
<td>2%</td>
<td>4%</td>
</tr>
<tr>
<td>(b) Two</td>
<td>15.5%</td>
<td>4%</td>
<td>10%</td>
<td>16%</td>
</tr>
<tr>
<td>(c) Three</td>
<td>15%</td>
<td>23%</td>
<td>22%</td>
<td>12%</td>
</tr>
<tr>
<td>(d) Four</td>
<td>38%</td>
<td>69%</td>
<td>55%</td>
<td>60%</td>
</tr>
<tr>
<td>(e) Five or more</td>
<td>27.5%</td>
<td>0%</td>
<td>11%</td>
<td>8%</td>
</tr>
</tbody>
</table>

χ² = 43.58 \hspace{1cm} p = < 0.0001

Question 11
"Would you mind sharing a study-bedroom?"

<table>
<thead>
<tr>
<th></th>
<th>Flat Dwellers</th>
<th>Private Boarders</th>
<th>Home Dwellers</th>
<th>Hostel Boarders</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Yes</td>
<td>83%</td>
<td>54%</td>
<td>58.5%</td>
<td>66%</td>
</tr>
<tr>
<td>(b) No</td>
<td>27%</td>
<td>46%</td>
<td>41.5%</td>
<td>34%</td>
</tr>
</tbody>
</table>

χ² = 15.38 \hspace{1cm} p = < 0.005
Question 12
"Which type of flat do you consider to be most suitable?"

<table>
<thead>
<tr>
<th></th>
<th>Flat Dwellers</th>
<th>Private Boarders</th>
<th>Home Dwellers</th>
<th>Hostel Boarders</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Self-contained old house</td>
<td>61.5%</td>
<td>39%</td>
<td>45%</td>
<td>49%</td>
</tr>
<tr>
<td>(b) Self-contained modern house</td>
<td>21%</td>
<td>19%</td>
<td>23%</td>
<td>22%</td>
</tr>
<tr>
<td>(c) Block of flats</td>
<td>9.5%</td>
<td>31%</td>
<td>20%</td>
<td>7%</td>
</tr>
<tr>
<td>(d) House converted into flats</td>
<td>8%</td>
<td>11%</td>
<td>12%</td>
<td>22%</td>
</tr>
</tbody>
</table>

$\chi^2 = 25.55 \quad p = < 0.005$

Question 13
"What amenities would you like in any village-type complex?"

<table>
<thead>
<tr>
<th></th>
<th>Flat Dwellers</th>
<th>Private Boarders</th>
<th>Home Dwellers</th>
<th>Hostel Boarders</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Cafeteria</td>
<td>42%</td>
<td>42%</td>
<td>47%</td>
<td>45%</td>
</tr>
<tr>
<td>(b) Shops</td>
<td>51%</td>
<td>46%</td>
<td>36%</td>
<td>33%</td>
</tr>
<tr>
<td>(c) Sports facilities</td>
<td>47%</td>
<td>57%</td>
<td>51%</td>
<td>41%</td>
</tr>
<tr>
<td>(d) Common rooms</td>
<td>39%</td>
<td>35%</td>
<td>42%</td>
<td>48%</td>
</tr>
<tr>
<td>(e) None</td>
<td>10%</td>
<td>4%</td>
<td>5%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Note: This question is not relevant to the Null Hypothesis test.

Question 14
"Where do you mainly study?"

<table>
<thead>
<tr>
<th></th>
<th>Flat Dwellers</th>
<th>Private Boarders</th>
<th>Home Dwellers</th>
<th>Hostel Boarders</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Home</td>
<td>63%</td>
<td>69%</td>
<td>49%</td>
<td>55%</td>
</tr>
<tr>
<td>(b) University</td>
<td>35%</td>
<td>27%</td>
<td>49.5%</td>
<td>37%</td>
</tr>
<tr>
<td>(c) Elsewhere</td>
<td>2%</td>
<td>4%</td>
<td>0.5%</td>
<td>8%</td>
</tr>
</tbody>
</table>

$\chi^2 = 25.27 \quad p = < 0.0005$

Question 15
"If flatting, is there a meal cooked in your flat?"

<table>
<thead>
<tr>
<th></th>
<th>Flat Dwellers</th>
<th>Private Boarders</th>
<th>Home Dwellers</th>
<th>Hostel Boarders</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) At least daily</td>
<td>76%</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
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<td>(c) Rarely</td>
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Note: This question is not relevant to the Null Hypothesis test.
3.14 Discussion of the Results of Survey I

The results may be evaluated in terms of the primary and secondary objectives of the survey, explained in Section 3.11.

The primary objective was to define the relative strengths of preference for the main categories of student dwelling accommodation and ancillary amenities, together with details of preferred life-style, household group size and ownership of the housing. This the data does clearly, as shown in Table 1.

Question 1, seeking the main reason for students living at home, finds 'Finance' reasons consistently dominating 'Family' reasons by approximately 2:1, and the other reasons by even more.

Question 2, seeking accommodation preferences, finds a preference for the 'Village-type complex' dominating preference for the 'House' by approximately 3:2, preference for the 'Block of Flats' by approximately 4:1 and preference for the 'Hostel' by approximately 11:1.

A growing trend away from 'Hostel' accommodation is confirmed.

'Flat-Dwellers' feel a very low preference for the 'Block of Flats' - a form they are more familiar with than the other respondent groups - and a perhaps reactionary high preference for the 'House'.

'Private Boarders', by contrast, have a very strong preference - perhaps a yearning - for the 'Block of Flats'.

Question 3 about travel modes, revealed a high dependence by all students except 'Hostel Boarders', on 'Public Transport' and added weight to the general case for locating student housing reasonably close to the University Campus and to public transport routes.
Question 4 about rental levels, and Question 5 about shopping locations confirmed common knowledge and do not warrant discussion.

Question 6, seeking opinions about domestic outdoor spaces, revealed an extremely strong preference for the provision of these spaces, and no doubt indicates a wish to achieve a desirable level of dwelling separation, and independence in conducting outdoor activities like recreation, crop cultivation and vehicle maintenance.

Question 7 indicates that there is no significant relationship between any of the accommodation modes and the habitual locations for social activities which indeed appear widespread.

Question 8, seeking the preferred socio-economic composition of the inhabitants of a 'Village-type Complex' finds slight preference for 'Students Only' over 'Anyone' and 'Young People Only' but a marked aversion to 'Low-Income People Only'. Thus student attitudes reflect those of their own and similar higher income families in the community at large. This aversion apart, students show little status bias and seem ready to mix with the population in general.

Question 9 seeking preferences on the ownership and management of any student housing scheme, reveals strong preference for the 'Students Association' as landlord. The low rating of the 'Government-per-University' option may be unduly low because of the connotations of 'Government'. While this partnership is technically exact, the provision and running of University Hostels and student flats is such that their character is solely a reflection of the University. Thus the question is seen as probably flawed by this misleading factor.

Question 10 seeking the preferred range of numbers of occupants of student flats, finds 'Four-person' households dominating 'Three-person' households by approximately 3:1.
There is clear evidence too that students who are experienced Flat-Dwellers are tolerant of 'Five-person or more' households, unlike all other classes of students.

Question 11, seeking opinions about the sharing of study-bedrooms, finds very strong 'Flat-Dweller' opinion and moderate student opinion in general against sharing, although amongst 'Private Boarders' and 'Home Dwellers' there is a minority support for sharing.

Question 12, seeking preferences for various forms of flat accommodation, finds the 'Self-contained Old House' preferred to the 'Self-Contained Modern House' by approximately 2.3:1. Houses converted into flats are generally disliked, extremely so by 'Flat-Dwellers' but notably less by 'Hostel-Boarders' who along with experienced 'Flat-Dwellers' share the strongest dislike for 'Blocks of Flats'. This result supports recent widespread criticism of cheaply built or converted low-rental flat accommodation.

Question 13, seeking preferred amenities to be integrated into any 'Village-type Complex' finds massive support for amenities of some sort, but reveals no clear preference as to what sort, although 'Sports facilities' are slightly preferred to the three other alternatives, 'Cafeteria', 'Shops', and 'Common rooms'.

Question 14, seeking the actual use of study environments, finds that 'Flat-Dwellers' and 'Private-Boarders' manage to study at their place better than 'Home-Dwellers', and that generally the place of residence is preferred to the University for study by approximately 1.5:1.

Question 15, seeking the incidence of meal cooking in student flats, finds an expected practice of cooking almost daily. Apart from hinting at one of the chief attractions of flatting for students, namely the culinary adventures, economies, and social occasions centred on the shared activities of eating-at-home, this question does not warrant discussion.
The secondary objective of Survey I as outlined in Section 3.11, was to identify any significant bias in the responses to the questions as revealed in the data, by recording the respondents' currently-occupied-accommodation and comparing this with their responses. It was felt that, with an assumed student desire for novel experiences, there could be significant associations between current accommodation and preferred (perhaps contrasting) accommodation.

Accordingly, the Null Hypothesis, as established in Section 3.12, that: "Respondents' category of current accommodation was not important in the frequency distribution" was tested by means of the Chi-squared statistic which compares the observed frequency with the theoretical expected frequency of preference under each accommodation category. The statistical significance of these comparisons was calculated in the normal way by testing the Chi-squared values against 'degrees of freedom' to find the confidence levels and hence the levels of significance which may be attached to the differences between the observed and expected frequencies of preference. These calculations are shown in Table 1 for each relevant question of the Survey I questionnaire.

As the results of the Chi-squared statistics show, the differences in response between the four groups of respondents, in terms of their current accommodation mode, were highly significant. This finding strongly rejects the Null Hypothesis, and hence it can be stated that: students' currently occupied mode of accommodation has a profound effect upon their preference responses to questions about Student Housing alternatives.
3.2 SURVEY II: EXISTING STUDENT HOUSING: Preferences

3.21 Objectives of Survey II

The results of Survey I disclosed three closely related facts about student preferences for their mode of accommodation.

Firstly, question 1 indicated that approximately 45% of all respondents thought their main reason for preferring to live at home would be 'Financial'. A further 13% thought their main reason would be 'Lack of Alternatives'. Together these reasons indicate a latent desire by some 58% of Auckland full-time students for modes of student accommodation alternative to the living-at-home mode. This latent desire could be expected to be fulfilled to the extent that agreeable alternatives to home life could be found at costs that suited student budgets. Knowledge of this potential demand for students' living away from home, and the conditions upon which it might be exercised, suggested broad prospective guidelines for both the scale and the economics of future student housing projects.

A second related result from Survey I - revealed by Question 2 - was that this student housing demand would be dominated by preferences for the 'Village-type-complex' (approx. 50%) and the private 'House' (approx. 33%) to the almost total exclusion of 'Hostels' (approx. 4.5%) and, to a lesser extent, 'Blocks of Flats' (approx. 13%). Since the 'Village-type-complex' can be assumed, from the traditional model, to imply an assembly or community of private dwellings, it is clear that preference was being expressed about virtually three basic housing stereotypes:

(i) the notional private 'House',
(ii) the notional 'Hostel', and
(iii) the notional 'Block of Flats'.

The combined mean preference score for the notional 'House' was therefore approximately 83% compared with approximately 13% for the notional 'Block of Flats', and approximately 4.5% for
the notional 'Hostel'. It was evident that students felt highly convinced about a preference for living as households in private houses and it was as a consequence of this discovery that the initial ideas about the similarities between the student housing problem and the general housing problem arose, eventually to be clarified as Hypothesis A.

The third related result from Survey 1 - revealed by question 12 - was that this dominance of the private House was qualified by a marked preference for the 'Self-contained Old House' over the 'Self-contained Modern House' by the mean ratio of 2.3:1 and over the 'Block of Flats' by 2.9:1.

This opinion amongst students appeared compatible with a number of factors assumed to be related to their lifestyles.

(a) In preferring a Self-contained House to a Flat, contiguous with other flats, students' independance of, as well as tolerance by neighbours is maximised and their prospects of minimum rentals through intensive house-sharing are improved (compared with flat-sharing).

(b) In strongly preferring Old Self-contained Houses in particular, students' expectations of matching their low incomes to low rental costs are maximised, since,

(c) Old Houses may commonly be found at low rentals due to their spartan conditions or landlords' neglect of normal standards of maintenance.

(d) Low standards of landlord maintenance infer lenient conditions of tenancy which further enhance students' independance from restrictions normally imposed by both landlord and neighbours, thus allowing students to pursue their exploratory lifestyles.

(e) This minimising of landlord restrictions further implies greater freedom for students to adapt, decorate and personalise the dwelling, or its outdoors, to their satisfaction.
(f) For a given rental, an Old House is likely to be more generous in space and more intriguing in character and for these reasons more sought after by students than its modern counterpart.

These observations (a) to (f) about factors which were assumed to be related to student opinion revealed by Survey I were the principal influences in setting a course for this next survey, Survey II, and within it the development of Hypothesis B.

Thus the primary theoretical objectives of Survey II were twofold. The first objective was to initially define for ongoing testing, through a series of surveys, the less specific Hypothesis A:

THAT STUDENT HOUSING REQUIREMENTS FOR NEW ZEALAND URBAN UNIVERSITIES CAN BE MET SATISFACTORILY BY THE LOW TO MEDIUM-RENTAL DWELLING FORMS AND ARRANGEMENTS OF MEDIUM-DENSITY INNER-SUBURBAN HOUSING ESSENTIALLY SIMILAR TO THOSE PREFERRED BY THE POPULATION AT LARGE.

The second theoretical objective was the definition and immediate testing of the more specific Hypothesis B:

THAT THE HOUSING MOST PREFERRED BY STUDENTS IS DETACHED IN ITS SITING, TRADITIONAL AND/OR INTRIGUING IN CHARACTER AND INFORMAL IN USE, BUT, NOTWITHSTANDING THESE, THE CHEAPEST TO RENT.

This Hypothesis B arose directly from the results of Survey I as discussed above and seems to be compatible with the ideas of Eichler and Kaplan (1967) later reconciled by Michelson (1970), who identify with the "trickle-down" theory whereby housing policy contrives to provide houses for the poorer by creating new homes for the richer and encouraging their turnover downwards as their age increases and their value decreases. For instance, it seemed clear from random observation that 3rd and 4th generation Victorian middle-class houses had followed this fate in coming to serve notably well
the student and lower income populations of today.

In clarifying the purposes of Survey II - in the light of Hypotheses A and B, and as a sequel to the findings of Survey I - a primary practical objective came to resolution. This practical objective was to have students declare their preferences for a specific range of existing dwellings actually then occupied as student housing and representative of one or other of the three basic stereotypes of accommodation which Survey I's findings on accommodation modes revealed. It became important to trace more exactly the real identity, both indoors and out, of current student housing and thence to compare it with the notional modes of housing which prompted the clearcut responses in Survey I.

Again this prospective evidence of the actual nature of student housing would allow a preliminary testing of both hypotheses A and B.

Much of the early research of Canter (1969d), Wools (1970), and Rapoport and Nutson (1968) had found significant response differences between students, housewives, teachers, architects as well as between wider culturally defined groups.

Thus a secondary theoretical objective became implicated in Survey II: the definition of hypothesis C:

THAT DIFFERENCES IN VOCATION OR PREOCCUPATION OF RESPONDENT GROUPS WILL CORRELATE WITH SIGNIFICANT DIFFERENCES IN THEIR RESPONSES TO COMMON EXPERIENCES.

The secondary practical objective which arose from this hypothesis was to test it in terms of student group differences.

Survey II afforded an opportunity to find out, from amongst the general student population, whether or not judgements of student housing varied with the identity of the respondent group. Accordingly two respondent groups were sought whose current University full-time courses and pre-occupations differed in a known way. These two groups would be asked to
judge the same presentation of student housing examples, and subsequently their data compared in order to achieve an initial testing of Hypothesis C.

A further practical objective of Survey II was a methodological one. It consisted of initiating and incorporating in the survey - albeit a preference survey - the trial use of the Semantic Differential technique for the sake of preliminary experience of its implementation and subsequently, in Survey II/2, experience of analysing its data.

3.22 Method of Survey II

The method used to acquire the data from the two student respondent groups, consisted of the administering of Instrument No. 2, a structured attitude-scaling questionnaire, to two groups of full-time Auckland University Students - one, a general student group of mixed age, sex and course representation and the other a group of 1st Professional Year Architecture students of fairly uniform age and mainly male sex. This questionnaire was prepared early in the 1972 session and then administered, with the assistance of three senior Architectural Psychology students late in the 2nd term of that year. Assistance in the preliminary analysis of preference formed part of their course assignment work. Both respondent groups were required to judge sets of slide projections representing (a) 'Exteriors', (b) 'Study-bedrooms' and (c) 'Kitchen-dining areas' in existing Auckland student dwellings considered to make up a representative selection.

The Questionnaire

The structured questionnaire consisted of three independent parts for simplicity and accuracy of administering and analysis. Each of the three parts was devoted to one of the three concepts (a) 'Exteriors' (b) 'Study-bedrooms' or (c) 'Kitchen-dining areas'. Part (a) of the questionnaire was completed by both respondent groups whereas part (b) was completed by the 1st Professional Year Architecture students.
only, and part (c) by the general student group only. The main interest lay in concept (a) 'Exteriors'.

As shown in Instrument No. 1 the questionnaires contained a sequence of ten bi-polar adjectival scales. Six of these scales were common to all three parts of the questionnaire while four scales were peculiar to concept (a) and four others common to concepts (b) and (c).

The slide projection of alternative cases of concept (a) was a sequence of fourteen examples of 'Exteriors' of existing student dwellings. The slide projection of alternative cases of concept (b) was a sequence of twelve examples of 'Study-bedrooms' in existing student dwellings. The slide-projection of alternative cases of concept (c) was a sequence of thirteen examples of 'Kitchen-dining areas' in existing student dwellings. Each student dwelling finally selected for survey, was represented under each of the three concepts (a), (b) and (c).

The adjectival scales used in all three parts of the questionnaire were a priori scales selected from those isolated and applied by Canter (1967, 1969c, d). Scales were selected subjectively on the basis of their semantic relevance to either the 'exterior' considerations associated with concept (a) or the 'interior' considerations associated with concepts (b) and (c).

The questionnaire recorded a small range of demographic data - Name, sex, University course, age and present place of residence but no correlation checks were made with these against the recorded preferences. Both groups were relatively homogeneous and indeed the main correlative interest lay in any differences in response between the two groups-as wholes rather than by individuals. Consistent with the preliminary interests and exploratory techniques of Survey II, no statistical testing of the preference results from Instrument No. 2, was to be carried out. The testing of Hypothesis C, by means of the Chi-squared test to determine the significance and level of confidence of any differences in preference revealed by two respondent groups, was planned for the later Survey No. 4.
Part 1: Existing Student Housing

The effects of buildings on behaviour are very subtle ones, so that we not only need to know how people behave but also why they behave as they do. One of the easiest ways into this is to ask people what they feel about aspects of a building. (Cater)

INSTRUCTIONS: Please indicate where EACH of the housing examples comes on EACH of the scales below by putting the appropriate number (1 to 7) in the box below the design. Do not ponder too long over any one question. Please treat each response separately. Any apparent repetition of questions is for statistical control. Please ensure you have completed EVERY item. Any comments you may have about this questionnaire would be very welcome.

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Part 2: Existing Student Housing

The effects of buildings on behaviour are very subtle ones, so that we not only need to know how people behave but also why they behave as they do. One of the easiest ways into this is to ask people what they feel about aspects of a building. (Cater)

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The data furnished by Survey II involving, as it did the Semantic Differential, held the potential for much more complex analysis than was to be undertaken at this early stage. These other multi-variate analyses of the semantics and satisfactions inherently recorded in the data were to be taken up at a later stage in the research programme, as Survey II/2.

Sampling Method

Survey II was administered to two discreet groups of full-time students attending the University of Auckland.

Group 1 was an extra-curricula 'encounter group' attending a regular series of 'Creative Living' sessions. One of these evening sessions - on the subject of 'Housing ourselves' - was specially conducted for the group, with the survey itself run over the final hour. This general group of students was made up of roughly equal numbers of each sex, included several post-graduate students, and was representative of most University Degree courses. Ages ranged from 18 years to 30 years. None of this general group were students of Architecture. There were 22 validly completed questionnaires returned.

Group 2 was a class of Architecture students who had experienced two thirds of their 1st Professional Year in the B.Arch course. While their earlier backgrounds were diverse, their 1st Professional Year sharing of a common Architecture course could be assumed to have induced some conditioning of their attitudes to architectural issues which in turn could be expected to show up when their overall group responses were compared to Group 1.

The questionnaire involves the respondent in reactive measurement by means of judged verbal responses. It is self-administered. Its elementary form as used in Survey II included brief guidance on the filling in of the scales. Before either
of the groups commenced their responses, the nature and procedure of the questionnaire was explained and demonstrated by example, and a quick-run preview of all slides in the 3 respective concept-series was projected to delimit the scope of the evaluations they were about to commence and thus, hopefully, nullify any undue over-reaction.

As the survey was run, each slide was projected for sufficient time for all respondents in the group to complete all ten scales in the questionnaire. Both groups viewed each of the three-concept-series of slides in the same sequential order. The following monochrome Plates 2a, 2b and 2c, copied from the original colour-slides, illustrate the sequence of alternative cases for each of the three concepts: 'Exteriors', 'Study-Bedrooms' and 'Kitchen-Dining' Areas. Furthermore, a complete set of 35mm colour-slides of the series is available for reference.
PLATE: 2a.1 'EXTERIORS'
PLATE : 23.2 'EXTERIORS'
PLATE: 2c.1 'KITCHEN-DINING AREAS'
3.23 Results of Survey II

The results of Survey II, in so far as preference rankings of the alternative concepts (a), (b) and (c) are concerned, are shown in Figures 2a, 2b, 2c respectively. Most interest lay in Figure 2a, dealing with the 'Exteriors'.

The graphs in these Figures, are based upon the overall mean scores recorded against each of the concept examples, and tables of these are shown at the base of each graph. The mean for each example, is that calculated from all respondents' scores for it, on all of the descriptive-scales in the questionnaire. This scale-mean would not necessarily always give a clear index of preference ranking, except in the case of questionnaires structured as this one was, where each scale continuum was oriented 1 to 7 so that the 'positively-valued' or 'most satisfying' pole of the scale lay at 1, and the opposing pole at 7. In this manner, consistent low scoring, by a concept example, on all of the scales, indicates a strong, if blunt, measure of high preference by the respondents, and vice versa.
Figure 2a: 'Exteriors' by combined groups.

Combined groups mean scores:

4.29, 2.45, 4.07, 3.24, 3.81, 4.87, 4.42, 5.42, 3.11, 4.88, 2.13, 3.81, 4.27, 3.51
GRAPH OF OVERALL PREFERENCE

FIGURE: 2b: 'STUDY-BEDROOMS' by GROUP 2

Overall Mean Scores:

GROUP 2: 3.37  4.08  4.02  3.05  2.77  4.56  4.02  3.09  3.46  3.45  2.62  2.97

GRAPH OF OVERALL PREFERENCE

FIGURE: 2c: 'KITCHEN-DINING AREAS' by GROUP 1

Overall Mean Scores:

3.77  4.25  3.18  2.45  3.58  2.25  4.25  3.96  3.81  3.56  2.73  3.01
3.24 Discussion of the Results of Survey II

With reference to Figure 2a, the upper graph of overall preference reveals a first ranking for 'Exterior' Example No. 11 - the rehabilitated, Victorian, masonry Terrace-Housing - by both Groups 1 and 2. This is quite clearly the most preferred dwelling for Group 1, but only narrowly for Group 2, (the Architecture Students) who hold Example No. 2 as almost first equal. Example No. 2 is again, of two storeys in masonry, although detached. In contrast to Example No. 11, it has an informal, pleasantly 'Mediterranean-vernacular' style but, on the other hand, shares a generosity of scale, accommodation and detailed design, with No. 11. Example No. 2 is third choice for Group 1. For both groups the high-rise State flats are ranked last. Moreover, the more modern flat-buildings, especially the crudely novel ones like Nos. 5 and 10, are generally low-ranked, although Group 2 responds more favourably perhaps to the solid 'classic modernity' of No. 7 and the slightly 'Romanesque' generosity of No. 3. The Auckland City Council 'Townhouses', No. 12, also score significantly better with Group 2 (the Architecture Students) than with Group 1. Thus there appears to be a marked preference, especially by Group 1, for typical older dwellings. No. 2 is the exception but it too has a strongly traditional character, as noted already. This general set of opinion is nowhere more marked than in a comparison between the multi-unit buildings, where the older more intricate Examples 11 and 4, are seen to be top ranking, whereas the modern versions, such as Examples 8, 5 and 10 are ranked bottom. Between them, these more modern examples embody characteristics of aesthetic 'abstraction' and 'banality', or functional 'meanness' or constructional 'slickness' (with attendant problems of internal climate and noise control) which are, by now, sufficiently recognised to prompt their low rankings.
As to the Hypotheses, there is some limited, contributory support for Hypothesis A, in that

(a) the range of dwellings identified and culled as student housing for Survey II, is loosely representative of inner-suburban housing in general, and

(b) student preferences amongst this range of dwellings, appear to favour stereotypes commonly occupied by the population at large, and which also, reflect the preferences about 'notional' dwelling-types expressed by students in Survey I.

Hypothesis B is strongly supported by the results of Survey II. Visual inspection of the dwelling-range, suggests that the students' preference-rankings clearly favour housing which is 'detached in its siting, traditional and/or intriguing in character, and informal in use, but, notwithstanding these, the cheapest to rent'. While rental-checks, at the time of the survey, showed that rents for Examples, 12, 3 and 7, all were in the medium to high category, those for the remainder were low to medium, and, were therefore, not an influencing factor in the top and bottom rankings. This observation further reinforces the identity of students' dwelling-preferences as contended in Hypothesis B.

Hypothesis C appears, on visual inspection, to receive some slight support from the findings shown in Figure 2a. As pointed out earlier in this discussion, there is an appreciably greater tolerance shown by Group 2 than Group 1, for the more wholesome of the modern dwellings like Examples 12, 3 and 7. Both groups concur on their 1st, 9th and last rankings, respectively Examples 11, 1 and 8, with nearly identical mean scores for Examples 11 and 1. But, over the rest of the range, while there is some slight variance of both preference and scoring means, between the groups, the rankings do tend to have similar patterns. Hence, such support as there is for Hypothesis C, derives chiefly from the manifest
upward-shift in popularity of the better modern dwellings in the eyes of the 1st Professional Year Architecture Students, whose greater (theoretical) understanding of the identity of these dwellings, presumably increases their acceptance of them.

Figures 2b and 2c show the assessed rankings of the 'Study-Bedrooms' and the 'Dining-Kitchen Areas', by Group 2 and Group 1 respectively. In general these two series of assessments are both characterised by more limited variance than was provoked by the series of dwelling exteriors. This variance is most limited in Group 2's assessment of the Study-Bedrooms.

In its assessments of Study-Bedrooms, Group 2 displays no clear tendency behind its rankings of the sequence offered. Attic rooms of distinctly ascetic character (Examples 11 and 6), take first and last preference. Together with Examples 4, 8, 10 and 9, which are ranked 4th, 5th, 6th and 7th, these rooms can be roughly distinguished by the noticeably higher 'architectural content' in their photographed identity. Other examples are architecturally more non-descript and are characterised slightly more by their general furnishings and occupants' belongings. This part of Survey II is regarded as abortive, because, by simply taking random photographs of those Study-Bedrooms which happened to be inside the pre-selected range of student dwellings, whose 'Exteriors' were the primary subject of inquiry in Survey II, there was consequently, an insufficient range of room-styles, an insufficient distinction between them and an inconsistent fraction of Architectural content in their identities as presented. It follows that little, if any, significance can be attached to this portion of the results of this exploratory survey.

In its assessments of Kitchen-Dining Areas, Group 1 displays a slightly clearer tendency in its sequence rankings. There is slight evidence of preference for more imageable, bold interiors with an element of intrigue about them, especially in the 1st, 2nd, 3rd and 4th choices - Examples 6, 4, 11 and 12 respectively.
But, for the same reasons as applied to the surveying of the Study-Bedrooms, little, if any, significance can be attached to these results about Kitchen-Dining Areas, and hence no fruitful discussion is possible.

However, as the discussion of the surveyed results about Student Housing 'Exteriors' disclosed, there was limited support for the Hypotheses A and B and a general confirmation of the anticipated nature of actual Student Housing which was earlier 'notionally' forecast by the results of Survey I, dealing with current modes of student accommodation.
3.3 SURVEY III: EXISTING AUCKLAND RESIDENTIAL STREETS

3.3.1 Objectives of Survey III

Survey III arose from a decision to investigate the nature of students' preferences for housing environments at the scale of the residential street. Interesting questions had arisen from the findings of Surveys I and II about the way dwelling types, which had won highest preference, might best be arranged on their sites and with respect to the streets they fronted on to. Issues such as subdivisional density and 'grain', the extent and character of front open courts, the width and character of the dedicated roadway, the sense of street enclosure and the importance of tree-planting, parking and views, were all left unresolved by the previous surveys.

Thus, Survey III was devised as a simple exploratory investigation without specific hypotheses, to ascertain the key identity and character of a cross-section of Auckland's suburban residential streets; and then to have a student sample population rank a representative selection of these streets in order of preference.

In spite of the absence of hypotheses, some tentative assumptions about the value of different forms of street would perhaps gain or lose some credibility by the survey's limited findings. These assumptions could be listed as:

(a) that in order to be climatically tolerable for pedestrian use, residential streets should achieve appreciable enclosure,

(b) that in order to encourage mutually supportive social awareness and interchange, residential streets should permit a proximity of dwelling locations close enough to the street, and to dwellings opposite, to sustain such awareness and interchange,

(c) that in order to achieve a clear identity of place and of related uses, residential streets should be sufficiently articulated by their built and natural environment to emphasise both the stable and the dynamic activities which occur in them,
(d) that a sense of pedestrian security, well-being and stimulation correlates with narrower streets, physically well defined by their onlooking dwellings and identifiable by clearly memorable spatial properties.

To the extent that a range of typical residential streets, both with and without the characteristics embodied in the above four assumptions, could be surveyed for preference ranking, then some indications could be expected of the relative validity of those assumptions.

Accordingly, it was decided to design Instrument No. 3, a simple structured questionnaire, aimed at finding out what aspects of typical residential streets appealed most to a respondent student group and also what indications there were of the validity of assumptions (a), (b), (c) and (d). This investigation would be no more than a pilot study for a possible later major survey to define guidelines for street planning and design, partly based upon people's expressed opinion as to what they liked and disliked about streets. A group of three 3rd Professional Year students taking a course in Architectural Psychology were instructed and directed through the process of designing and administering the questionnaire and analysing the results.
3.32 Method of Survey III

The procedure adopted was to photograph on 35mm monochrome film some thirty Auckland suburban residential streets. Several exposures were made of each street and their contact prints used to sort out groups of streets according to as many street categories as were thought to be readily distinguishable by a random population of respondents.

The criteria used to identify these categories of street were:
(i) Housing type, age and construction.
(ii) Proximity of houses to each other and to the street.
(iii) Presence of significant planting in or adjacent to the street.
(iv) Widths and alignments of roadway and footpath.

These street criteria were all assumed to receive wide recognition and to contribute fundamentally to the appearance and identity of residential streets.

Applying these four criteria to the whole sample of photographed Auckland streets, a series of five street categories were identified:
A. Early working-class streets in Victorian Auckland.
B. 'State-Housing' estates built during the 1950's and 1940's.
C. Streets of recent City Council 'Town-House' estates.
D. Established upper-middle class suburban streets.
E. Recent middle-class suburban streets.

A selection was made of three examples representative of each of the five categories. These five sets of three examples were depicted in 250 x 200 monochrome photographic enlargements mounted in trios on five 'street-category' show-cards A, B, C, D, and E. Illustrations of these show-cards are given in Plates 3.1 to 3.5.

The show-cards were all shown to the respondents, who were then asked to complete, to their satisfaction, the questionnaire which
required them to choose from the displayed photographs, the streets and the aspects of streets which they preferred.

The Questionnaire

The structured questionnaire was a simple two-part instrument, with Part 1 recording the age, sex and occupation of each respondent, and Part 2 recording his or her judged preferences about the five street categories, as well as three other aspects of street character.

As a pilot instrument, this questionnaire was devised for completion by only a small sample of students and without statistical tests.

Sampling Method

Rather than survey a wide representative sample of student opinion, as was indeed considered for a later possible full survey of street preference, this pilot Survey III was addressed to a homogeneous group of 50 full-time University Hostel students from various regions of New Zealand other than Auckland. The hostel was in central Auckland and the respondents were assumed to be generally unfamiliar with other than a few Auckland streets.

All the student respondents fell into the 18 year old to 20 year old age group. There were 50 completed questionnaires returned, 27 from males, 23 from females.
Survey III Questionnaire
Existing Auckland Residential Streets

There often appears to be a discrepancy between what people prefer in the environment around them and what architects think people's preferences are. The streets we live in come into this area of interest.

The following questionnaire is intended to ascertain your preferences about different street situations and to form design guidance for future planning.

Part 1: Please tick appropriate box:

Age of respondent: 10-20 21-30 31-40 41-50 50 and over

Sex: male female

Occupation:

Part 2:

1. The photos show various street scenes categorised as A, B, C, D, E. Please place them in order of preference:

   first second third fourth fifth

2. Tick the street type most similar to your own (i.e., where you live):

   A B C D E Type not shown

3. Mark road types in order of preference by putting the related letter in the appropriate box:

   A cul-de-sacs first
   B one way roads second
   C usual two way thru roads third
   D roads with a median strip down the centre fourth

4. What features do you like about the streets in these photos? Please tick the appropriate box (es):

   A+ Plenty of planting (trees etc) A- A little planting (shrubs etc)
   B+ Grass verges (between road & footpath) B- No verges
   C+ On street parking C- Off street parking
   D+ Narrow streets D Average width D- Wide streets
   E+ Similar houses E- Varied houses
   F+ House set back from street F- House close to street
   G+ Fenced front yard G- Open front yard
PLATE: 3.3 STREET CATEGORY C
3.3.5 Results of Survey III

The results of Survey III are summarised in Table 3.

Table 3, concerned with Part 2 of the questionnaire, shows the frequency distribution as expressed by the respondent group, in response to the alternatives offered in each question.
TABLE 3: SURVEY III

Frequency Distribution of responses for each question.
Sample Size = 50. Males: 27, Females: 23.

PART 2:

Question 1:
"The Photos show various street scenes categorised as A, B, C, D and E. Please place them in order of preference".

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[Chart showing responses]

Histogram of 1st Choice

Question 2:
"Please tick the street type most similar to your own where you live".

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<th>C</th>
<th>D</th>
<th>E</th>
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<td>4</td>
<td>1</td>
<td>10</td>
<td>7</td>
<td>28</td>
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</table>

% Distribution 0% 8% 2% 20% 14% 56%

Question 3:
"Please mark road types A, B, C, and D in order of preference".

<table>
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<th>C</th>
<th>D</th>
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</thead>
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<td>One-way</td>
<td>Two-way</td>
<td>Two-way + median</td>
</tr>
<tr>
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<td>32</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>2nd</td>
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<td>16</td>
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</tr>
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<td>3rd</td>
<td>7</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>4th</td>
<td>5</td>
<td>18</td>
<td>7</td>
</tr>
</tbody>
</table>

[Chart showing responses]

Histogram of 1st Choice

Question 4:
"What features do you like about the streets in these photos?"

[Chart showing responses]

Histogram of Preferences
3.34 Discussion of the Results of Survey III

The results are evaluated in terms of the two broad objectives of the survey, explained in Section 3.31, namely,

(i) finding out what aspects of typical residential streets were preferred most by the respondent student group, and

(ii) finding out what indications there were of the validity of the assumptions (a), (b), (c) and (d) about the value of various forms of street.

The data shown in Table 3 clearly reveals student preferences as sought under objective (i).

Question 1, of Part 2, seeking preference rankings of the five categories of street scenes, finds category D scoring an overwhelming popularity.

The streets in this category have a grand scale and are of the established upper-middle classes, with a variety of substantial higher quality homes and an abundance of mature trees.

Categories E and C are of much lower, almost equal standing. Category E is typical of many wide and vacant looking streets in newer middle-class suburbs, with keen attention paid to property display, eclecticism in the varied choice of styles and comparative sparceness or immaturity of tree growth. Category C streets represent new middle-class 'Town-House' estates developed and promoted by Local Authorities over the last decade. Their medium-density masonry dwelling forms are 'established' in the planning, architectural and landscaping professions but hardly yet elsewhere; streets are deliberately narrow and ambiguous, access is confined, and landscaping, with varied intentions of enclosure, is vigorously improvised.

Categories A and B both rank equally dismally. Both are typical of lower-income suburbs, A involving speculative building of the late 19th Century, and B involving State Housing of the 1930's and 1940's. Category A exhibits narrow streets, with strong enclosure through dwelling density and proximity
to boundaries, but not through large scale planting. Category B has only moderate street enclosure by its dwellings, but this is moderately supplemented by tree planting. While dwelling setbacks from frontages are great, roadways are of moderate width only. Both categories are readily identified by their respective uniformities of wooden dwelling style. It is held that these styles carry widely recognised and potent associations for most adult New Zealanders, especially about inhabitants' presumed levels of occupation and income.

Question 2 of Part 2 simply established the judged similarity of each respondent's own home street with the five street categories A, B, C, D and E examined in Question 1.

The findings presented, demonstrate a clear pattern of the origins of the student sample group.

A majority, 56%, had lived in streets/roads dissimilar to any of the five street categories. Being Hostel students, an appreciable sub-group could be assumed to have come from farming families or from other rural or provincial settlements not represented in the street categories.

Of the other 44% of students who did identify with any of the street categories, the dominant sub-group of 20% saw similarity in Category D, while the next largest sub-group of 14% saw similarity in Category E, so that together they confirm the fact that a majority of urban students are from higher-income urban families.

No-one admitted to having his domicile in a Category A street, only 2% identified with Category C, - which is consistent with the relative novelty of this category, - while a mere 8% found similarity in the ubiquitous State Housing Category B.

The combined results of questions 1 and 2 of Part 2, portray an expression of conservative taste in residential street character on the part of students of non-Auckland and rural domiciles, and probably Conservative family backgrounds. For a distinctive respondent group a distinctive diagnosis of street tastes has been described.
Moreover, and of critical importance to a discussion about objective (ii) of this survey (seeking to validate assumptions (a), (b), (c) and (d) about the value of various forms of street), the dominant criterion underlying the students' judgement of preference for the five street categories, appears to have been "inferred household income" or, "evident capital value", as mediated by the evidence of the built and natural residential environments displayed in the photos.

The purely spatial and relational attributes of street form inherent in assumptions (a), (b), (c) and (d) have not been shown to influence preference in any consistent way. For example, the attributes of street form inherent in the assumptions are largely present in both of the Categories A and C, yet the novel and more substantial alternative C, gains notably over alternative A. Until these assumptions can be tested across examples of residential streets of apparently equivalent "income or capital value", their validity will remain undetermined.

Question 3 of Part 2 seeking road-type preferences, finds a very strong preference for the Cul-de-Sac by approximately 3:1 over the standard Two-way through-Road, 6.4:1 over the Two-way Road with median, and by 16:1 over the One-way through-Road.

It seems that circuitous and inconvenient vehicular access, usually associated with Cul-de-Sac networks, is willingly accepted for the sake of the advantages of safety, tranquility and probably local place-identity, which are likely to be achieved in a Cul-de-Sac environment. On the other hand, in the absence of the Cul-de-Sac prospects, a preference is shown for maximum traffic convenience and flexibility usually associated with the standard Two-way Road rather than for its grander variant with median strip, or for the more limited purpose One-way Road.

Question 4 of Part 2, seeking preferred Street Features, finds overwhelming preference for ample tree-planting, for grass verges, for houses of varied design, and set back from the street. It finds very strong preference for off-street
parking and for fenced or hedged front yards. There is strong preference for average street widths, less for wide streets and much less still for narrow street widths.
3.4 SURVEY IV: PROPOSED MEDIUM-DENSITY HOUSING
- Its Layout, Identity and Interior Design

3.41 Objectives of Survey IV

Findings from Surveys I, II and III provided cumulative evidence that students' housing aspirations, initially and long-term, might not be singularly different from those of other Aucklanders. This evidence was 'circumstantial', resting on surveyed opinions and preferences about alternative life-styles and dwelling environments which were observed to be comparable with those of other Auckland Households.

The urge to test these observations of similar aspirations, by having a Student Population and a Household Population both submit to a common survey procedure, led to a major survey of these two groups. This was carried out in two stages during 1973 and 1974 and is designated Survey IV.

More specifically, Hypothesis A:

**THAT STUDENT HOUSING REQUIREMENTS FOR NEW ZEALAND URBAN UNIVERSITIES CAN BE MET SATISFACTORYLY BY THE LOW TO MEDIUM-RENTAL DWELLING FORMS AND ARRANGEMENTS OF MEDIUM-DENSITY INNER-SUBURBAN HOUSING ESSENTIALLY SIMILAR TO THOSE PREFERRED BY THE POPULATION AT LARGE,**

together with Hypothesis B:

**THAT THE HOUSING MOST PREFERRED BY STUDENTS, IS DETACHED IN ITS SITTING, TRADITIONAL AND/OR INTRIGUING IN CHARACTER, AND INFORMAL IN USE, BUT, NOTWITHSTANDING THESE, THE CHEAPEST TO RENT,**

would be comprehensively tested across a more controlled set of variables than was achieved in the earlier surveys.

With even more pertinence to the two-group nature of the samplings involved in Survey IV, and as a qualification of Hypothesis A, there was the intention of testing Hypothesis C:

**THAT DIFFERENCES IN OCCUPATION OR PRE-OCCUPATION OF THE RESPONDENT GROUPS WILL CORRELATE WITH SIGNIFICANT DIFFERENCES IN THEIR RESPONSES TO COMMON EXPERIENCES.**
In seeking to compare a Student Population with Auckland Householders, the apparent contradiction of Hypothesis C with Hypothesis A requires reconciliation. This reconciliation was predicted to occur as follows:

Firstly, while the occupational and preoccupational differences between the Student Group and the Householder Group, as a whole, were likely to be significant, the latter group would, by its very size and randomness, including demographic sub-groups whose characteristics would be substantially similar to those of the students.

Secondly, it was predicted that these sub-groups with characteristics similar to those of the students would tend to show preferences for housing conditions comparable with those of the students.

Thirdly, since the urban areas and housing conditions at stake in Hypothesis A are, respectively, inner-suburban areas and low to medium-rental housing, it was presumed that preference for them would therefore be shared by students and the similar sub-group of the population at large. Thus, it is this key qualification of the concept of "population-at-large" which brings a reconciliation between the two hypotheses.

Apart from interests focussed on Hypotheses A, B and C and group comparisons, a major prospect in devising Survey IV was that of amassing a wide spectrum of preference data considered crucial to the formation of future design policy for medium-density housing.

Three assumptions influenced the development of the survey design:

(i) that medium-density housing, per se, was not within the experience of the majority of any population sample available in Auckland;

(ii) that the survey design must cater for this status quo by including, among its concepts to be ranked, a quota of relatively familiar alternatives however radical other included alternatives might be, and;
(iii) that, in the absence of such medium-density housing experience, a variety of opportunities to, in fact, acquire that experience and later assess it, must be devised and implemented. Survey IV was one opportunity.

In the light of these assumptions, the quest for information and design guidance about medium-density housing was resolved into a comprehensive questionnaire related to a series of drawings and montages depicting a controlled range of design variables thought to be fundamental to this form of housing. These variables were to range in nature and scale from site planning, through room relationships and enclosure, to building and room character. Moreover, preference about these variables would be ascertained and compared in two basic ways:

(i) in relation to the two population samples: Students and Householders, and

(ii) in relation to a range of respondent characteristics recorded in a demographic section of the survey instrument.

3.42 Method of Survey IV

The method used to acquire the data consisted of administering Instrument No. 4A to a voluntary sample of interested University students of representative age, sex, vocational interests, home locations and accommodation currently occupied; followed by the administering of Instrument No. 4B to a representative random sample of Auckland Suburban Households. Both instruments consisted of structured questionnaires, both were administered in the field with the assistance of a study team of Architectural Psychology students. Instrument No. 4A was administered at the end of the winter term of 1973, and Instrument No. 4B - adapted for Householders - a year later.
The Questionnaire

Instrument No. 4A was an elaborate structured questionnaire consisting of 52 questions in 3 parts. The first 12 questions were concerned with the students' demographic characteristics, questions 13 and 14 were concerned with preference for aspects of accommodation modes (of the sort found in Survey 1), while the rest sought to identify preferences about 7 categorical Design Topics, each comprising an array of variants which, earlier, had been subjectively pre-judged as representative of that design topic, as it related to medium-density housing. An intended topic, Topic No. 2, was withdrawn from the survey because its variant displays were not ready.

Instrument No. 4B, to be completed by Auckland Householders, was an adaptation of Instrument No. 4A. The first 8 questions dealt with the householders' demographic characteristics, while the rest sought judgement of preference about the identical sequence of Design Topics and variants, as was displayed in Instrument No. 4A. These questionnaires, with their accompanying Design Topic displays, were self-administered.

Statistical testing of the results of both questionnaires centred on finding any significant correlations between expressed preferences and either group identity or individual respondent identity. This was done by testing the Null Hypothesis that:

"Neither respondent characteristics nor group identity are important in the frequency distribution of preference".

The Chi-squared test was to be used for these comparisons as well as for checking the significance and confidence levels of any associations revealed.
The following questionnaire is intended to ascertain your preferences in different situations and to form a design guide for projected student housing and other medium-density housing schemes.

All answers should be shown by transferring the relevant coding number to the right hand column. Responses are anonymous. Should you not wish to answer any question, leave a blank in the coding column.

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**Father's/Mother's occupation:**

| 1/ Yes | 2/ Perhaps | 3/ No |

**If you were offered accommodation in such a University student housing complex, would you accept it?**

| 1/ Private study-bedroom with facilities shared by say 12 |
| 2/ Married couple's flat |
| 3/ Ordinary flat for group of 3 to 6 occupants |

**Exterior: TOPIC NO 1**

**Arrangement of Units.**

Here we are concerned with the basic ways of grouping together a small number of dwelling units in an urban situation. We are not concerned with the shape of the units themselves, but only with their arrangement. Figures A, B, C, D, & E represent five possible arrangements - please list them in order of preference.

**Exterior: TOPIC NO 2**

**Outdoor domestic areas:** THIS TOPIC WAS WITHDRAWN.

**TOPIC NO 3**

**Exterior: Form and character of units.**

Here our concern is with the basic shape, identity and character of the individual dwelling-unit seen in a typically urban housing arrangement. Figures A, B, C, D, & E represent five possible forms of dwelling unit. Please list them in order of preference.

**TOPIC NO 4**

**Interior activities and relationships:**

Connection between living area and study-bedroom.

Please place the six examples A, B, C, D, E & F in order of preference considering only the connection zone between living area and study bedrooms.
Living, Dining, Kitchen relationship

Please rate in the coding column:
1 for Essential, 2 for Desirable, 3 for Unimportant,
4 for Undesirable, each of the following design provisions:

(For Example: Visual connection between living and dining is Desirable)

Design Provisions:

A. Spatial Relationships

1. Visual connection between living & dining
2. Visual connection between kitchen & dining
3. Visual connection between kitchen & living
4. Direct access to outside from kitchen
5. Direct access to outside from dining
6. Direct access to outside from living
7. Sunshine in living area
8. Sunshine in dining area
9. Sunshine in kitchen area

B. Activities Accommodated in living/dining/kitchen area

10. Provision for parties
11. Provision for overnight guests
12. Provision for entertaining at dinner
13. Provision for quiet reading space

14. Do you see the living space as an essential common area in a student flat consisting of study bedrooms?

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<tr>
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<th>Yes</th>
<th>No</th>
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15. Do you see the study-bedrooms as supplementary locations for some of the above common activities?

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<tr>
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<th>Yes</th>
<th>No</th>
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<td>33</td>
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16. Please rate in order of preference the following plan arrangements: (see plans A, B, C, D)

Note: They are diagramatic only and show the degree of separation.

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TOPIC NO. 5

Interior:
Living room character

The object of these drawings is to gauge your response to a range of room shapes which are feasible in living room areas of student flats.

There are eight sketches A, B, C, D, E, F, G, H.

Would you please rank these in order of preference.

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### TOPIC NO 6

**Interior:**

**Study Bedrooms**

<table>
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<tr>
<th>Sheet one shows birdseye view of four student bedrooms A, B, C, D. The rents for all four are the same. Concentrate on the windows and rank in order of preference.</th>
<th>36</th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
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<tr>
<td>Sheet two shows birdseye views of two student bedrooms A &amp; B. The rents are the same. Neglect for the moment items such as doors and windows. Which do you prefer?</td>
<td>37</td>
<td>1st</td>
<td>2nd</td>
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<td>Sheet three. Considerable economies can be achieved through the shape of the rooms and these will reflect in the rents. The three rooms A, B &amp; C shown have their rents indicated underneath and are of the same area. Please rank in order of preference.</td>
<td>38</td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
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<tr>
<td>Sheet four shows three rooms A, B, &amp; C with a built in wardrobe, the other two with a movable wardrobe. Please rank in order of preference.</td>
<td>39</td>
<td>1st</td>
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<td>3rd</td>
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<tr>
<td>Sheet five shows sectional perspective views of three rooms A, B &amp; C. The rooms are of the same total floor area and the rent paid for each is the same. Please rank in order of preference.</td>
<td>40</td>
<td>1st</td>
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### TOPIC NO 7

Laundry facilities for large scale student housing communities.

The flats to be designed will be self-contained in every way; but an exception could be the laundry facilities. This questionnaire aims to find out students present thoughts on:

1. **Full laundry facilities included in each flat:**
   - washing machine (with wringer or spindryer), clothesline, hot water cupboard and hot water drawn off flat supply.

2. **Communal laundry for complex: (with basic facilities in each flat)**
   - w.m.’s; spin dryers; cabinet dryers, outside line, table for sorting and folding, clothes trolley; ironing board; dustpans, buckets, mops and brushes; good floor drainage, view of children's playground and scenic view; seats and tea and coffee making facilities; hot water supply independent of flats.

3. **Communal laundry built in association with recreational centre,**
   - helping to make up a communal centre of shops, T.V. room, gymnasium etc.

Which of the above three concepts would you prefer?  

| 1. | 2. | 3. | 41 |
Would you select your above preference if:-

A. You had to pay for the use of the washing facilities separately from rent.
   1 Yes  2 No  42

B. You had the facilities included in your rent?
   1 Yes  2 No  43

C. The communal laundry was able to be used by other outside students; i.e. serve as a University laundrette.
   1 Yes  2 No  44

Did the thought of some of the following affect your decision?

A. That a communal laundry would be an invasion of your privacy?
   1 Yes  2 No  45

B. That a communal laundry would afford the possibility of social contact and interaction with other students of the housing complex?
   1 Yes  2 No  46

C. Having to leave your flat and walk to the laundry?
   1 Yes  2 No  47

D. Would it still prove inconvenient if the distance was under 60 yards?
   1 Yes  2 No  48

E. That the presence of a communal laundry would give the housing complex a too "institutionalized" (e.g. Hall of residence) type of atmosphere?
   1 Yes  2 No  49

What days do you prefer for doing your washing?

1 Sat  2 Sun  3 Mon
4 Tue  5 Wed  6 Thur
7 Fri

What time of day?

1 a.m.  2 p.m.  3 evening

Do you do your washing?

1 Twice weekly  2 Weekly
3 Weekly-Fortnightly  4 Fortnightly

In a flat with own private laundry - would you prefer the laundry facilities to be?

1 Laundry adjacent to kitchen  2 In the bathroom

P.J. Bartlett,
Senior Lecturer,
31/7/73

THANK YOU FOR YOUR CO-OPERATION
QUESTIONNAIRE

Because of the growing trend towards family housing in the form of 'town houses' and similar two-storeyed attached dwellings, a post-graduate research project was begun in 1973 at the School of Architecture, University of Auckland, in order to assess community attitudes to a range of alternative design approaches likely to be found in this type of dwelling.

Your co-operation in this survey will greatly assist us, and eventually contribute to a deeper understanding of the current preferences of householders, by those who share responsibility for housing policy and design.

The following questionnaire is intended to ascertain your preferences among different alternatives and to form a guide to the design of site layouts, room arrangements, and the exterior and interior character of dwellings in projected housing schemes.

All answers should be recorded in the 'box' or space on the right hand side of the questionnaire. Responses are anonymous. Should you not wish to answer any question, please leave a blank.

PERSONAL INFORMATION

1. **AGE:**

2. **SEX:** (Please tick)  
   - Male:  
   - Female:  

3. **MARITAL STATUS:**  
   - Married:  
   - Living with permanent partner of opposite sex:  
   - Unmarried:  
   - Divorced:  
   - Widowed:  

4. **PREVIOUS HOME LOCATION:**  
   - City:  
   - Town:  
   - Rural:  
   - Overseas:  
   - Other:  

.../2.
5. **VEHICLE OWNERSHIP:**
- Bicycle: □
- Motorcycle: □
- Car: □
- Boat: □
- None: □
- Other: □

6. **RELIGIOUS AFFILIATION:**
- Methodist: □
- Anglican: □
- Presbyterian: □
- Catholic: □
- None: □
- Other: □

7. **OCCUPATIONS OF ADULTS IN YOUR HOUSEHOLD:**

8. **WHAT TYPE OF ACCOMMODATION DO YOU CURRENTLY OCCUPY?:**
- Private House: □
- Boarding House: □
- Flat: □
- Large Flat (6 or more persons): □
- Other: □

**INTRODUCTION TO DESIGN TOPICS**

Please consider the accompanying sets of drawings when answering the following questions:

Each set of drawings deals with a distinct design topic and is distinguished by its topic number, for example:

Topic One in the Questionnaire deals with Topic No. 1 on the set of drawings.

9. **TOPIC ONE**

Figures A, B, C, D & E represent five possible arrangements - please list them in order of preference.

We are not concerned with the shape of the dwelling units themselves, but only with their arrangement on the site.

First
Second
Third
Fourth
Fifth

.../3.
10. **TOPIC TWO**

Figures A, B, C, D & E represent five possible forms of dwelling unit. Please list them in order of preference.

Here our concern is with the basic shape and character of the individual dwelling unit.

11. **TOPIC THREE**

Figures A, B, C, D, E & F show various kinds of connection between living area and bedroom.

Please place them in order of preference.

12. **TOPIC FOUR**

Choose one of the following words

- Essential
- Desirable
- Unimportant
- Undesirable

To describe your feelings towards the following:

(For Example, - A visual connection between living & Dining Rooms is Desirable)

12.01 Visual Connection between Living & Dining Rooms is ______________________
12.02 Visual Connection between Kitchen & Dining Room is ______________________
12.03 Visual Connection between Kitchen & Living Room is ______________________
12.04 Direct Access to Outdoors from Kitchen is ________________________________
12.05 Direct Access to Outdoors from Dining Room is ____________________________
12.06 Direct Access to Outdoors from Living Room is ____________________________
12.07 Sunshine in Living Room is ____________________________________________
12.08 Sunshine in Dining Room is ____________________________________________
12.09 Sunshine in Kitchen is ________________________________________________
12.10 Provision for Parties is _________________________________________________
12.11 Provision for Overnight guests is __________________________________________
12.12 Provision for Entertaining at Dinner is ______________________________________
12.13 Provision for Quiet Reading/conversation space is __________________________
12.14 Do you see the Living room as an essential common area in your dwelling? (Please tick)  
   Yes  
   No
12.15 Do you see the Bedrooms as alternatives to the Living room as a common area? (Please tick)  
   Yes  
   No
12.16 Figures A, B, C & D are alternative plan arrangements. Please list in order of preference:  
   First  
   Second  
   Third  
   Fourth
13. **TOPIC FIVE**

Eight sketches A, B, C, D, E, F, G & H show a range of Living Room shapes. Please place them in order of preference.

14. **TOPIC SIX**

Sheet one shows birds-eye views of four bedrooms A, B, C & D with four window arrangements.
Please place them in order of preference.

Sheet two shows birds-eye views of two bedrooms A & B.
Please place them in order of preference.

Sheet three. The three rooms A, B & C shown have their rents indicated underneath and are of the same area. Assuming you were to rent one of these rooms, please place them in order of preference.

Sheet four shows three rooms A, B & C, one with a built-in wardrobe, the other two with a movable wardrobe.
Please place in order of preference.

Sheet five shows views of three rooms A, B & C. The rooms are of the same total floor area.
Please place them in order of preference.

15. Additional comments you may have:

THANK YOU FOR YOUR CO-OPERATION

P.J. Bartlett,
Senior Lecturer
24 July 1974
Sampling Method

Survey IV was administered to two distinct population samples:
(i) a sample of 253 full-time Auckland University Students who volunteered to complete their questionnaire, and,
(ii) a sample of 163 Auckland Suburban Households who were selected by a process of random street sampling. See Appendix 1.

The student survey was held in 1973 by publicising the event beforehand with an invitation to interested full-time students to volunteer for the survey by visiting a manned advice and display centre, set up for the purpose of exhibiting the graphic display of design topics, as well as issuing and returning the questionnaires. This display centre was mounted, for two-day periods, firstly, in the Students' Union Cafeteria, secondly, in the lounge of O'Rorke Hall - the principal Hall of Residence in Auckland for New Zealand undergraduate students - and, thirdly, in the lounge of Norman Spencer Hall - a complex of University-managed student flats occupied mainly by graduate students. The overall sample was fairly representative of age, sex, course, home-location and currently occupied accommodation as shown in Table 4.1.

The Household survey was conducted in 1974 by deploying a team of Architectural Psychology students throughout an assortment of randomly selected suburban streets. There, respondents from each household, of whatever kind, were recruited by personal invitation, before proceeding to examine a swatch of graphical display cards depicting the design topics prior to filling in the questionnaire. Completed questionnaires were collected later the same day, or at a later date by arrangement. The demographic data on the sample population of Householders are as shown in Table 4.2.
TABLE 4.1: SURVEY IV - STUDENTS
Sample Size = 253

Frequency Distribution of Demographic Data on Respondents

<p>| Q.1. Age: 17 yrs 18 yrs 19 yrs 20 yrs 21 yrs 22 yrs 23 yrs 24 yrs 25 yrs+ NA |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                 | 9               | 32              | 54              | 60              | 28              | 26              | 17              | 12              | 14              | 1               |
| Q.2. Course: BA/MA BSc/MSc BE LLB B.Com. B.Arch. DFA MBA/MD DTP NA |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                 | 78              | 58              | 26              | 22              | 20              | 31              | 4               | 3               | 2               | 9               |
| Q.3. Academic Level: Undergraduate Graduate NA |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                 | 224             | 27              |                 |                 |                 |                 |                 |                 |                 |
| Q.4. Year of Course: 1st 2nd 3rd 4th 5th 6th NA |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                 | 57              | 71              | 63              | 33              | 18              | 6               | 4               |                 |                 |
| Q.5. Sex: Male Female NA |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                 | 186             | 66              |                 |                 |                 |                 |                 |                 |                 |
| Q.6. Marital Status: Married Single NA |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|</p>
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<th></th>
<th>28</th>
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<td>Q.8. Pre-University Home: City Town Rural Overseas NA</td>
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<td>25</td>
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<tr>
<td>Q.9. Vehicle: Bicycle Motorcycle Car None NA</td>
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<td>Q.10. Religion: Methodist Anglican Presbyterian Catholic Other None NA</td>
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<td>29</td>
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<td>Q.11. Current Accomodation: Home Private Board Hall of Residence House/Flat Flat Other NA</td>
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<td>4</td>
<td>5</td>
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<td>Q.13. Acceptance of Student Housing Complex: Yes Perhaps No NA</td>
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<td>Q.14. Preferred Flat: Study-Bedroom Couple's Ordinary Shared Facilities. Flat House/Flat Other NA</td>
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### TABLE 4.2: SURVEY IV - HOUSEHOLDS
Sample Size = 163

**Frequency Distribution of Demographic Data on Respondents**

Locality: Ignored for Statistical analysis.

<table>
<thead>
<tr>
<th>Q.1. Age:</th>
<th>18-24 yrs</th>
<th>25-29 yrs</th>
<th>30-34 yrs</th>
<th>35 yrs+</th>
<th>NA</th>
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<tr>
<th>Q.2. Sex:</th>
<th>Male</th>
<th>Female</th>
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<thead>
<tr>
<th>Q.3. Marital Status:</th>
<th>Married</th>
<th>Defacto couple</th>
<th>Unmarried</th>
<th>Divorced</th>
<th>Widowed</th>
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<thead>
<tr>
<th>Q.4. Previous Home:</th>
<th>City</th>
<th>Town</th>
<th>Rural</th>
<th>Overseas</th>
<th>Other</th>
<th>NA</th>
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</table>

<table>
<thead>
<tr>
<th>Q.5. Vehicle:</th>
<th>Bicycle</th>
<th>Motorcycle</th>
<th>Car</th>
<th>Boat</th>
<th>None</th>
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<th>Q.6. Religion:</th>
<th>Methodist</th>
<th>Anglican</th>
<th>Presbyterian</th>
<th>Catholic</th>
<th>None</th>
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<th>Q.7. Occupations:</th>
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<th>7</th>
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<td>1</td>
<td>27</td>
<td>26</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Q.8. Current Accommodation:</th>
<th>Private House</th>
<th>Boarding House</th>
<th>Flat</th>
<th>Large Flat</th>
<th>Other</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>0</td>
<td>27</td>
<td>0</td>
<td>1</td>
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</tbody>
</table>

As a matter of interpretative interest, tests of association, between each and every other aspect of the above demographic data on Households, were carried out using the Chi-squared test on computer analysed contingency tables. Significant but largely anticipated correlations were found as follows:

**Significant at the 1% level of confidence were:**

(i) Correlation between young householders and unmarried status.

(ii) Correlation between male head of household and unmarried status, and between female head of household and married status.

(iii) Correlation between women and housewifery.

(iv) Correlation between married householders and current occupancy of a private home.

**Significant at the 2.5% level of confidence were:**

(i) Correlation between young adult householders and flat-dwelling.

(ii) Correlation between the unmarried and non-ownership of cars.
3.43 Results of Survey IV

The results of Survey IV are summarised in two ways:

(i) The frequency distributions of first preference for the variants in each Design Topic are presented in the form of histograms in the following Figures 4.01 to 4.06.5. These histograms show the surveyed results of both of the respondent population samples - Students and Households - superimposed for ready comparison.

(ii) The occurrence of significant correlations between Design Topic preferences and respondents' demographic characteristics, is discussed in conjunction with each Design Topic illustration as shown in the following Figures 4.11 to 4.16.5, set out in the same sequence as experienced by the respondents. The significance of these correlations is accounted for by the confidence levels and supporting values for Chi-squared and Degrees of Freedom as shown. These were analysed from the contingency tables of paired questions calculated in the computer printouts. Significant tables are shown in the discussion.

In order to execute the Chi-squared statistic validly, it has been necessary to regroup categories of demographic data especially in those questions in Part 1 of Instruments 4A and 4B, which offered categories too numerous for responses to occur of sufficient size (a minimum response of 5). Accordingly, re-grouping has been carried out in questions 1, 3, 4, 5, 6, 7 and 8. For this reason, respondent classes discussed with the survey results, have often been modified. For example, in question 6 of Instrument 4B, re-grouping has reduced the number of classes of 'Religious Affiliation' to three, viz. (i) Protestant (subsuming Methodist, Anglican and Presbyterian), (ii) Catholic, and (iii) None (subsuming Other).
TOPIC NO. 1

The histogram of 1st preference regarding TOPIC No. 1, 'Arrangement of Dwellings on Site', shows variants B and C as the 1st and 2nd choice of Auckland Households but the reverse choice, 2nd and 1st of Auckland Students. Variant E is a close 3rd choice of both groups. Variant A provoked the greatest variance in response between the two groups: it is the 3rd equal choice of Households, but emphatically the lowest choice of Students. The Megaform D is as unpopular with Households as the Row-housing was with Students.

Variant B, the clear 1st choice of Households, is notable as the only one consisting of a cluster of detached dwellings and thus, can be considered to involve the slightest conceptual shift from traditional suburban housing arrangements. This gentle shift is towards increased density - with a corresponding inferred drop in privacy - and towards the addition of a notional 'common green' offering the basis of an identifiable
TOPIC NO. 1: ARRANGEMENTS OF DWELLINGS ON SITE

VARIANTS A, B & C

NOTE: The original survey displays showed larger images with two cases per page.

Figure: 4.11a
TOPIC NO. 1 : ARRANGEMENTS OF DWELLINGS ON SITE
VARIANTS D & E

Figure : 4.11b
group of homes sharing three territorial zones: a public street, semi-private surroundings and a communal zone.

Variants E and C are markedly stronger distillations of this B model, with inferred privacy further decreasing, and the communal zone, as well as public group identity, further increasing. The high preferences recorded for variants C, B and E - especially by the Students - tends to reinforce the preference by students, revealed in Survey III, for the Cul-de-Sac type of residential street and its inherent housing cluster.

Variant A - 'The Street' - has provoked highly reactive responses. It can be associated strongly with European stereotypes, whose effects on Auckland judgements are varied. It combines increased density with reduced privacy. There is no communal zone, but a very pronounced public one, without at the same time, offering strong group identity as in B, C and E. In this respect if offers anonymity.

Variant D, the 'Megaform' is the most homogeneous arrangement, with the least privacy, the most public and semi-public territory, and, with its urban apartment-block image, is the furthest from the more suburban cluster-model B. Its bottom ranking is consistent in these terms.

The occurrence of significant correlations between Variants A, B, C, D or E and each respondent group's demographic characteristics is analysed from the computer printout contingency tables and outlined, on a comparative basis, as follows:

In TOPIC No. 1, Variant A has drawn a strong preference by acknowledged Catholic Households, which is statistically, probably significant \((P = 5\%\)^1 Indeed it is narrowly their first choice - perhaps 'Hogside' revisited.

Variant B has drawn a strong preference by acknowledged Protestant Households, which is statistically, probably significant \((P = 5\%\)^1 It is very prominently their first choice - perhaps suburbanly re-assuring.
Variant C has drawn a strong preference by Households of no (or fringe) religion and an equally strong rejection by Protestant Households, which is statistically, probably significant (P = 5%).¹

Variant E has drawn preference by Protestant Households and strong rejection by Households of no (or fringe) religion, which is statistically, probably significant (P = 5%).¹

1. TABLE : 4.3.1 Religious Affiliation x TOPIC No. 1

CONTINGENCY TABLE FOR N. 6 x 6. G. CHI-SQUARED: 17.76979 WITH 8 DEGREES OF FREEDOM.

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¹ Chi-Square Value: 17.76979 with 8 degrees of freedom.
TOPIC NO. 2

The histogram of 1st preference regarding TOPIC No. 2, 'Character of Dwellings' shows Variant B as overwhelming 1st preference by Households. It rates only 3rd by Students and, in so doing, accounts for the greatest variance between the respondent groups in this topic, although Variants C and D too, have drawn marked variance in response. Both groups concur in heavily rejecting Variant E, but in their 1st, 2nd and 3rd choices, the Students show wide divergence from the Households in their preferences. This 1st, 2nd and 3rd choice divergence between the respondent groups, is notably greater in TOPIC No. 2 than in TOPIC No. 1 and tentatively indicates one possible emphasis underlying respondents' discriminating interest in housing design - an emphasis on dwelling identity and meaning.
TOPIC NO. 2: CHARACTER OF DWELLINGS
VARIANTS A, B, & C

Figure: 4.12a
TOPIC NO. 2: CHARACTER OF DWELLINGS
VARIANTS D & E

Figure: 4.12b
As to this identity in the range of dwelling variants displayed, Variant A signifies 'High Period Modern' with an abstract aesthetic, and a reductionist, sophisticated approach to detailed design; Variant B signifies 'Modern Masonry Vernacular' typical of some Auckland Local Authority town housing and originally, from a Mediterranean tradition; Variant C represents a trendy image of generous and informal pole-framed, spatially-dynamic accommodation, just familiar at the time of the survey in the newer suburbs and the journals that mirror them; Variant D embodies the current movement back to traditions and nostalgias of our colonial establishment, to crafted intricacies of design and forthright architectural gesture which bowed to its social contract; Variant E epitomises the more banal types of mass-produced, drearly permanent, industrialised domestic building, rare in New Zealand but widely recognised as typical of the post-World-War 2, European reconstruction programme.

The occurrence of significant correlations between Variants A, B, C, D or E of TOMIC No. 2, and each respondent group's demographic characteristics is analysed from the computer printout contingency tables, and outlined on a comparative basis as follows:

Variant A has drawn strong rejection by Householders under 30 years of age but increasing preference with increase in age (30 yrs to 60 yrs) which is statistically significant (P = 1%).

Variant B has drawn rejection by Householders of 25 to 29 years of age, but preference by those of 30 to 34 years, which is statistically significant (P = 1%). By comparison, Variant B has drawn rejection by students enrolled in Liberal Arts courses, but preference by Science and Engineering Students, which is statistically probably significant (P = 2.5%).

Variant C has drawn rejection by Householders under 25 years and over 30 years of age, but strong preference by those in the 25-29 years-of-age group which is statistically significant (P = 1%).
Variant D has drawn strong preference by Householders under 25 years of age, preference by those between 25 and 29 years of age, but has drawn increasing rejection by Householders from 35 years of age upwards. By comparison, Variant D has drawn strong preference by Liberal Arts Students but strong rejection by Science and Engineering Students which is statistically probably significant \((P = 2.5\%)\).\(^3\)

Variant I:\(\) has drawn very strong rejection by Householders of all age groups, and comparable rejection by students in all courses, and hence there are no statistically significant correlations.

2. **TABLE 4.3.2 Householders' Age Group x TOPIC No. 2**

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3. **TABLE 4.3.3 Students Course x TOPIC No. 2**

<table>
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<td>2.71</td>
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<td>22</td>
<td>22</td>
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<td>22</td>
</tr>
</tbody>
</table>

\(^3\) Chi-square with 12 degrees of freedom.
TOPIC NO. 3

The histogram of 1st preference regarding TOPIC No. 3, 'Living-Bedroom Relationships', shows Variant B as a very strong 1st preference by Auckland Households, with Variant C a strong 2nd preference, but the rest ranked relatively low. Households and Students concur in ranking Variant A the lowest, and Variant E as their 3rd preference, but display notable variance in their rankings of the other Variants B, C, D and F. Whereas Household preference declines with the addition of half-storey and full-storey stairways - especially when unpartitioned and opening onto living rooms - Students' preference rises. The 1st preferences of both groups, Variant D by Students and Variant B by Households, together account for approximately $2/3$ of the total Topic variance.
TOPIC NO. 3: 'LIVING-ROOM/BEDROOM RELATIONSHIPS'
VARIANTS A, B, C, D, E & F.

Figure: 4.13
Thus, there is evidence in TOPIC No. 3 that households, presumably in the light of their experience and values, resist the change-of-level concept in dwellings and also seek to maximise the separation of living-room from bedroom by means of a closeable intervening lobby.

Students, on the other hand, responding perhaps to the inherent drama of movement, the spatial configuration, and formal intricacy of an exposed stairway, seem to prefer those very characteristics in dwellings.

The occurrence, of significant correlations between Variants A, B, C, D, E or F of TOPIC No. 3, and each respondent group's demographic characteristics, is analysed from the computer printout contingency tables and outlined as follows:

Variants C and E both draw strong preference by Students from city homes, but strong rejection by Students whose homes were in other-than-city locations, which is statistically probably significant ($P = 2.5\%$).

Variants B and D both draw strong rejection by Students from city homes, but strong preference by Students whose homes were in other-than-city locations, which is statistically probably significant ($P = 2.5\%$).

4. TABLE : 4.3.4 Students' Pre-University Home Location x TOPIC No. 3

<table>
<thead>
<tr>
<th>Contingency Table for 0, 2, 5, 8, 17</th>
<th>PHI-Square $\phi$</th>
<th>14.99479 with 5 degrees of freedom</th>
</tr>
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<tr>
<td>$1.1$</td>
<td>$1.57$</td>
<td>$5.30$</td>
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<td>$1.7$</td>
<td>$2.23$</td>
<td>$2.25$</td>
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<td>$2.8$</td>
<td>$3.73$</td>
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<td>$2.7$</td>
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<td>$2.6$</td>
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<tr>
<td>$2.9$</td>
<td>$1.53$</td>
<td>$1.55$</td>
</tr>
</tbody>
</table>
TOPIC NO. 4

NOTE: TOPIC No. 4 included an introductory series of 15 questions, without any supporting graphics display, and referring to detailed aspects of room use, relationships, outlook and orientation. While their results were analysed, their interest and significance was not considered to be sufficient for inclusion in this presentation of findings.

The histogram of 1st preference regarding the section of TOPIC No. 4, dealing with 'Separation of Kitchen/Dining/Living Activities, shows Auckland Household preferences increasing as the degree of physical separation of each of the three activities increases. This physical separation of the activities, whether as the cause or the effect, is a function of the physical enclosure of the spaces they occur in. Moreover, as space enclosure increases so does activity and room identity. Thus it is assumed that in assessing the
TOPIC NO. 4: SEPARATION OF KITCHEN/DINING/LIVING ROOMS
VARIANTS A, B, C & D

Figure: 4.14
desirability of any variant, a respondent compares his lifestyle concept of the activities in question with the variants displayed, and matches this activities concept to that variant which signifies it for him most clearly, by virtue of its degree of activity or room identity.

For the Household group, Variant D, offering maximum separation, is the 1st choice. For Students it is the last choice. The Students respond notably to Variant C - their 1st choice - combining mixed cooking and dining activities in sub-sectors of one room, separated from living room activities in another. The 'open-plan' arrangement of Variant A is well tolerated by the Students whereas for the Householders it ranks last.

The occurrence, of significant correlations between Variants A, B, C or D of TOPIC No. 4, and each respondent group's demographic characteristics, is analysed from the computer printout contingency tables and outlined as follows:

Variant B has drawn strong rejection by Car-owners among Auckland Households but very strong preference by those without cars, which is statistically probably significant \( (P = 5\%) \).

Variant D has drawn strong preference by car-owning Households but strong rejection by those without cars, which is statistically probably significant \( (P = 5\%) \).

Variant B has drawn mild rejection by Protestant Households but preference by Catholic ones, whereas Variant D has drawn the opposite responses, which is statistically probably significant \( (P = 2.5\%) \).

5. TABLE 4.3.5 Households Vehicle Ownership x TOPIC No. 4

<table>
<thead>
<tr>
<th>CONTINGENCY TABLE FOR Q. 6, X 6, 27, CHI-SQUARED = 10.08954 WITH 11 DEGREES OF FREEDOM.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 4 1.23 10 5.73 6 7.67 6</td>
</tr>
<tr>
<td>3 7.27</td>
</tr>
<tr>
<td>5 10.51 96 113</td>
</tr>
</tbody>
</table>

6. TABLE 4.3.6 Households Religious Affiliation x TOPIC No. 4

<table>
<thead>
<tr>
<th>CONTINGENCY TABLE FOR Q. 6, X 6, 27, CHI-SQUARED = 15.04066 WITH 9 DEGREES OF FREEDOM.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 9.14 17 17.61 22 77.97 72</td>
</tr>
<tr>
<td>2 2 4.67 7 4.67 6 3.37 4 15.99 15</td>
</tr>
<tr>
<td>3 2 2.62 34 11.99 13 15.44 22 15.74 43</td>
</tr>
<tr>
<td>4 2 15.99 27 15.74 43 54</td>
</tr>
<tr>
<td>5 135</td>
</tr>
</tbody>
</table>
TOPIC NO. 5

The histogram of 1st preference regarding TOPIC No. 5, dealing with 'Character of Living-Rooms', shows considerable unanimity of opinion between the two respondent groups, about Variants C, D, E and F. These are all given low ratings by both groups. Variant A has prompted marked variance in ranking, being 3rd choice by Households but 2nd-to-last by Students. Variant G has strong support by both groups, ranking 1st by Householders and 3rd by Students. Variant G has drawn the strongest overall support by the combined groups, and also the greatest variance. It is the overwhelming 1st preference by Students and a high 2nd preference by Households.
TOPIC NO. 5 : CHARACTER OF LIVING-ROOMS

Figure: 4.15a
TOPIC NO. 5: CHARACTER OF LIVING ROOMS

Figure: 4.15b
There is clear evidence that a floor-level change in living rooms, as in Variants G, H and B, is popular amongst both Households and Students - filling the first two preferences by Households and the first three by Students. The combination of a floor-level change and a sloping ceiling, as in Variants G and H, ranks 1st and 2nd preference with Students and 2nd and 4th with Households. The tension and greater variety of spatial qualities, introduced by the sloping ceiling, draws very strong Student preference (as did stairs and half-levels in the 'Living-Bedroom Relationships' Study) but comparatively less preference from Households who seem to prefer almost equally the flat-ceilinged combinations B and A.

This series of Living-room settings consisted of eight combinations of three factors - Ceiling, Floor and Rear wall - each rendered in two conditions, to make up the total of eight combinations. The surveyed findings about these eight combinations, proved fruitful in two directions. Firstly, they provided a basic simulation design for Venter's (1974) research into attitudes towards Living-rooms, in which the effects of the addition of elements to a bare setting on respondent judgements of meaning were analysed. Secondly, findings from TOPIC No. 5 invited further study in depth of the way in which, not only preference, but judgement of the meanings and satisfactions of a factorially designed range of living-room simulations might vary with each arrangement, and how significant the architectural components of the simulations might be in affecting judgements of meaning and satisfaction. This experimental research was carried out in 1976, as the final investigation of this series, and is described in Survey VIII.

The occurrence, of significant correlations in TOPIC No. 5, between Variants A, B, C, D, E, F, G or H and each respondent group's demographic characteristics, is analysed from the computer printout contingency tables and outlined as follows:

Variant H has drawn strong preference by Students of city domicile, but rejection by Students of non-city domicile, which is statistically probably significant (P = 5%).
Both Variants B and G have drawn preference by Students of non-city domicile which is statistically probably significant \( (P = 5\%)^7 \).

By comparison, Variants A and B have drawn preference by Householders of Formerly City Domicile, but rejection by those of Formerly Non-City Domicile, which is statistically significant \( (P = 1\%)^8 \).

7. TABLE 4.3.7 Students' Pre-University Home Location x TOPIC No. 5

<table>
<thead>
<tr>
<th>CONTIGUITY TABLE FOR G, B x 2, 34</th>
<th>CHI-SQUARE</th>
<th>5.99842 WITH 2 DEGREES OF FREEDOM.</th>
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</thead>
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<tr>
<td>1</td>
<td>20.06</td>
<td>0.67</td>
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<td>2</td>
<td>20.14</td>
<td>0.73</td>
</tr>
<tr>
<td>3</td>
<td>10.14</td>
<td>0.73</td>
</tr>
<tr>
<td>4</td>
<td>10.14</td>
<td>0.73</td>
</tr>
</tbody>
</table>

8. TABLE 4.3.8 Householders' Previous Home Location x TOPIC No. 5

| 1 | 19 | 11.67 | 25 | 29.81 | 3 | 6.72 | 0.86 | 5 | 6.78 | 6 | 2.43 | 7 | 6.38 | 8 | 16.78 |
| 2 | 26 | 4.57  | 6  | 0.04  | 4 | 1.74 | 4   | 1.95 | 3 | 2.61 | 7 | 1.09 | 2 | 6.30  |
| 3 | 21 | 37    | 6  | 0.74  | 12 | 1.74 | 2   | 1.95 | 3 | 2.61 | 0 | 1.09 | 2 | 6.30  |
| 4 | 29 | 4.57  | 6  | 0.04  | 4 | 1.74 | 4   | 1.95 | 3 | 2.61 | 7 | 1.09 | 2 | 6.30  |
TOPIC NO. 6.1

The histogram of 1st preference regarding TOPIC No. 6.1, dealing with 'Bedroom Window Arrangement', shows close agreement between the two respondent groups in their ranking of the Variants A, B, C and D. Students' judgements appear to be more polarised between the 1st and last choice, as indicated by the greater variance in their scoring. Bedroom Variant D incorporating a Corner Bay-Window is very strongly preferred by both groups. It is somewhat surprising to find that Variant C which has French Doors and Balcony, loses to Variant B which has a window in each of two adjacent walls. Apparently the double orientation of Variant B, offering inferred alternatives of view and sunlight, (as does 1st choice Variant D) is more highly valued than the potential outdoor excursion offered by the balcony in Variant C.
TOPIC NO. 6.1: 'BEDROOM WINDOW ARRANGEMENT'

VARIANTS a, b, c & d

Figure 4.16.1
No statistically significant correlations were found between any of the Variants of TOPIC No. 6.1 and the demographic characteristics of the respondent groups.
Histogram of 1st Preference

FIGURE: 4.06.2 TOPIC No. 6.2: 'BEDROOM PLAN SHAPES'

Auck. Households  Auck. Students

TOPIC NO. 6.2

The histogram of 1st preference regarding TOPIC No. 6.2 dealing with 'Bedroom Plan Shape', again shows close agreement between respondent groups with Students again recording the greatest scoring variance. They are once again more emphatic in their likes and dislikes, than Households. Of the two plans of equal floor area, Variant B is very strongly preferred, presumably for the more complex uses and visual experiences which its two-zone space can be expected to accommodate.

The occurrence, of significant correlations in TOPIC No. 6.2, between Variants A or B, and each respondent group's demographic characteristics is analysed from the computer printout contingency tables, and outlined as follows:
Variant A has drawn very strong rejection by Male Householders but very strong preference by Females, whereas Variant B has drawn very strong preference by the Males but equally strong rejection by Female Householders, which is statistically probably significant \( (P = 2.5\%) \).

Furthermore, Variant A has drawn strong rejection by Households formerly of Town (not City) Domiciles, but preference by those formerly of Rural Domiciles, whereas Variant B has drawn strong preference by Households formerly of Town Domiciles, but rejection by those formerly of Rural Domicile, which is statistically probably significant \( (P = 5\%) \).

9. TABLE 4.3.9 Householders' Sex x TOPIC No. 6.2

<table>
<thead>
<tr>
<th>Contingency Table for ( 2 \times 6 )</th>
<th>( \chi^2 )-Squared: ( 5.14583 ) with 1 Degree of Freedom.</th>
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</thead>
<tbody>
<tr>
<td>1 4 9.10 24 15.70 2652.14 26346.52 129</td>
<td>51 106 157</td>
</tr>
</tbody>
</table>

10. TABLE 4.3.10 Householders' Previous Home Location x TOPIC No. 6.2

<table>
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<tr>
<th>Contingency Table for ( 4 \times 6 )</th>
<th>( \chi^2 )-Squared: ( 6.4158 ) with 2 Degrees of Freedom.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 30 66.32 54 66.40 80</td>
<td>2 10 10.50 24 77.60 33</td>
</tr>
<tr>
<td>3 18 16.16 18 21.62 29</td>
<td>15 103 154</td>
</tr>
</tbody>
</table>
TOpic No. 6.3

The histogram of 1st preference regarding TOpic No. 6.3, dealing with 'Bedroom Plan Proportions' - as one generator of high or low compactness, and hence economy, in medium-density accommodation - again shows close agreement between the two respondent groups, except that, in this topic, the greatest variance is found in the Households' scoring.

All of the Variants are of equal floor-area, but Variant C with the Most Expansive Window wall, and window, together with the Higher Rental, wins 1st preference convincingly over Variant B amongst Households, but narrowly amongst Students, who possibly, were influenced more strongly by the lowest Rental aspect of Variant B, than were the more financially secure household respondents.

No statistically significant correlations were found between any of the Variants of TOpic No. 6.3 and the demographic characteristics of the respondent groups.
TOPIC NO. 6.3: 'BEDROOM PLAN PROPORTIONS' 

VARIANTS a, b & c 

Figure: 4.16.3
FIGURE: 4.06.4 TOPIC No. 6.4: 'BUILT-IN OR MOVABLE WARDROBES'

TOPIC NO. 6.4

The histogram of 1st preference regarding TOPIC No. 6.4, dealing with 'Built-in or Movable Wardrobes', again shows close agreement between the two respondent groups, and again, as in TOPIC No. 6.3, the greatest variance is found in the Households' scoring.

Variant A, the only one with a Built-In Wardrobe, is overwhelmingly 1st preference by Households and Students. Students show slightly less preference for Variant A and slightly more for the movable wardrobes, especially the more space-articulating Variant C.

The occurrence of significant correlations in TOPIC No. 6.4 between Variants A, B or C and each respondent group's demographic characteristics, is analysed from the computer printout contingency tables, and is outlined as follows:
TOPIC NO. 6.4: 'BUILT-IN OR MOVABLE WARDROBES'

VARIANTS a, b & c

Figure: 4.16.4
Variant A has drawn rejection by Household Males but preference by Household Females, which is statistically significant \( (P = 1\%)\).11

11. TABLE 4.3.11 Householders' Sex x TOPIC No. 6.4

<table>
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<tr>
<th>Contingency Table for Q x 12 x Q</th>
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<th>6,76</th>
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<th>1,11</th>
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<td>107,69</td>
<td>1</td>
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<td>4,07</td>
<td>17</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
<td>14</td>
</tr>
</tbody>
</table>

Chi-Squared = 12.84644 with 2 degrees of freedom.
TOPIC NO. 6.5

The histogram of 1st preference regarding TOPIC No. 6.5, dealing with 'Cross-Sectional Shape of Rooms of identical floor area'—shows a distinctive negative correlation between the overall responses of the two groups, but with the Students again exercising the greatest variance in their rankings.

In these compared scores, another insight is revealed about the two groups' differing evaluations of room character, especially as this is affected by ceiling-planes and their heights. This finding strongly confirms similar evidence about ceiling preferences shown and discussed in TOPIC No. 5, 'Character of Living-Rooms'.

Variant C, a not unpopular last choice by Households, is an enthusiastic 1st choice by Students. Variant A is a much less enthusiastic 1st choice by Households, and probably represents the familiar domestic stereotype. By contrast,
Variant C probably infers difficulties in, say, child-rearing and housekeeping routines in the eyes of Households; whereas for Students, it probably infers a degree of improvisation, or adventure in the use of space; kinetic and visual drama; and a worthwhile economy and variety in the occupancy of the room. It would seem that routine difficulties associated with tall ceilings or mezzanine lofts are of little account to Students - and possibly to the young in general - a not surprising confirmation.

NOTE: The questionnaire to Students in Survey IV, included an end-series of questions designated TOPIC No. 7, relating to Laundry Facilities for Large-Scale Student Housing Communities. There was no supporting graphics display for this topic, nor was it relevant to include in the questionnaire to Households. Accordingly the results from TOPIC No. 7 are not presented here, as are the other topics, for comparative analysis.
3.44 Discussion of the Results of Survey IV

Following the detailed commentary incorporated with the Results of Survey IV in Section 3.43, it is of interest here to discuss the broader implications of those results in relation to aspects of Hypotheses A, B and C.

Hypothesis A states:

THAT STUDENT HOUSING REQUIREMENTS FOR NEW ZEALAND URBAN UNIVERSITIES CAN BE MET SATISFACTORILY BY THE LOW TO MEDIUM-RENTAL DWELLING FORMS AND ARRANGEMENTS OF MEDIUM-DENSITY INNER-SUBURBAN HOUSING ESSENTIALLY SIMILAR TO THOSE PREFERRED BY THE POPULATION AT LARGE.

Survey IV did not investigate relationships between the cost or rental, and the size or character of housing (except marginally for room proportions in Topic No. 6.3). But, to the extent that Householders' and Students' assessments of alternative forms and arrangements of medium-density housing have been recorded and compared, then, this, the main aspect of Hypothesis A can indeed be tested.

In discussing the comparisons illustrated in the foregoing histograms of preference, significance is conceded not by statistical checks, but by observation and comparison of the variance in specific judgements relative to the variances recorded in the entire series of topics surveyed.

The topics which recorded close agreement between Householders and Students were TOPIC Nos. 6.1, 6.2, 6.3, and 6.4. In these topics, dealing with extremely basic, single-variable, planning issues, the patterns of preference are similar, although scoring variance differs: greater by the Students in TOPIC Nos. 6.1 and 6.2, but greater by the Householders in TOPIC Nos. 6.3 and 6.4. In terms of these topics and their planning issues, Hypothesis A is confirmed.

Comparisons between Householders' and Students' preferences in other topics shows varying agreement and disagreement.
In TOPIC No. 1, dealing with the 'arrangement of dwellings on sites', both groups chose the same pair of variants B and C, for their 1st and 2nd preferences, but in opposite order, and both closely agreed on their 3rd preference E. Thus, TOPIC No. 1 results tend to confirm Hypothesis A.

In TOPIC No. 2, dealing with the 'character of dwellings' there is slight agreement on variant A, close agreement on E - the least preferred - but strong disagreement about 1st, 2nd and 3rd preferences. Thus TOPIC No. 2 results generally do not confirm Hypothesis A, but if younger aged householders are compared with Students, there is closer agreement and confirmation of Hypothesis A.

In TOPIC No. 3, dealing with 'Living-Bedroom relationships', there is slight agreement about variants A, C and E - variant C being the 2nd preference of both groups - but very strong disagreement about 1st, 3rd and 4th preferences. Thus TOPIC No. 3 results do not confirm Hypothesis A.

In TOPIC No. 4, dealing with the 'Separation of Kitchen/Dining/Living rooms', there is some agreement between variants B and C which are among the first 3 preferences but none on the lowest preferences D and A. Thus the results of TOPIC No. 4 tend slightly to confirm Hypothesis A.

In TOPIC No. 5, dealing with the 'Character of Living-rooms', there is considerable agreement between the two groups especially over variants C, D, E and F and partly over B and G - this despite much greater variance in the Students' scoring. Thus the results of TOPIC No. 5 tend to confirm Hypothesis A.

In TOPIC No. 6.5, dealing with the 'Cross-Sectional Shape of Rooms', there is agreement about the 2nd preference variant B but disagreement over 1st and 3rd preferences A and D. Thus the results of TOPIC No. 6.5 tend not to confirm Hypothesis A.

The overall conclusion from these comparisons of group judgements across all topics is that there is a strong measure of group agreement - in the ratio of approximately 3:1 - and hence confirmation
of the main aspect of Hypothesis A being tested. However, where disagreement is manifest, it appears to derive from marked differences in the values the two groups place upon aspects of the identity and meaning of dwellings and their interiors, especially where these aspects introduce conflict with utilitarian ones.

Hypothesis B states:

THAT THE HOUSING MOST PREFERRED BY STUDENTS, IS DETACHED IN ITS SITTING, TRADITIONAL AND/OR INTRIGUING IN CHARACTER, AND INFORMAL IN USE, BUT, NOTWITHSTANDING THESE, THE CHEAPEST TO RENT.

The results from TOPIC No. 1, dealing with 'arrangement of dwellings on sites', show the one variant incorporating detached dwellings - Variant B - given 2nd preference by Students. Their clear 1st preference is for a cluster of attached dwellings grouped about a communal square - Variant C. Since three other variants involving arrangements of attached dwellings, were all ranked below the detached one, B, there is some support for stating that these results tend slightly to confirm Hypothesis B.

Results from TOPIC No. 2, dealing with the 'Character of Dwellings', show a clear preference by Students for Variants C, D and B well ahead of A and E. The preferred trio all have strong attributes of 'Tradition' and/or 'Intrigue' as mentioned in Section 3.43, and, also, in the case of the 1st preference, Variant C, the inferred attribute of 'Informality in Use'. These results, compared with those for householders, strongly confirm Hypothesis B.

Turning now to interior aspects of the housing, several findings, from TOPIC Nos. 3, 5, and 6.5, allow the testing of Hypothesis B.

Firstly, results from TOPIC No. 3, dealing with 'Living-Bedroom Relationships', showed pronounced disagreement between the two respondent groups, with the Students preferring Variants D, C, F and E, all with varying attributes of 'Intriguing' staircase and spatial character as well as a relative 'Informality' in the use and separation of the two accommodation zones.
Results from TOPIC No. 5, dealing with the 'Character of Living-rooms', showed a very strong preference by Students for Variants G and H whose attributes of ceiling slope, floor-level change and window-wall modulation, made them the most 'Informal' and 'Intriguing' of the range.

Similarly, results from TOPIC No. 6.5, dealing with the 'Cross-sectional Shape of Rooms' showed Students in disagreement with Householders, in strongly preferring Variant C to the other two. Again, as in TOPIC No. 5, the Students confirm a strongly felt preference for the most dramatic alternative in terms of space, form and movement attributes which, in Variant C, contribute to its being the most 'Informal' and 'Intriguing' of the range.

All of the above series of results on Students' preferences for interior aspects of housing, strongly confirm Hypothesis B.

Hypothesis C states:

THAT DIFFERENCES IN OCCUPATION OR PRE-OCCUPATION OF THE RESPONDENT GROUPS WILL CORRELATE WITH SIGNIFICANT DIFFERENCES IN THEIR RESPONSES TO COMMON EXPERIENCES.

Results from TOPIC No. 2, dealing with the 'Character of dwellings' showed a general disagreement in responses by the two respondent groups, except that a sub-section of the Householders, - made up of the younger age-groups, and presumably likely to be sharing many of the pre-occupations of the Students - were found to agree more closely with the Students in their preferences. Thus these results, at once tend to confirm Hypothesis C, and, at the same time its corollary.

Further confirmation of Hypothesis C is offered strongly by the results from TOPIC No. 3, dealing with 'Living-Bedroom Relationships'; slightly by results from TOPIC Nos. 4 and 5, dealing with 'Room Separation' and 'Living-room character' respectively; and very strongly by the results from TOPIC No. 6.5, dealing with 'Cross-sectional Shape of Rooms'. Overall it may be stated that these results tend to confirm Hypothesis C.
As a further statistical testing of Hypothesis C, the scoring patterns of the Household population-sample were directly compared with those of the Student population-sample, by means of computer analysed contingency tables and Chi-squared statistic. This comparison was made for each of the questionnaire Design Topics, and gave the results for the Chi-squared Statistic ($\chi^2$) against Degrees of Freedom (D.F.) shown in Table 4.4.

**TABLE 4.4**

<table>
<thead>
<tr>
<th>TOPIC No.</th>
<th>Chi-squared Statistic ($\chi^2$)</th>
<th>Degrees of Freedom (D.F.)</th>
<th>Probability ($P$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 1</td>
<td>39.72796</td>
<td>4</td>
<td>1.000000</td>
</tr>
<tr>
<td>No. 2</td>
<td>38.30263</td>
<td>4</td>
<td>1.000000</td>
</tr>
<tr>
<td>No. 3</td>
<td>50.23242</td>
<td>5</td>
<td>1.000000</td>
</tr>
<tr>
<td>No. 4</td>
<td>72.73453</td>
<td>3</td>
<td>1.000000</td>
</tr>
<tr>
<td>No. 5</td>
<td>60.00913</td>
<td>7</td>
<td>1.000000</td>
</tr>
<tr>
<td>No. 6.1</td>
<td>11.74213</td>
<td>3</td>
<td>0.991679</td>
</tr>
<tr>
<td>No. 6.2</td>
<td>43.53635</td>
<td>1</td>
<td>1.000000</td>
</tr>
<tr>
<td>No. 6.3</td>
<td>7.39160</td>
<td>2</td>
<td>0.975172</td>
</tr>
<tr>
<td>No. 6.4</td>
<td>16.13999</td>
<td>2</td>
<td>0.999687</td>
</tr>
<tr>
<td>No. 6.5</td>
<td>40.10248</td>
<td>2</td>
<td>1.000000</td>
</tr>
</tbody>
</table>

Thus Table 4.4 reveals an exceedingly strong distinction in the way the two population samples judged their preferences in all of the topics presented. This distinction between the groups is statistically highly significant, since the probabilities ($P$) are so high and thus indicate that the observed group differences are not the result of a chance occurrence. Accordingly Hypothesis C is strongly confirmed.
3.5 **Survey V: The Use and Design of Outside Spaces**

The purpose and timing of Survey V requires introductory explanation.

As originally planned, the major Survey IV was to include a topic with a question seeking preferences from a simple selection of four site-plans, in which attention was focussed upon various kinds of domestic outdoor spaces - all private and semi-private activity areas related to the dwelling. The display material for this topic was not prepared in time for the survey deadline and so the topic was withdrawn.

In consequence, Survey V was planned to fill, partially, this knowledge gap in Survey IV. In that it is directed solely to Auckland Households, it does not afford comparison with a student population as did the topics in Survey IV, but, in that it attempts to define existing, as well as preferred, outdoor spaces and activities, it gives an indication of trend and a basis for assessing the degree of appropriateness which respondents judged their present siting arrangements to have - a comparison not possible in Survey IV.

### 3.5.1 Objectives of Survey V

This survey was intended to provide tentative knowledge of two kinds, about domestic outdoor spaces:

(i) Knowledge about existing uses of typical Front, Rear and Side Areas of a range of site-layouts in a sample of Auckland suburban dwellings, and,

(ii) Knowledge about the preferences felt by the occupants of those dwellings, for various arrangements of these typical Front, Rear and Side Areas.

Australian studies of dwelling-site activities and usage (Dalton, 1969), and of the interface between dwelling-site and street
Both demonstrate elaborate inventories and patterns of outdoor activities in domestic, private open-space. Since a pursuit of increased site-densities could well be expected to place these outdoor activities in some jeopardy, an examination of actual and preferred site-usage seemed essential, in order to determine the existence and extent of any site redundancy which might be re-allocated in future subdivision policy.

In this preliminary investigation about the use of dwelling sites, there were no pre-judgements about possible associations between classes of locality, or dwelling, on the one hand, and patterns of site usage on the other. For this reason, while resolving to design the Survey in such a way that typical patterns of suburban dwelling-site arrangement would be graphically represented, it was considered important to canvas Household opinions about these samples, in a random suburban sampling manner, rather than by pre-selection of respondents according to, say, their dwelling's category of site arrangement.

3.52 Method of Survey V

The method adopted was to prepare three sets of diagrammatic drawings showing birds-eye views of site arrangements; one set depicting five characteristic Front Areas of dwelling sites, a second set depicting four characteristic Rear Areas, and a third set depicting seven characteristic Side Areas. These drawings were to be considered by respondents in relation to questions aimed at identifying their existing and preferred site arrangements. The drawings are shown in Figures 5.1, 5.2 and 5.3.

These sixteen drawings of characteristic outdoor domestic areas were considered to be sufficiently distinguishable for recognition and response by a random suburban population sample. While many more subdivisional variants are practised, the adopted ones were judged to be representative of the main alternatives currently permitted by Local Authority Planning Ordinances.
The sets of drawings were collated in the questionnaire with their related questions, and the whole survey instrument was presented and explained to respondent Households before they attempted it. The questionnaire was devised, administered and analysed all under supervision, during the 1976 academic session by an assignment team of six senior B.Arch. students.

The Questionnaire

The structured questionnaire for Survey V was a four-part instrument, consisting of an introductory, demographic section of eight questions relating to the respondents, their existing dwelling and the intensity with which they occupied it; followed by three parts surveying existing and preferred uses of domestic outdoor spaces. In these three parts of the instrument, each set of drawings of characteristic outdoor areas was accompanied by a standardised sequence of eight questions, four of which accounted for current use and identity of the respective areas, while the remaining four sought respondents' preferences in these matters.

While the data gathered with Part 1 of the instrument enable a few elementary comparisons to be made of respondent sub-groups, by means of the Chi-squared statistic, this potential has not been actioned at this stage since none of the respondent classifications were comparable with either those of the Auckland Households or of the Students in Survey IV. Therefore analysis of Survey V is limited to Tables of Frequency Distributions of Response together with their related histograms.

Sampling Method

The instrument was distributed and explained by the assignment team to a suburban population of 70 respondent Households, selected by a random sampling procedure which determined residential streets and house numbers in the following six suburban localities of Auckland:

Devonport, Mount Roskill, Greenlane, Glenfield,
Mount Albert and Kelston.
The questionnaire was self-administered and collected by the team later on the day of issue.

Analysis of the sample population's demographic data, from Part 1 of the instrument, reveals that:

- average period lived in dwelling = 8 years,
- 73% of dwellings were owned, 27% were rented,
- the average occupancy of dwellings = 3.1 persons
- the breakdown of population age was:
  
<table>
<thead>
<tr>
<th>Age Group</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5 yrs</td>
<td>16%</td>
</tr>
<tr>
<td>6-10</td>
<td>8%</td>
</tr>
<tr>
<td>11-15</td>
<td>6%</td>
</tr>
<tr>
<td>16-20</td>
<td>10%</td>
</tr>
<tr>
<td>21-25</td>
<td>12%</td>
</tr>
<tr>
<td>26-30</td>
<td>18%</td>
</tr>
<tr>
<td>31-35</td>
<td>9%</td>
</tr>
<tr>
<td>36-40</td>
<td>2%</td>
</tr>
<tr>
<td>41-45</td>
<td>2%</td>
</tr>
<tr>
<td>46-50</td>
<td>6%</td>
</tr>
<tr>
<td>51+</td>
<td>10%</td>
</tr>
</tbody>
</table>

- 56% of the occupants are at home during week days
- the occupation distribution of adult working occupants was:

  - retired : 4.36%
  - domestic : 10.75%
  - professional : 35.48%
  - 'white collar' : 23.66%
  - 'blue collar' : 25.81%
The following questionnaire is intended to ascertain both your use of, and your preferences for outside spaces in prevailing housing situations. This knowledge will be used as a guide in developing alternative medium-density layouts.

PART 1:

Name of street: ____________________________
Locality: ____________________________

1. Dwelling (Please tick)
   a. Owned: ____________________________
   b. Rented: ____________________________

2. How long have you lived here?
   a. Years: ____________________________
   b. Months: ____________________________

3. How much longer do you think you will live here?
   a. Years: ____________________________
   b. Months: ____________________________

4. How many people live here?

5. What are their age groups?

   Age in years: 0-5 ________ 6-10 ________ 11-15 ________ 16-20 ________ 21-25 ________ Over 50 ________

   31-35 ________ 36-40 ________ 41-45 ________ 46-50 ________

6. During the weekdays, how many are at home?

7. During the weekends, how many are at home?

8. What are the occupations of the working adults?
FORM OF QUESTIONNAIRE APPLIED UNIFORMLY TO PARTS 2, 3 AND 4 OF INSTRUMENT NO. 5, DEALING WITH FRONT, REAR AND SIDE OUTDOOR AREAS. (originally 1 questionnaire per Area).

The figures shown are examples of domestic outdoor areas.

1. Referring to the drawn examples:– which of them do you consider resembles your own home?

A ...... E ......
B ...... F ......
C ...... G ......
D ......

2. Referring to the chosen resembling example, and assuming it represents your own home, what room in your present house overlooks this front/rear/side outdoor area?

<table>
<thead>
<tr>
<th>Room</th>
<th>Please tick</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entrance</td>
<td></td>
</tr>
<tr>
<td>Living</td>
<td></td>
</tr>
<tr>
<td>Dining</td>
<td></td>
</tr>
<tr>
<td>Kitchen</td>
<td></td>
</tr>
<tr>
<td>Laundry</td>
<td></td>
</tr>
<tr>
<td>Bathroom</td>
<td></td>
</tr>
<tr>
<td>Bedrooms</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td></td>
</tr>
</tbody>
</table>

3. How often is this outdoor area actually used?

Daily ......
5-6 times/week ......
3-4 times/week ......
1-2 times/week ......
Never ......

4. What activities occur in this outdoor area?

Visual relief ......
Relaxation ......
Eating ......
Sleeping ......
Games ......
Enterprising ......
Hobbies ......
Housework ......
Gardening ......
Parking ......
Storage ......
Rubbish bins ......
Talking to people ......
Hanging out washing ......
5. Referring to the drawn examples again, and assuming you had a choice, which are your first 3 preferences?

1st preference ........
2nd preference ..........
3rd preference ..........

6. Which of these rooms would you like to overlook the Front/Rear/Side outdoor area of your first preference?

Entrance ..............
Living .................
Dining ................
Kitchen ...............
Laundry ..............
Bathroom .............
Bedrooms .............
Study .................

7. Which of these activities would occur in your preferred Front/Rear/Side outdoor area?

Visual relief ..........
Relaxation ...........
Eating ...............
Sleeping ............
Games ...............
Entertaining .........
Hobbies .............
Housework ..........
Gardening ..........
Parking .............
Storage .............
Rubbish bins .......
Talking to people ..... 
Hanging out washing 

8. How often would you prefer this space be used?

Daily .................
5-6 times/week ........
3-4 times/week ........
1-2 times/week .......
Never ..............

Thank you for your co-operation.
3.53 Results of Survey V

The results of Survey V are summarised and compared in Table 5. This table, relating to Parts 2, 3 and 4 of the questionnaire, shows the Frequency Distribution of the population's responses to the alternatives offered for judgement in each question. Histograms combine responses for both existing and preferred situations to enable comparison to be made.
TABLE 5: SURVEY V

Frequency Distribution of responses to each question as recorded in Parts 2, 3 and 4 of the questionnaire. Responses to Parts 2, 3 and 4 are given as percentages of the sample size, and grouped together either by question, or by pairs of questions, to help comparisons to be made.

Sample Size = 70 Dwelling Households; 226 occupants.

QUESTION 1:
"Referring to the examples drawn, which of them do you consider resembles your own home?"

Part 2: FRONT Areas:

```
<table>
<thead>
<tr>
<th>DRAWINGS</th>
<th>% RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2.86%</td>
</tr>
<tr>
<td>B</td>
<td>8.57%</td>
</tr>
<tr>
<td>C</td>
<td>40.0%</td>
</tr>
<tr>
<td>D</td>
<td>28.5%</td>
</tr>
<tr>
<td>E</td>
<td>20.0%</td>
</tr>
</tbody>
</table>
```

HISTOGRAM OF RESPONSE

Part 3: REAR Areas:

```
<table>
<thead>
<tr>
<th>DRAWINGS</th>
<th>% RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0%</td>
</tr>
<tr>
<td>B</td>
<td>17.19%</td>
</tr>
<tr>
<td>C</td>
<td>67.19%</td>
</tr>
<tr>
<td>D</td>
<td>15.63%</td>
</tr>
</tbody>
</table>
```

HISTOGRAM OF RESPONSE
Part 4: SIDE Areas

% RESPONSE

EXAMPLE
A : 7.27%
B : 9.09%
C : 9.09%
D : 40.00%
E : 20.00%
F : 0%
G : 14.54%

HISTOGRAM OF RESPONSE
QUESTION 5:

"Referring to the drawn examples again and assuming you had a choice, which are your first three preferences?"

**Part 2: FRONT Areas**

<table>
<thead>
<tr>
<th>1st Preference</th>
<th>2nd Preference</th>
<th>3rd Preference</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: 0%</td>
<td>2.44%</td>
<td>7.89%</td>
</tr>
<tr>
<td>B: 0%</td>
<td>4.88%</td>
<td>7.89%</td>
</tr>
<tr>
<td>C: 26.19%</td>
<td>17.07%</td>
<td>57.89%</td>
</tr>
<tr>
<td>D: 14.29%</td>
<td>68.29%</td>
<td>13.16%</td>
</tr>
<tr>
<td>E: 59.52%</td>
<td>7.32%</td>
<td>13.16%</td>
</tr>
</tbody>
</table>

**Pie-Charts of Responses**

**Part 3: REAR Areas**

<table>
<thead>
<tr>
<th>1st Preference</th>
<th>2nd Preference</th>
<th>3rd Preference</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: 45.20%</td>
<td>21.43%</td>
<td>11.90%</td>
</tr>
<tr>
<td>B: 28.57%</td>
<td>54.76%</td>
<td>16.67%</td>
</tr>
<tr>
<td>C: 14.28%</td>
<td>21.43%</td>
<td>57.14%</td>
</tr>
<tr>
<td>D: 11.90%</td>
<td>2.38%</td>
<td>14.28%</td>
</tr>
</tbody>
</table>

**Pie-Charts of Responses**
Part 4: SIDE Areas

<table>
<thead>
<tr>
<th>1st Preference</th>
<th>2nd Preference</th>
<th>3rd Preference</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2.50%</td>
<td>15.00%</td>
</tr>
<tr>
<td>B</td>
<td>32.50%</td>
<td>10.00%</td>
</tr>
<tr>
<td>C</td>
<td>10.00%</td>
<td>7.50%</td>
</tr>
<tr>
<td>D</td>
<td>17.50%</td>
<td>20.00%</td>
</tr>
<tr>
<td>E</td>
<td>17.50%</td>
<td>20.00%</td>
</tr>
<tr>
<td>F</td>
<td>15.00%</td>
<td>22.50%</td>
</tr>
<tr>
<td>G</td>
<td>5.00%</td>
<td>5.00%</td>
</tr>
</tbody>
</table>

Pie-Charts of Responses
QUESTION 2:

"Referring to the chosen resembling example, and assuming it represents your own home, what room in your present house overlooks this front out-door area?"

QUESTION 6:

"Referring to the drawn examples again, and assuming you had a choice, which of these rooms would you like to overlook the front outdoor area of your first preference?"

<table>
<thead>
<tr>
<th>Part 2 : FRONT Areas</th>
<th>% Response : Qu. 2</th>
<th>% Response : Qu. 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Entrance</td>
<td>21.34%</td>
<td>31.40%</td>
</tr>
<tr>
<td>B. Living Room</td>
<td>26.22%</td>
<td>26.74%</td>
</tr>
<tr>
<td>C. Dining Room</td>
<td>7.93%</td>
<td>9.30%</td>
</tr>
<tr>
<td>D. Kitchen</td>
<td>6.10%</td>
<td>5.81%</td>
</tr>
<tr>
<td>E. Laundry</td>
<td>2.44%</td>
<td>3.49%</td>
</tr>
<tr>
<td>F. Bathroom</td>
<td>3.66%</td>
<td>3.49%</td>
</tr>
<tr>
<td>G. Bedrooms</td>
<td>31.71%</td>
<td>17.44%</td>
</tr>
<tr>
<td>H. Study</td>
<td>0.61%</td>
<td>2.33%</td>
</tr>
</tbody>
</table>

HISTOGRAM OF RESPONSE
### Part 3: REAR Areas

<table>
<thead>
<tr>
<th>Room</th>
<th>% Response</th>
<th>% Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entrance</td>
<td>5.19%</td>
<td>2.91%</td>
</tr>
<tr>
<td>Living Room</td>
<td>13.64%</td>
<td>21.36%</td>
</tr>
<tr>
<td>Dining Room</td>
<td>11.69%</td>
<td>22.33%</td>
</tr>
<tr>
<td>Kitchen</td>
<td>18.83%</td>
<td>13.59%</td>
</tr>
<tr>
<td>Laundry</td>
<td>17.53%</td>
<td>7.77%</td>
</tr>
<tr>
<td>Bathroom</td>
<td>16.23%</td>
<td>4.85%</td>
</tr>
<tr>
<td>Bedrooms</td>
<td>14.94%</td>
<td>17.48%</td>
</tr>
<tr>
<td>Study</td>
<td>1.95%</td>
<td>9.71%</td>
</tr>
</tbody>
</table>

![Histogram of Responses](image)

### Part 4: SIDE Areas

<table>
<thead>
<tr>
<th>Room</th>
<th>% Response</th>
<th>% Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entrance</td>
<td>15.11%</td>
<td>7.61%</td>
</tr>
<tr>
<td>Living Room</td>
<td>23.02%</td>
<td>17.39%</td>
</tr>
<tr>
<td>Dining Room</td>
<td>3.60%</td>
<td>15.22%</td>
</tr>
<tr>
<td>Kitchen</td>
<td>10.07%</td>
<td>16.30%</td>
</tr>
<tr>
<td>Laundry</td>
<td>6.47%</td>
<td>10.87%</td>
</tr>
<tr>
<td>Bathroom</td>
<td>10.79%</td>
<td>8.70%</td>
</tr>
<tr>
<td>Bedrooms</td>
<td>29.50%</td>
<td>15.22%</td>
</tr>
<tr>
<td>Study</td>
<td>1.44%</td>
<td>8.70%</td>
</tr>
</tbody>
</table>

![Histogram of Responses](image)
QUESTION 3:
"How often is this outdoor area actually used?"

QUESTION 8:
"How often would you prefer this outdoor area to be used?"

Part 2 : FRONT Areas:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>% Response : Qu. 3</th>
<th>% Response : Qu. 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Daily</td>
<td>54.55%</td>
<td>62.79%</td>
</tr>
<tr>
<td>B. 5-6 times/week</td>
<td>7.58%</td>
<td>4.65%</td>
</tr>
<tr>
<td>C. 3-4 times/week</td>
<td>3.03%</td>
<td>11.63%</td>
</tr>
<tr>
<td>D. 1-2 times/week</td>
<td>21.21%</td>
<td>13.95%</td>
</tr>
<tr>
<td>E. Never</td>
<td>13.64%</td>
<td>6.98%</td>
</tr>
</tbody>
</table>
Part 3: REAR Areas:

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Daily</td>
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</tr>
<tr>
<td>5-6 times/week</td>
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</tr>
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<td>3-4 times/week</td>
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<tr>
<td>1-2 times/week</td>
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</tr>
<tr>
<td>Never</td>
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</table>

% Response: Qu. 3  % Response: Qu. 8

- 210 -

Part 4: SIDE Areas:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>% Response</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>5-6 times/week</td>
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</tr>
<tr>
<td>3-4 times/week</td>
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</tr>
<tr>
<td>1-2 times/week</td>
<td>7.28%</td>
</tr>
<tr>
<td>Never</td>
<td>9.09%</td>
</tr>
</tbody>
</table>

% Response: Qu. 3  % Response: Qu. 8

- 210 -
QUESTION 4:
"What activities actually occur in this outdoor area?"

QUESTION 7:
"Which of these activities would occur in your preferred outdoor area?"

Part 2: FRONT Areas:

<table>
<thead>
<tr>
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<th>% Response</th>
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<tbody>
<tr>
<td>A. Visual Relief</td>
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</tr>
<tr>
<td>B. Relaxation</td>
<td>13.39%</td>
<td>13.42%</td>
</tr>
<tr>
<td>C. Eating</td>
<td>4.18%</td>
<td>4.03%</td>
</tr>
<tr>
<td>D. Sleeping</td>
<td>1.26%</td>
<td>2.68%</td>
</tr>
<tr>
<td>E. Games</td>
<td>5.02%</td>
<td>7.38%</td>
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<tr>
<td>F. Entertaining</td>
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<td>G. Hobbies</td>
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<td>2.01%</td>
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<tr>
<td>H. Housework</td>
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<td>2.01%</td>
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<tr>
<td>I. Gardening</td>
<td>19.25%</td>
<td>22.15%</td>
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<tr>
<td>J. Parking</td>
<td>10.88%</td>
<td>6.71%</td>
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<tr>
<td>K. Storage</td>
<td>0.42%</td>
<td>2.68%</td>
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<tr>
<td>L. Rubbish Disposal</td>
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<td>2.68%</td>
</tr>
<tr>
<td>M. Talking</td>
<td>11.30%</td>
<td>12.08%</td>
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<tr>
<td>N. Clothes drying</td>
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Correct vertical Scale 1:50
### Part 3: REAR Areas

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<tr>
<th>Activity</th>
<th>Q4 % Response</th>
<th>Q7 % Response</th>
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<tr>
<td>A. Visual Relief</td>
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</tr>
<tr>
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<td>13.49%</td>
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<td>C. Eating</td>
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<td>6.75%</td>
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<tr>
<td>N. Clothes drying</td>
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<td>7.54%</td>
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</table>

#### Histogram of Responses

ACTIVITIES: A B C D E F G H I J K L M N

HISTOGRAM OF RESPONSES
### Part 4: Side Areas

<table>
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<th>Activity</th>
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<th>% Response: Qu. 7</th>
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<td>10.06%</td>
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<td>B. Relaxation</td>
<td>5.43%</td>
<td>11.83%</td>
</tr>
<tr>
<td>C. Eating</td>
<td>3.88%</td>
<td>5.33%</td>
</tr>
<tr>
<td>D. Sleeping</td>
<td>3.10%</td>
<td>2.96%</td>
</tr>
<tr>
<td>E. Games</td>
<td>6.98%</td>
<td>5.92%</td>
</tr>
<tr>
<td>F. Entertaining</td>
<td>4.65%</td>
<td>7.69%</td>
</tr>
<tr>
<td>G. Hobbies</td>
<td>2.32%</td>
<td>4.14%</td>
</tr>
<tr>
<td>H. Housework</td>
<td>6.20%</td>
<td>4.14%</td>
</tr>
<tr>
<td>I. Gardening</td>
<td>20.16%</td>
<td>14.20%</td>
</tr>
<tr>
<td>J. Parking</td>
<td>17.05%</td>
<td>10.66%</td>
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<tr>
<td>K. Storage</td>
<td>0.78%</td>
<td>2.96%</td>
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<tr>
<td>L. Rubbish disposal</td>
<td>2.32%</td>
<td>3.55%</td>
</tr>
<tr>
<td>M. Talking</td>
<td>8.52%</td>
<td>11.84%</td>
</tr>
<tr>
<td>N. Clothesdrying</td>
<td>7.75%</td>
<td>4.73%</td>
</tr>
</tbody>
</table>
3.54 Discussion of the Results of Survey V

Question 1, seeking identification of each respondent household's own existing site arrangement, found Example C of the Front Areas clearly the most common, Examples D and E moderately common, but Examples B and A uncommon. Examples C, D and E differ only in their spatial boundaries - C being the most open-fronted and E the most closed-fronted, - while B and A introduce an important shift in the density and character of the dwellings themselves.

It appears that there is a relationship in Front Areas, between an Example's openness to the Street Frontage, and its prevalence in existing Auckland suburbs. By contrast, from question 5, seeking preferences for these same examples, it is revealed that preference follows the reverse relationship. Thus the order of preference E, D, C is the reverse of the order of incidence C, D, E.

Preference is shown to increase with enclosure from the Street Frontage.

Of the Rear Areas, Example C is overwhelmingly the most common, with Examples B and D rather uncommon and Example A rare. Example C is the typical single-zone fully-enclosed Rear Area. Example D is of similar layout but almost unenclosed. Again, by contrast, from question 5, seeking preferences for these same examples it is revealed that preference is in a reverse order. Our typical back-yard is given 3rd preference only, while the two-zone Examples A and B gain 1st and 2nd preference. These two preferred examples offer not only typical boundary enclosures, but further degrees of withdrawal - and hence shelter and privacy - by virtue of enclosing effects of the dwelling form itself. Thus, again for Rear Areas, preference is shown to increase with enclosure from others.

Of the Side Areas, Example D is very common in the surveyed suburbs, Examples E and G are much less common, Examples A, B and C are uncommon, and Example F very rare. Examples D, E and G have rectangular open-ended Side Areas with varying boundary enclosures. Examples A, B and F have boundary enclosure too, but in addition infer a degree of enclosure from either the Front or Rear Areas.
Again, comparing existing arrangements with those preferred, as revealed by question 5, Example A, the most prevalent existing type of Side Area, is not ranked in the first three preferences. Examples B and F are the most preferred, again presumably, for the inferred spatial identity and enclosure which they afford with respect to the Front Area and the street.

Question 2 seeking identification of each household's own existing room orientations, found that Bedrooms, Living-rooms, and Entrances, in that order, were the dominant rooms overlooking the Front Area. By contrast, from question 6, it is revealed that while the same three facilities are the most preferred overlooking Front Areas, their ranking is reversed. Front Areas are seen as primarily related to the process of arrival and departure, substantially to outlook from the Living-room, partly to outlook from Bedrooms and much less to outlook from the dining room and other facilities.

In applying question 2 to Rear Areas, it appears that Dining-rooms, Kitchens, Laundries and Bathrooms, Bedrooms, and Living-rooms, in that order, are all to be commonly found overlooking Rear Areas. In marked contrast to this situation, question 6 reveals a very strong preference for the Dining-room, Living-room ahead of Bedrooms and Kitchen. It appears that preferred concepts of Rear Areas consist of not only relationships with the traditionally back-yard orientated utility rooms, but, also relationships with those rooms devoted to the more leisurely occasions in family life.

In applying question 2 to Side Areas, it appears that especially Bedrooms, frequently Living-rooms, and, to some extent, Entrances all commonly overlook existing Side Areas. Contrasting with this existing pattern is the almost equal preference shown by question 6 for the Living-room, Kitchen, Dining-room or Bedrooms to overlook the Side Area. Thus, these preferences indicate a wish to generalise the use of Side Areas to a modest extent.

Question 3, seeking the actual Frequency of Use of outdoor areas, reveals a highly dominant pattern of Daily use of all outdoor areas - Front, Rear and Side. Moreover, Question 6 reveals that preferred
frequency of use of these outdoor areas is very similar to the actual frequency - an expected finding.

Question 4 was an important amplification of question 2, in that it provided definition of activities carried out in the various outdoor areas, independently of those activities that could be merely inferred from the knowledge of which rooms overlooked these outdoor areas. Accordingly, question 4 reveals that Front Areas support high levels of activity such as Gardening, Visual Relief, Relaxation, Talking and Parking, but low levels of other activities. Question 7 reveals preferences that generally infer only slight changes in this use-pattern, except that Parking would be halved, and both Entertaining and Relaxation would be increased.

Applied to Rear Areas, question 4 shows, again, a dominance of Gardening, with Clothesdrying, Relaxation and Visual Relief also common. Preferences for Rear Areas, as shown by question 7, do not differ much from the existing usage, except that Clothesdrying is preferred at less than a half of its existing level.

Finally, applied to Side Areas, question 4 shows, yet again, the strong dominance of gardening, with parking also a major activity in Side Areas. Visual Relief and Rubbish Disposal are the other two strong activities in this outdoor space. Preferences revealed by question 7 are for a marked decline in Gardening, Parking and Rubbish Disposal, but for a strong increase in Relaxation and Talking in Side Areas.

An overall summary view of the results of the paired questions 2 and 6, together with 4 and 7, is that

(i) A strong case exists for an elaboration of the use of Rear Areas (and to a lesser extent, where site dimensions permit, Side Areas). Strong preference has been revealed for intensifying the everyday usage of Rear Areas which would comprise at least two broad activity zones, enabling them to cater for a full range of utilitarian as well as leisure activities.
(ii) The dominant activity in all three outdoor areas is, Gardening. There is some evidence that it should preferably be reduced in importance, except in the Front Area. Here, this fact, together with the high importance placed on Visual Relief, Relaxation and Talking, assigns to these Front Areas a highly Aesthetic and Display role. Indeed, it seems clear that, where Gardening, as a major domestic pursuit, is not keenly sought after in dwelling site arrangements, potential site redundancy is amply present in our suburban Front Areas, to some extent present in Side Areas but not generally in Rear Areas.
3.6 Survey VI: Proposed Houses for Farms

3.6.1 Objectives of Survey VI

This survey, conducted in 1972, sought to record the responses of a cross-section of New Zealand farmers, to a range of ten farmhouse designs carried out the year before by Senior Architecture Students in a project expressly organised to investigate the opinions of rural people about country homes.

From the outset this project was sponsored by the 'New Zealand Farmer', a national fortnightly journal of agriculture. Editorialy, the journal held the view that there was a pressing need for improvement in the general standard of rural domestic architecture. This view then, was entirely compatible with the intentions of Survey VI of the research programme, which were to investigate the special needs, the special problems and the special opportunities of farmhouse design. Another objective at the methodological level, was the running of a second trial of the Semantic Differential technique, following on from its initial use that same year in Survey II, but this time focussed on proposed designs rather than on existing dwellings. Lastly, it was hoped to discover what key concerns, or 'dimensions', preoccupied a farming population in its assessment of farm-house designs. Accordingly, the survey was promoted and administered through a series of ten issues of the 'New Zealand Farmer' journal in the expectation that readers who were sufficiently interested, would respond to the questionnaire by assessing the published designs and returning it completed.

In initiating a modest survey of the responses of farmhouse owners to these ten designs by students, it was felt that the scope of the survey should not be too exhaustive. In deciding how the inquiry should be limited, it was borne in mind that utilitarian aspects of home facilities and layout in farmhouses are known and amply discussed among farmers, designers and builders. Moreover, being comparatively objective in kind,
these aspects are readily accessible to interested designers right from the inception of a design commission.

A much more moot question, it was felt, was the one of architectural character in the farmhouse. Here, inside and outside the home, the general appearance, satisfaction and meaning of one's concept 'Farmhouse' is at stake. This is where - for owners and designers alike - one's more or less expressive, emotive and artistic intentions prevail. The central question was: "how dominant and how recognisable were these intentions in the farming-community?"

This is a design issue that is seldom matter-of-fact or objective. Rather, it is subjective, and increasingly unruly in this second half of the century. Both personal as well as farming-community values and aspirations are involved, self-respect is paramount, while it seems financial cost-constraint plays a fickle role, smiling tolerantly on the pursuits of cherished aspirations, but frowning intolerantly on anything else. It was hoped that Survey VI would provide a basis for commencing to map this issue as it related to proposed new farmhouse designs.

Growing from these ideas about farmers' attitudes to their dwellings, was the expectation that the survey would give some indication of the way farming families reconcile the important practical and, above all, productive criteria of their agricultural life - especially as these affect their expenditure on capital works like accommodation - with their sense of life-purpose and their values relating to, say, child-rearing, self-respect and environmental harmony. With all his concern for practicality, what was the farmer's 'image' of home? Was the growing impression of 'suburban looks' in recent farmhouses just an expedient or inexpensive mantle to throw over his thrifty housing habits, or was it perhaps his goal image anyway?
3.62 Methods of Survey VI

The method used to acquire the data from the voluntary population of rural respondents, consisted of the administering of Instrument No. 6, a structured attitude-scaling questionnaire, to the nation-wide, general readership of the 'New Zealand Farmer' journal. The journal issue of July 13th 1972 introduced and explained the survey project to readers, provided a copy of the questionnaire, to be retained and progressively filled in by them, as well as a full description of the first of the ten farmhouse designs to be assessed. The following nine fortnightly issues of the journal described the rest of the ten design series. Each farmhouse design was described by means of developed sketch plans and a brief design report. Drawings included plans, sections, elevations together with interior and exterior perspective sketches. The results, and a discussion of the survey, were reported to readers in the journal issue of April 12th 1973.

The Questionnaire

The structured questionnaire was a single-part instrument made up of twenty bi-polar adjectival scales by which each of the ten designs could be evaluated as it appeared in the 'New Zealand Farmer'. This type of questionnaire was chosen because of its ability to offer insights into those issues of architectural character outlined in Section 3.61 'Objectives of Survey VI'. In doing this, it would be seeking out respondents' feelings and judgements about the connotative meanings of both the exterior and the interior character of the proposed dwellings.

The adjectival scales used in the questionnaire were a priori scales selected from those isolated and applied by Canter (1967, 1969c & 1969d). The scales were selected subjectively on the basis of their semantic relevance to both the exterior and interior considerations associated with the concept 'Farmhouse'. No attempt was made to differentiate between scales or judgements about exterior character and those about interior character.
Assessments and responses to all of the relevant aspects of a design of which respondents were aware, were to be recorded 'as-a-whole'. The adjectival scales all provide either 'functional' or 'experiential' descriptions; in other words, they may be used to indicate how well, or otherwise, the buildings seem to work or contribute to the experience of domestic living, whether they be considered as an assembly of materials, space and equipment providing shelter, services and comforts, or, as a set of mainly visual experiences which affect their imagined occupants.

The chosen descriptive scales were thus scales which were intended to court subjective value judgements. Utilitarian factors of planning were openly catered for in only four of the twenty scales. However, invited comments from the respondents about practical issues, inexpressible through the questionnaire, fully compensated for this imbalance. Analysis of the questionnaire data would be by multi-variate analysis of variance. This was expected to establish the mean score of each design on each scale, and to fix the relationships between all of the scales, and between all of the scales and all of the designs as defined by the respondents. Further, the presence of any 'dimensions' of connotative meaning underlying the respondents use of the scales, could be identified.

**Sampling Method**

The questionnaire was introduced and explained in the 'New Zealand Farmer' July 13th 1972. It was retained and filled in by interested readers, as each of the farmhouse designs, in the series of ten, was published and then finally returned care of the Editor for analysis.

Sixty readers, representing most rural districts and farming backgrounds of New Zealand, furnished returns. In view of the length of time needed to assess each design and the twenty week duration of the published series, this was a gratifying
response. The majority of respondents showed, through their thoughtful comments in accompanying letters, a deep involvement in the project. A few participants found difficulty in either fully understanding or fully completing the scoring of the designs. Many expressed frustration with the pre-determined scope of evaluation imposed on them by the Semantic Differential questionnaire. In the event, their written comments not only helped relieve their scoring frustrations, but also counterbalanced the questionnaire's bias towards very subjective evaluations of meaning and appropriateness to the near exclusion of utilitarian matters. Thus a great many supplementary practical criticisms and opinions were received in this way and are compiled, along with the survey analysis, in a respondents' 'forum of opinion' about farmhouses.

While some frustration arose from the biased and unfamiliar nature of the questionnaire, as mentioned above, more was far as a result of an unevenness in the standard and style of graphic and verbal presentation of each design, and in the explanation of the specific problems each was expected to solve - an unevenness which unavoidably reflected the individuality of the ten authors of the designs. See Figures 6.1 to 6.10 which follow.

For the analysis, a sample of forty fully-completed questionnaires were used, all sufficiently representative of farm-type and district to ensure a generality of opinion. The respondents were, in the majority of cases, female - farmhouse-wives - who presumably included their whole family's views in their responses.
INSTRUCTION NO. 6

Survey VI Questionnaire

Houses for Farms

INSTRUCTIONS: Please indicate where EACH of the designs comes on EACH of the scales below by putting the appropriate number (1 to 7) in the box below the design. Do not ponder too long over any one question. Please treat each response separately. Any apparent repetition of questions is for statistical control. Please ensure that you have completed EVERY item. Any comments you may have about this questionnaire would be very welcome.

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<th>4</th>
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Farmhouse for Wellington

This farmhouse was designed for a North-Wellington site which has a gentle slope to the west with views to the South Island and northward to Kapiti Island. North-south winds reach gate gates; high microcarpa trees protect the site so that wind passes straight over.

The house needed four bedrooms and the client preferred separate services for the master bedroom. The house has two clear parts: one part serves outside activities, the other is for formal entertaining. The private courtyard cannot be seen into by approaching visitors.

The "dirty entry" is on the sheltered side of the house and...
also on the same side as the woolshed. This entry space is also the laundry, and dirty clothes can be left here. Clean laundry storage is in the hallway. The laundry floor is concrete, self-draining and can be sluiced down.

Wet weather gear is stored inside the door and there is a seat with boot storage under. Hand-washing will be done in the laundry tub, but if a major clean-up is needed the bathroom is reached off the laundry. The WC is reachable without removal of outside gear.

The kitchen is divided into work and living areas. The eating space opens on to the sun. Morning sun will come in the gable windows. The courtyard will prevent afternoon sun shining in the housewife's eyes as she prepares the evening meal. There is a ventilated hood over the stove — necessary in an open plan. Preserves and bulk storage are in the pantry.

The formal dining area has the view of the South Island. This is the cold side, but the central heating boiler should keep it warm. The fireplace is included in the entertaining area as a personal preference.

The master bedroom is separated from the others for adult privacy but children in trouble should be easily heard. The washroom and dressing room are on the south side to insulate the bedroom from the biting Wellington cold.
This is the second in the series of farmhouse designs by third-year Auckland University School of Architecture students. Readers are invited to assist by filling in scores in a questionnaire which, at the end of the series, will be processed by the University and from which it is hoped information can be extracted that will be of value in the training of architects who are interested in rural house design. The questionnaire was printed in our issue of July 13 and should be kept and filled in as each design appears.

Design by Owen Young
Owen Young, the designer of this farmhouse, for a site on the Kaipara Flats, Northland, writes:

The house has 3 bedrooms. Further bedrooms or worker's quarters may be added, if required. All bedrooms open out towards the north-west afternoon sun.

The approach to the house is from the south-east. A back entrance is provided, with ready access to a shower, toilet and laundry. The kitchen is provided with deep-freeze and pantry for bulk food storage.

The farmyard and approach road are visible from the kitchen, which is orientated to give an outlook over as much of the farm as possible.

The family-room serves as a multi-use space — as a hobby-room, sewing-room, or space for children. A larger lounge contains a fireplace and small office alcove, where a writing desk, paperwork and books are kept.

All living areas open out towards the east and are sheltered from south-west prevailing winds.
This series of farmhouse designs is by third-year Auckland University School of Architecture students. Readers are invited to fill in a questionnaire, which was published in our July 13 issue to be kept and filed in issue by issue. The university hopes, from this questionnaire, to extract information which will be of value to those interested in rural house design.

Design by R. M. Houliston
The designer, R. M. Houliston, writes: This house was designed for a dairy farm where there would be a share-milker in the existing house, the owner living in the new house.

The existing house is close to the major activity areas on the farm: the milking shed, the calf-rearing shed, the winter feeding barns and the implement shed.

The situation of the owner's new house is still reasonably close to all these activities and, being on a rise, has a better view of the farm than the existing house.

The wet entry incorporates a shower, toilet and laundry facilities. This area allows for dirty clothing to be discarded before moving to other areas of the house and hence is close to both the kitchen and dining areas. Also in this area is the farm office, accessible directly from the farm. Equally well, it is related to the formal entrance for agents who call at the house.

The kitchen is linked to the wet entry, the formal entry, dining and living areas, but, in addition, has sun throughout the day and an extensive view of the farm. The breakfast bar in the dining room would get more use for informal meals and the dining room would be used for more formal occasions.
The living space is the family room for entertaining and relaxing and is close to the kitchen and dining room. The gallery to the north of the living space provides closed play space for children as does the gallery to the bedrooms. From here the farmer can view the farm and the terraces and courtyard in front of the living room.

The bedrooms are on the west side, in a two-storied form which acts as a weather buffer to the courtyard it encloses. The master bedroom is close to all bedrooms either horizontally or vertically. Study spaces are not specifically catered for in bedrooms as, usually, it is only for a few years that they are required. Due to the easy contour of the farm, views from the upper-storey windows are intimate rather than expansive.

The form of the building aims at providing a strong barrier to the south and west, thus reducing the effect of the weather on the open areas of courtyards and terraces to the north and east.
This series of farmhouse designs is by third-year Auckland University School of Architecture students. Readers are invited to fill in a questionnaire, which was published in our July issue to be kept and filled in issue by issue. The university hopes, from this questionnaire, to extract information which will be of value in training architects who are interested in rural house design.

Design by R. Gordon
The designer, R. Gordon, writes: Although this farmhouse was designed for a real situation — a dairy farm on the Kapara Plains, just north of Auckland — the predominantly flat nature of the site gives the house validity in relation to many other situations where similar landforms and climatic conditions are involved.

The house is for a dairy farmer with a young family, and the main requirement other than for a functional and fairly simple house, was that adequate space and privacy should be provided for the children as they progress in their education.

The plan exhibits features typical of many New Zealand farmhouses, such as a large wet entry and clothes-changing area, as well as a more formal front entry, a large kitchen and pantry with the dining area closely related, and a clear distinction between the day-living and bedroom areas of the house.

Main living and bedroom areas, and exterior courts, are orientated to the sun, with the bedrooms also being located to limit the possibility of disturbance from noise.
This series of farmhouse designs is by third-year Auckland University School of Architecture students. Readers are invited to fill in a questionnaire, which was published in our July 13 issue to be kept and filled in issue by issue. The University hopes, from this questionnaire, to extract information which will be of value to training architects who are interested in rural house design.

Design by Darrington Slater

EAST

WEST
FARMHOUSE AT LEIGH

By Darrington Slater

The site for this farmhouse at Leigh was on a north-facing slope below the brow of a hill, with an almost complete view of the farm to the east and west and the ocean and distant islands to the north. This site also offers southerly most of the day and shelter from the southerly and westerly winds.

The house is in the form of a semicircle around a north-facing courtyard with the kitchen occupying the central position in the complex. The dining room, living room, one bedroom and the gallery all open directly into the court.

The pellitory, kitchen, dining room and their associated timber decks make this court the most important area in the house complex during fine weather. For wet weather there is a large living area.

Three large bedrooms are downstairs and the main bedroom plus study upstairs.

One formal entry close to the living area has been provided as well as a wet entry where one can discard farm clothes and clean up before coming into the house. This wet entry is at the back of the double garage and next to the rumpus room which can also double as shearer's accommodation.

The sheeters' or rumpus room has the necessary separation from the privies of the rest of the house. This room is close to the clean-up facilities — toilet, shower and handbasin.

As with the other rooms within the house, the kitchen is large (400 sq ft) with all the necessary equipment as well as a preparation table. This kitchen, which lies well for the sun, view and shelter, is separated from the dining room by a low breakfast bench.

The gallery is extra wide to provide, besides a well-lit, warm and sheltered passage with a good outlook, room for activities such as sewing, reading and especially a children's play area in wet weather.

The building has been spread over the hill and appears as a low, squat building with a feeling of belonging to the landscape. The house and its form is broken by the many different sloping roofs and vine-covered pergolas above the wooden decks.

MATERIALS

Exterior: vertical board and batten (cedar)

Roof: super six Fibrolite

Decks: treated pine

Foundations: strip footings

Interiors: rib-board walls, exposed beams and linking in dining and living area.

SQUARE FOOTAGE

Bedrooms: 12 ft by 10 ft

Dining: 12 by 10

Main hv. oom: 16 by 20

Living: 20 by 15

Kitchen: 14 by 10

Shearers: 12 by 9

1. Sunnyside: 12 ft by 10

Total area of the house is 1500 sq. ft.

Assuming a cost of $14.25 sq. ft., cost of house (1572), would be $22,000.
This series of farmhouse designs is by third-year Auckland University School of Architecture students. Readers are invited to fill in a questionnaire, which was published in our July 13 issue to be kept and filled in issue by issue. The university hopes, from this questionnaire, to extract information which will be of value in training architects who are interested in rural house design.

Design by J. E. Hall

KEY:
1 gallery
2 bedroom
3 bathroom
4 shower
5 toilet
6 entry
7 living
8 dining
9 kitchen
10 laundry
11 pantry
12 garage
13 car court
DESIGNER'S REPORT

The site for the house was on a largely treeless, windswept, undulating area, which called for a sturdy and well-constructed dwelling. The site was open to the wind, and the northern walls were of a more open nature and all the living areas were oriented towards the south, which provided a small, sheltered court with direct access to the interior, as well as a number of timber decks and garages.

Apart from the usual considerations of domestic life, the designer paid special attention to the outdoor areas, with a large deck close to the kitchen, and the separation of the more formal living room. The use of a gallery also provided a safe space for the children's play area. The layout of the house was designed to encourage a healthy and active lifestyle, with a focus on the natural environment.

—J.E. Hall.
This series of farmhouse designs is by third-year Auckland University School of Architecture students. Readers are invited to fill in a questionnaire, which was published in our July 13 issue to be kept and filled in issue by issue. The university hopes, from this questionnaire, to extract information which will be of value to training architects who are interested in rural house design.

**Designed by K. J. Johnston**

1. Approach road.
2. Rear vehicle access & parking.
3. Elevator to garage.
4. 4' x 6' high aluminium sliding door.
5. 3' x 6'.
6. Front door.
7. Store & laundry.
8. Laundry & wash.
9. L-shaped verandah.
10. Shed & store.

**Designer's notes**

This proposed design is for a new homestead for a high-yielding sheep and beef cattle farm, located on a northerly coastal area at Leigh, north of Auckland.

The site, as proposed by the owner, gives a 180-degree ocean vista, stretching to the north to Whangarei and taking in the coastal islands of the Hauraki Gulf.

With the possibility of this house, perched 1000ft above sea level, on a prominent headland, becoming a coastal landmark, a strong formal outline, contrasting with, but still complementary to, the surrounding landscape was required. Thus, the strongly formal north elevation.

The site lends itself to the use of strong vertical elements, through the use of split levels, allowing a part of the house to drop from the brow of the hill, giving protection from the persistent coastal breezes, which might otherwise make outdoor living very uncomfortable.

Through changes of level the
Key to floor plan.
1. Children's bedrooms, isolated from the master bedroom.
2. Master bedroom.
3. Dining area, with associated courtyard.
5. Office - sewing room, with telephone.
6. linen room, to double as storeroom.
7. Sleeping and changing area.
8. Hot water heater and farm clothes storage.
9. General working entrance and boot storage.
10. Courtyard with provision for storage of wet weather gear.
12. Cork-sided general purpose living area, looking to court area.
13. Recreation area.
14. Lounge area.
15. Garage.
The house is split into three zones: sleeping area, general working, and formal evening zone. Thus, general everyday living activities occur on the one level, with the "working" entry, leading through the washing zone to the kitchen-dining area. The office-sewing area branches conveniently off, so is readily accessible from the working areas.

It is only when one goes to the bedroom or retreats to the lounge for the evening that a change of level is required.

The living area has been partially broken to allow several concurrent uses—watching TV, reading, children playing—without one activity imposing on the others.

To reduce the effects of the high rate of insulation, due to the northern and coastal aspect, window sizes have been reduced to a minimum, with high narrow windows to reinforce the vertical structural elements. Small window area helps reduce heat gains in summer and heat loss during the colder months—a factor often forgotten in modern houses.

Windows are distributed around the circumference, so that the consistent ocean view is broken into a series of small vistas.

With the exposed nature of the site, durable materials are required to combat the salt-laden winds. Concrete block is employed to its fullest advantages here, with the lower level being constructed of 6" concrete block cavity walls and the upper levels, 6" veneer walls.
This series of farmhouse designs is by third-year Auckland University School of Architecture students. Readers are invited to fill in a questionnaire, which was published in our July 13 issue to be kept and filled in issue by issue. The university hopes, from this questionnaire, to extract information which will be of value in training architects who are interested in rural house design.

**Designed by Darrington Slater**

The farm house at Mimi is for a dairy farm and is sited on a very steep, south-facing hill. This south-facing hill presents problems of providing adequate sun and shelter to all rooms.

The house has three bedrooms, a large kitchen and a big living space broken up according to the activities intended for it.

The paved west courtyard is important to the complex as a service area as well as a sheltered, warm area for outdoor activities in dry weather. Entry to the wash-up area by the back entry is also here.

Many verandahs surround the building to give it pleasant outdoor spaces as well as a rural character.

There is a view of the sea from this house towards the east and north-east. Hence the location of the kitchen in the central position of the house and the orientation of the living area. The bedrooms are tucked into the hill.

The house offers a small, yet cozy, environment with great emphasis placed on the outdoor spaces of the courtyard and the wooden decks.

Total area of the house is 1210 sq. ft. Assuming a cost of $14 a square foot, the cost of the house (1973) would be $15,000.

—Darrington Slater.
Houses for Farms

A dramatic farmhouse for a dramatic site.

This series of farmhouse designs is by third-year Auckland University School of Architecture students. Readers are invited to fill in a questionnaire, which was published in our July 13 issue to be kept and filled in issue by issue. The university hopes, from this questionnaire, to extract information which will be of value in training architects who are interested in rural house design.

Designed by J. S. Carnachan

Designer's notes

The Site: Situated high on the cliffs above Pakiri beach with a 360° ocean view as far north as Whangarei Heads. Building faces N.W.E.

Building images: (a) The sea suggested images of lighthouse towers and heavy, rock-like building forms. (b) The sharp roofs and gables of the existing historic farmhouse and the roofs of farm sheds scattered round the farm. The collection of roof forms evident in the new house is an answer to the above.

Solution: (a) Steep sloping site suggested excavation to sink courts into the ground and provide shelter on an exposed site. (b) Site also suggested a two level plan with bedrooms, storage and bathrooms on lower level. (c) Design aims to enhance the impact of passing through to the living rooms with a dramatic view of the sea.

Materials: Concrete block plastered, exposed timber beam roof, with plywood flooring.

— J. S. Carnachan
Left: The house as it would appear when approached from the farm, facing the sea. The detached parts to the left is the office, adjacent to the parking area. Right of the second gable is the sheltered court, opening off the dining and living room which is under the course gable, and which extends right through to the deck on the far side, overlooking the ocean.

HOUSES FOR FARMS

from page 107

Right: A model of the house viewed from the side facing the sea. The ground in front slopes steeply away to the flanks near a hundred feet below. The outlook encompasses 210 degrees of ocean, coastline and islands.
Houses for Farms

This is the last in the series of farm house designs which have been appearing for the past ten issues. As we explained at the beginning, these designs have been published in collaboration with the University of Auckland School of Architecture.

They were made by third-year students as part of their training in an exercise in which the FARMER collaborated in the hope of encouraging in future architects an interest in the special problems of rural domestic architecture, and an awareness of the need for more professionalism and expertise in the design of farm houses.

Similarly, we hoped that readers of the FARMER might become more aware of the need for seeking professional advice in the planning of new farm houses.

With the first design we published a questionnaire supplied by the School of Architecture in which readers were asked to answer a series of questions relating to their reactions to each design.

Readers who have been interested in doing this will now be able to fill in the final set of spaces and return their completed questionnaires to this office. From here they will be sent to the University where they will be processed. The lecturer associated with this exercise, Peter Bartlett, has promised that a summary of this analysis will be made available for publication in the FARMER.

Some letters from readers commenting on the designs have already been received by Peter Bartlett, and he has expressed appreciation of these. He hopes for more, together with the returned questionnaires, but he emphasises that, whether you have filled the questionnaire in or not, you are cordially invited to write commenting on the designs.

The questionnaire was of a special kind attempting to ascertain readers' views on the meaning and appropriateness of the designs; apart from this, readers' specific comments on matters of style, practicability of layout, and the efficiency of the designs for housekeeping and so on, would be welcome.

Peter Bartlett says that all letters received will be answered individually.

By BRUCE R. SCOTT
Designer's notes

One of the main criteria in the development of this design was the need for building in stages. Thus, the living room, bedrooms, and garages and east bedrooms can be added at later dates.

The back entrance consists of a spacious, covered washing area and adjacent wash-up room with shower and toilet, etc. The laundry is readily accessible from this area and the wash-up room also doubles as a private bathroom for any helping hands.

The kitchen and family room are spacious for the preparation of large meals and comfortable everyday living. A good view of the farm and local main road is obtainable from the kitchen.

The pantry for bulk food storage also houses the freezer and is accessible from the kitchen as well as the covered back entrance for unloading goods.

Upstairs a lockable office and a study/sewing room can be accommodated, both being well lit by the skylight. This keeps the above mentioned activities away from children. The office also has a good view of the farm.

Bruce R. Scott
During the third term of the 1971 academic year at the School of Architecture, the Farmer assisted in organizing a tour of farms by a group of third-year students in order that they might study and prepare sketch designs for farmhouses to suit general types of farms.

We made a cash award to students whose farmhouse designs were judged suitable for publication in the Farmer. These designs were published between July and November, 1971. The educational aims in this three-week project were strictly limited to those of familiarization with farming life and exploration of possible design solutions catering for it. Sketch designs only were called for. For most of the students, it was their modern attempt of farmhouse design.

In presenting the design studies to our readers we—and the School of Architecture—wanted to assure that recipients become more involved in the exercise. At the School of Architecture this anticipated student involvement was seen as a valuable opportunity to seek the help of those readers who are interested in raising the general standard of rural domestic architecture. Their help was sought through a questionnaire which surveyed some of the assumptions of the design.

The School of Architecture has ensured us that “feedback” of this kind is of great educational value as a test of concepts and design decisions adopted by students. We hope that it too, proved stimulating and interesting to our readers. As a reminder to readers, one elevation at each of the ten designs submitted is reproduced on this page.

Editor,
3.6.3 Results of Survey VI

The questionnaire data from Survey VI are summarised in Table 6. This shows the aggregated scores, from forty respondents, for each of the ten designs, on each of the twenty descriptive scales.

The results of a multi-variate analysis of variance ('MANOVA'), recorded in Survey VI, are represented graphically in Figure 6.2 simultaneously depicting the interrelationships of the ten designs and the twenty descriptive scales, both with themselves respectively, and with one another; all as judged by the forty respondents. The plane of this graph is established on the two dimensions, or factors, which together, account for the greatest percentage of variance in the overall responses. The percentage of the variance accounted for by each of these factors is noted on the two axes of the graph.

For this analysis of variance by computer, the programme BMD 1M of the Health Sciences Computing Facility, U.C.L.A., was used.
TABLE 6: SURVEY VI

Summary of aggregated scores for each of ten designs on each of twenty descriptive scales. Sample Size = 40.

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3.64 Discussion of the Results of Survey VI

The results as illustrated graphically in Figure 6.2 show that the effects of the designs on respondents' judgements have been significant and have led to clear discrimination between each design. Looking at the overall response pattern, it is interesting to note the concerted good performances on the main evaluative scales, of Design Nos. 1, 3, 5, 8 and 10, with No. 8 emphatically the most satisfying.

The very modesty of the single-storey, Design No. 8 - to the point of some inadequacy in the sleeping and wet-entry areas - appears to have been seen as an important virtue, in contrast to the elaborateness of most of the designs.

Design No. 1 is unexpectedly low in ranking on a number of main evaluative scales, for a design that has a relatively familiar yet characterful formal image, as well as a high standard of presentation.

Design No. 3 was such a forthright revival of solid Victorian images, that it seemed to sort out respondents as either staunch followers or opponents. When favoured, it would seem to be because its strong image and particular upstairs intrigues are valued sufficiently to counter housekeeping or maintenance disadvantages.

Design No. 5, a predominantly one-storeyed layout, is with No. 10, the second most popular design, is highly ranked on most scales and is notable for being first on the 'Uplift' and 'Adequacy' scales.

Design No. 10 with a second ranking on the principal group of main evaluative scales, and with only minor negative comments on layout, (it is predominantly single-storeyed again), nevertheless ranks low on 'Impressiveness' & 'Character', probably because of a harshness in its basic building forms and in its window design.
Design Numbers 2 and 6 undoubtedly fared worse than they deserved on account of insufficient drawings and sketches in their presentation. No. 2 is regarded as 'Dull' and 'Inadequate'.

Two designs in the series - Numbers 7 and 9 achieved notoriety and provided a salutary lesson for designers, by demonstrating how, for rural families, an acknowledged high ranking of 'Impressiveness' or 'Uniqueness' can nevertheless be clearly dissociated from the other basic dimensions of satisfaction including 'Beauty' and general 'Suitability'.

Examination of these results depicted in Figure 6 show that the assessment of satisfaction and meaning in 8 out of the 10 designs was based primarily upon the scales of 'Harmony', 'Goodness', 'Friendliness', 'Welcome', 'Coherence', 'Stability', 'Beauty', 'Pleasantness', 'Uplift' and 'Adequacy'. The other two 'exotic' designs were judged in terms of their 'Impressiveness', 'Liveliness', 'Sophistication' and 'Uniqueness'. Design No. 7 especially, is considered to be so 'Unique' as to be almost totally 'Unsuitable'.

However, in spite of the fact that 80% of the designs were not associated with these latter more 'rhetorical' scales, these scales were nonetheless equally important in prompting the overall variance in the design assessments. This is demonstrated in the graph by the markedly long vector lengths for these 'rhetorical' scales. Such vector importance - achieved by most of the descriptive scales in this survey - is an index of the importance of the role of these scale attributes in the eyes of the farming people, when they were assessing the designs. Thus, for example the shorter vector lengths of the 'Uplift', 'Adequacy', 'Dignity', and 'Femininity' scales, indicates that these scales were held to be slightly less important than the others, in judging the designs.
The centre of the graph corresponds to a 'neutral' score of 4 on any of the descriptive-scales. It is interesting to note the extremely concerted - almost synonymous - use by farmers of the scales: 'Goodness', 'Welcome', 'Harmony', 'Friendliness' and 'Coherence', for the illumination it brings to their concept of 'Goodness', as a dwelling design quality. Notable too, is the very close association of 'Pleasantness' with 'Beauty', a distinctly 'aesthetic' coupling. In all, the graphed findings of farmers' responses to the ten farmhouse designs show a crystallizing of their concern around three salient components of satisfaction and meaning:

(i) Centrally, a dominant 'mildly-aesthetic' component, comprising 'Pleasantness' and 'Beauty', closely flanked by,

(ii) a 'strongly sociable' cum 'orderly' component, comprising 'Goodness', 'Welcome', 'Friendliness', 'Harmony' and 'Coherence', and, more remotely flanked on the other hand by,

(iii) a less important component comprising 'functional' and 'morale-affecting' issues.

These inferences from the questionnaire results are loosely but vividly supported by the respondents' general comments, and provide together, a tentative insight into the intentions of farming families about farmhouses, that is quite revealing although not unexpected. Fundamentally they seem to be interested in - and have strong intentions towards - environmental qualities in their homes that are every bit as 'supra-utilitarian', 'gesture-laden' and 'image-laden' as those of suburban families.
Respondents' Comments

These comments, often paraphrased, constituting a forum of opinion about farmhouses, are taken from respondents' letters and comments generously volunteered and enclosed with completed questionnaires:

Comments on specific designs:

Design No. 1

"Northern elevation appealed."
"Back door should open into kitchen, not laundry."
"Bit impractical."

Design No. 2

"Suburbia! - no appeal."
"Outside very dull - like implement or cowshed."
"Looking like different-sized boxes thrown together."

Design No. 3

"Plan too elaborate and messy."
"An exciting home - happy to live in this home but would like an additional TV room."
"Liked immensely. Layout simple, practical, and design has character."
"Very good and practical."
"The most appealing."
"Should have double garage."
"Should avoid passing through dining room en route to living room."

Design No. 4

"Plan too elaborate and messy."
"Outside doesn't appeal, but am conservative. Retreat is doubtful benefit on first floor."
"Like a factory."
"Good, but too spread out."

Design No. 5

"Plan too elaborate and messy."
"Very practical and has character."
"More suited to colder climate than North Auckland - kitchen too hot. Lacks office."
"Living room an odd shape."
Design No. 6
"Adequate, but lacks character and imagination."
"Too many outside doors for windy place."
"Practical, but gallery is wasteful."
"Gallery too remote from kitchen."

Design No. 7
"Broken roof line does not blend into rural setting and strongly resembles a city skyline."
"Plan too elaborate and messy."
"Looks like some kind of industry."
"Very like a factory - hate to plan garden around it."
"Looks like an industrial plant - one could get lost in this house."
"Like a freezing works."
"Too many stairs and levels, no wardrobe in bedroom and no fire escapes."
"Like a gaol."
"Too big and extravagant."
"Landmark, but looking like a butter factory - messy."
"Children's bedrooms, master bedroom, kitchen, all too dislocated. Difficult to weatherproof roof shapes. Ugly form."

Design No. 8
"Commended widely, but thought to be a bit small."
"Layout good and pleasant to work in."
"Good. Very attractive, but needs extended wet-day entry - first choice."
"Most favoured but needs office."
"Most practical and suitable design."

Design No. 9
"A very interesting and exciting layout which appealed, but some dislike felt of turrets."
"Plan too elaborate and messy."
"Industrialist's coastal homestead. Perhaps the most exciting of all the designs but also the most unsuitable."
"Could grow on me - with a lot of money. Too many doors."
"Interesting plan and luxurious home for the wealthy. Solid cantilevered balconies seem ugly and top-heavy."
"Not attractive as farmhouse."
"Joinery firm should make a fortune - doors, doors, doors."
"Too bitsy and disjointed. Prefer a calmer concept for house in such dramatic coastal surroundings."

"Too big and extravagant."

**Design No. 10**

"Easy-to-manage house, pleasing to the eye and easy to keep."

"Excellent floor plan but a discordant roof."

"Most practical and suitable design."

**General Comments:**

"Open-beam ceilings are too cold."

"Why are odd cupboards and wardrobes added externally to walls - this surely is more costly?"

There should be two toilets in all farmhouses.

"Were women consulted when designing these houses? - Designs generally seem too masculine."

"The farm office is regarded as a very important room and should be accessible directly from outside without having to pass through major rooms."

Provision for pantry, wet entrance, laundry, showers, kitchen routines and informal snacks was thought to be well handled in the majority of designs.

Open courtyards facing sun with house forming protection from prevailing winds is liked, but supplementary terraces or decks facing westwards are considered exposed and redundant.

Spacious bedroom access galleries were regarded as an advantage serving also as play or work space, but only when this space was intimately related to the kitchen hub of the house - which was only seldom in the designs.

The modest area of window glazing in most designs was appreciated.

The provision of study and sewing areas was well thought of, although remoteness and inconvenience of size in some designs was criticized.

North-facing kitchens were criticized for over-heating in summer.

Complicated roof forms are found to be aesthetically ugly and practically expensive to build and maintain. They evoke "messiness" in most judgments.

Separate questionnaires for husband and wife would have been welcomed. Much compromising occurred.
More perspective sketches or photos of models would have allowed a more confident assessment.

Complaints were voiced that the questionnaire allowed expression of opinion about the building in its entirety but not about specific practical aspects of plans.

Several readers felt that the extravagance of concept and design spoilt the many sincere attempts to design practical houses.

One reader is now dissuaded from believing any worthwhile design guidance is to be had from consulting the architectural profession if its attitudes to farm house designing are as evidenced in this series.

"Why such builders' nightmares? Farmers see enough of barns about the farm without coming home to live in one as well - designs seem nothing more than a shed with lean-to's tacked on here and there - some of the floor plans are good, but the elevations disappoint."

"Too much variance in information given with each design. Answers would have been more consistent if all the designs had been judged together."

"Re extra housekeeping routines on farms, there is less time for housework. Hence mothers with growing families would find upper floors, split levels, and extensive planning too inconvenient."

Washrooms and covered wet entrances were well thought of.

"Architects go 'off the deep-end' and 'create' too intensively. As a result, the exterior appearances generally are too original and disconcerting and are disliked by comparison with floor plans."

"Conceded that farmhouses should have more character than is common but most of these designs are thought to go too far and are too elaborate. Their visual and housekeeping chaos is unacceptable."

"Questionnaire unfair in comparing houses of very different floor area and cost."

"Farmers are basically conservative and don't want 'way-out' designs or 'lean-to' image - prefer a 'gracious home' not a 'German castle' or a 'lighthouse'."

"Land is plentiful - no need for second storey. Experience of two storeys and split level has taught that a single level is most desirable."

"Prefer ranch or colonial style even though thought to be 'old hat'."

"Some exterior doors open to face a toilet door."

"Avoid back entrance via laundry."

"All schemes look too expensive."
Problems were met in answering questionnaire where information on site, family, materials and size was lacking. Suggest a scale 'Economical - Luxurious'.

"Many broken, expensive roof lines."

"Pleased to note the return of verandahs for controlling summer heat and driving rain."

"No estimates, sq.ft. or total cost, no dimensions."

"Result of jumbled untidy outline in designs must be an increased cost and an aesthetic loss."

"Shearers should not live in the house with teenage children and would prefer independent quarters anyway."

"Too many outside doors mean draughty winters, limitation of furniture arrangements and security risks."

Most difficult sections of questionnaire were thought to be: uplifting - depressing; lively - calm; bright - dull; harmonious - discordant; coherent - incoherent.

"Offices should be large and central as the communications centre of the farm business."

"Open fireplaces popular but provision of fuel storage considered inadequate."

"Designs often look like fortresses with narrow slit windows and blank walls making the visitor feel like an intruder."

"Little advantage in providing slit windows to reduce heat loss when overall layout cancels this by being extended and broken."

"No farmer's wife would bother walking up a flight of stairs to a first floor just to view the property."

"Windows must be easy to keep clean."

"Unfavourably impressed by the restless, jumbled roof lines. Could no one design a simple, tasteful, yet practical house similar to the American ranch home?"

Series enthusiastically received by readers - majority look forward to future series. Suggestions include: More houses for farms; landscaping; Rehabilitating existing houses.
3.7 SURVEY II/2: EXISTING STUDENT HOUSING:
its Satisfaction and Meaning.

3.7.1 Objectives of Survey II/2

Survey II/2 is the sequel to the earlier Survey II described in Section 3.2. Together, these form a two-stage survey, about existing student housing examples, wherein the first stage saw the devising and administering of the survey instrument, the gathering of surveyed data, and a simple analysis of preference rankings of various exterior and interior housing examples. The second stage - Survey II/2 - was a more elaborate analysis of the acquired data, in search of insights into 'Satisfaction' and 'Meaning'. Preparation for the earlier Survey II involved the theoretical objectives of defining hypotheses A, B and C. Practical objectives consisted of:

(a) discovering students' preferences for aspects of existing housing they were actually occupying, for comparison with preferences recorded in Survey I on modes of student accommodation;

(b) preliminary testing of Hypotheses A, B and C;

(c) trial experience in the use of questionnaires based on the Semantic Differential technique.

Turning now to the later Survey II/2, sequel to Survey II, its objectives embrace the interests, discussed in Section 2.4, concerning 'Satisfaction' and 'Meaning', and may be stated as follows:

(a) preliminary experience in the multi-variate analysis of data acquired by the use of the Semantic Differential technique;
(b) the identification of specific satisfactions and meanings attributed by students to examples of their existing housing 'Exteriors', and, hopefully,

c) the detection of the basic architectural characteristics of the examples, which account for those specific satisfactions and meanings perceived by the students;

d) further examination of evidence for Hypothesis C, that is, of the way the two student groups might compare, particularly in their assessments of satisfaction and meaning, and finally,

(e) a reconciliation of findings from sections (b) or (c) above, with relevant aspects of Hypotheses A, and B.

3.72 Method of Survey II/2

As a solely analytical sequel to Survey II, this Survey II/2 is based upon the method of its forerunner. Likewise, these surveys share common data. It is in the manipulation of these data, (relating to 'Housing Exteriors'), and in the results derived from them, that Survey II/2 warrants the separate treatment and discussion outlined below.

The results of Survey II/2 were obtained by computer, using a Multivariate Analysis of Variance. This technique of analysis, (MANOVA), has been used in all of the surveys whose instruments incorporate the Semantic Differential technique. A fuller discussion of this analysis procedure is given in Section 3.84, and Appendix 4. Its initial use in Survey II/2, was based on 'Teddybear', a programme by J.B. Wilson, V.D. 1976 November 1st, and ultimately - for more accurate graphic plotting -
on the BMD 12V and BMD 07M programmes of the Health Sciences Computing Facility, U.C.L.A.

3.73 Results of Survey II/2

The results of Survey II/2 are presented in two parts, each with its supporting data tables, and its own graphical output. The two parts are as follows and as shown in Tables 7A and 7B.

A. Student 'Housing Exteriors' assessed by Group 1.

B. Student 'Housing Exteriors' assessed by Group 2.

These two sets of results together form the basis of the combined discussion presented in Section 3.74.
RESULTS OF SURVEY 11/2

Part A - 'Housing Exteriors' assessed by Group 1

TABLE 7A

(a) Mean Scores (over all subjects) for each 'Housing Exterior' on each Descriptive Scale

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(b) Principal Factors on each Descriptive Scale

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CUMULATIVE PROPORTION OF TOTAL VARIANCE:

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(c) Alternative 'Extremes' on the Factors

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(d) Correlation Matrix of Descriptive Scales

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FIGURE 7A: 'EXTERIORS' BY GROUP 1
RESULTS OF SURVEY II/2

Part B - 'Housing Exteriors' assessed by Group 2

**TABLE 7B**

(a) Mean Scores (over all subjects) for each 'Housing Exterior' on each Descriptive Scale

<table>
<thead>
<tr>
<th>GROUP</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
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(b) Principal Factors on each Descriptive Scale
(c) Alternative 'Exteriors' on the Factors

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<th>COEFFICIENTS FOR CANONICAL VARIABLE</th>
<th>1</th>
<th>2</th>
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(d) Correlation Matrix of Descriptive Scales

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Figure 7b: 'Exteriors' by Group 2
3.74 Discussion of the Results of Survey 11/2

Figures 7A and 7B display the interrelationships between the fourteen 'Housing Exteriors' and the ten descriptive scales, as assessed by Group 1 and Group 2 respectively.

Bearing in mind the fact that the descriptive-scale vectors all have the same true length in the multi-dimensional space depicted in either graph, and, that, since the greatest variation in the subjects' responses is accounted for by the two largest factors which form the two axes of either graph (65% and 18% for Group 1; 55% and 28% for Group 2), then, we may conclude that those descriptive-scales of greatest plotted length in either graph are those which contribute most to the two largest factors concerned, and hence, themselves account for the greatest variation in subjects' responses.

Thus in Figures 7A and 7B, it is clear that the scales measuring 'Character', 'Status', 'Friendliness' and 'Beauty' were responsible for most of the variation in both Groups' assessments of the 'Exteriors'. In other words, these scales represented the attributes of these particular 'Exteriors' which enabled respondents of both Groups to distinguish them the most; apparently being notably strong in some cases but notably weak in others.

By contrast, the attributes of 'Pleasantness', 'Welcome' and 'Suitability' were not significant in affecting assessments of these 'Housing Exteriors' which probably indicates that respondents regarded these attributes as relatively unimportant in judging these 'Exteriors'. A possible explanation for this, could be that 'Suitability', as a characteristic of this range of student housing, is of rather low criticality, and on the other hand, that concerns for 'Pleasantness' and 'Welcome' have been seen to be met by concerns for the attributes of,
say 'Beauty' and 'Friendliness' respectively.

Regarding the four dominant scales, 'Characterfulness' is the predominant one, being the strongest scale in Group 2's assessment and the second strongest in Group 1's. However, while the relationship of the other three dominant scales, 'Friendliness', 'Status', and 'Beauty' - holds steady for both respondent groups, that of the 'Characterfulness' scale varies greatly, and along with it, its meaning. It seems that for Group 2 (the Architecture Students), the meaning of 'Characterfulness' is closer to 'Friendliness' than it is to 'Beauty' and 'Status'. Sociable rather than aesthetic qualities prevail in its meaning. On the other hand, for Group 1 (the General Students), the meaning of 'Characterfulness' is judged to be decidedly closer to 'Beauty' and 'Status', which gives it a strong aesthetic rather than sociable connotation.

Both groups of students share the view that 'Friendliness' and 'Statusfulness' are approximately opposed in their meanings. In other words, they believe that 'Status' in their dwellings is achieved only in conjunction with almost total 'Unfriendliness'. Furthermore, while both groups agree that 'Statusfulness' is quite closely allied to 'Beauty', there is minor conflict between them as to whether or not this allied aesthetic pair is 'Good'. The Architecture students see some slight 'Goodness' in these aesthetic attributes, whereas the General Students see them as somewhat 'Bad'.

Within this field of scale-meanings, is interspersed the set of fourteen 'Housing Exteriors'. These 'Exteriors' are interrelated according to the degree to which they were distinguished, one from the other, and also, the degree to which they were assessed as possessing any of the ten attributes defined by the descriptive-scales. The blends of meaning attributed to the 'Exteriors' are depicted by the graph. A comparison between the two graphs, Figures 7A and 7B reveals a strong similarity between the two patterns of 'Exteriors'.

For both groups, the examples of 'Housing Exteriors' analysed as most preferred in the earlier Survey II, hold consistent relationships with the two dominant descriptive-scales, 'Friendliness' and 'Statusfulness'. This leading selection of 'Exteriors', comprising Numbers 11, 2, 9 and 4, seems, by its location, to infer a nameless component which is the resultant of, mainly, 'Friendliness', 'Characterfulness', 'Statusfulness' and 'Beauty'. Moreover, this resultant component, or attribute, can, by inference, be termed 'Greatest Satisfaction' and could logically be assumed to have its vector lying near to 'Exteriors' 11 and 2 - the 1st and 2nd preferences of these respondent groups, as disclosed in Survey II.

It is interesting to note the slight 'tumbledown' element coupled with some 'honest' clothes-drying-on-front-verandahs to be found in the most 'Friendly' Exteriors - numbers 9, 4, 13 and 1. The most neutral examples, assessed by both groups, were numbers 14 and 3, each generous in space and detail, each somewhat of the Romantic Tradition - number 14 reflecting the 'arcadian' suburb, and number 3 the 'mediterranean' resort.

The modern 'Townhouse' example number 12, is for both groups, the most 'Statusful' of all and, especially for the Architecture students, also the most 'Beautiful'. Accordingly it is thus rated the least 'Friendly' of all. Survey II's least preferred examples, numbers 8, 6, 5, 10 and 7, all lie in the graph-space occupied mostly by the negative halves of the descriptive-scale vectors, i.e. in the opposite hemisphere to the leading examples 11, 2, 9 and 4.

From the foregoing results it can be concluded that the two groups of students substantially agree about what attributes or meanings they regard as important in assessing a representative range of student dwelling 'exteriors' and, furthermore, they agree about their ratings of the various examples of that range when assessed in terms of those attributes or meanings. Thus, since strong concurrence between the two respondent groups has been found, it follows that, for groups with such minor
differences in their preoccupations, Hypothesis C is not confirmed.

Furthermore, by inspection, it is apparent that both of the groups assess the greatest satisfaction to be present in those dwelling examples whose accommodation appears generous, whose architectural style is traditional rather than modern, and whose spatial and formal identity is characterful and intriguing rather than superficially decorative. Thus Hypothesis B is confirmed.
3.8 SURVEY VIII: LIVING-ROOM DESIGNS:

Attitudes to Simulations of these

3.81 Objectives of Survey VIII

In the earlier findings from TOPIC No. 5 of Survey IV, a clear preference was shown by Students, and a less clear, yet somewhat comparable one by Households, for a certain 'complexity' in the character of Living-rooms. Wool (1970) had conducted a series of detailed experiments using drawings of factorially designed living-rooms, which were judged in terms of their perceived 'Friendliness' by one group of housewives and two groups of Students. 'Friendliness' had previously been isolated as the principal dimension of meaning, attributed by widely representative sample populations, to domestic interiors.

In Wool's findings, the relative percentage of the variance taken up by each of the four architectural factors he manipulated in the experiments, was remarkable for the dominance of the Seating-arrangement and Ceiling factors over the factors of Window and Furniture design.

In TOPIC No. 5 of Survey IV, Seating-arrangement and Window design had been kept constant through all eight of the topic conditions. These eight conditions were based upon three architectural factors: Ceiling, Floor and Window-wall. There were two conditions of each of these factors giving an eight condition (2 x 2 x 2), factorially designed, series of drawings. As deduced in the discussion of the histogram of preference for TOPIC No. 5, a major proportion of the variance in the judgements of preference, was attributable to the Ceiling factor and the Floor factor, in their various combinations with the other elements in the setting.

Thus, on the evidence of these two distinct research projects, there was good reason to assume that, in any further research into people's psychological responses to domestic interiors, such as Living-rooms, important architectural ingredients of the setting under study would certainly be Ceilings, and probably Furniture-arrangement and Floor-configuration too. It was further predicted
that Window-wall-disposition (as distinct from Window-design, included in Wools' experiments but of small relative effect), would prove to have an appreciable effect on judgements of room satisfaction and meaning. This expected effect seemed consistent with the premise that the location of a window-within-a-wall, as well as the juxtaposition of that window-wall with other space-bounding elements of a room, contribute crucially, to that rooms character, in terms of a number of its key attributes, for example: its enclosure, its outlook, its privacy, its convenience, its comfort or its friendliness.

In sum, it seemed reasonable - to the point of truism - to assert that most of a room's architectural identity, in terms of such above-mentioned key attributes, could be accounted for by reference to specific conditions pertaining to its four primary room elements or factors, namely: its Ceiling, its Furniture-arrangement, its Floor-Configuration, and its Window-wall-disposition. The architectural variables for a prospective study of satisfaction and meaning, in an interior setting, had been established, and, with that, the foundations of Survey VIII.

Survey VIII was to have, as its first objective, a comparative assessment, by two distinct student groups, of the satisfactions and meanings they perceived in a factorially designed series of full-size simulations of Living-rooms, when measured on a set of predetermined bi-polar semantic scales.

A second objective was to be a comparative analysis, from this assessment by the combined groups, of the relative effects on respondents' psychological responses, of each of the alternative conditions of any of the four architectural elements in the experimental series, analysing these effects one element at a time.

A third objective was to be a comparative analysis, from the assessments by the combined groups, of the relative effects on respondents' psychological responses, of each of the four architectural elements, each element taken as-a-whole and compared with the other three and with the effects of interaction and error variance.
A fourth objective was to be a comparative analysis, from the assessments by the combined groups, of the satisfactions and meanings they perceived in each of the alternative living-room designs making up the simulated series, when measured on the predetermined set of bi-polar semantic scales.

A fifth objective was to monitor and analyse the relative constancies of respondent use of the semantic scales by which the series of living-rooms was assessed and to examine the patterns of use of these scales for any salient underlying dimensions of meaning.

In addition to these five main objectives, it was intended that Survey VIII should afford an opportunity to investigate and perhaps identify general correlations between, on the one hand, various aspects of 'satisfaction' and 'meaning' as perceived by distinct respondent groups, and, on the other, aspects of the experimental designed settings and their basic architectural elements.

Based upon the findings from Surveys II, II/2, and IV\(\text{A}\), upon certain research findings by Canter (1969b, 1969c, 1969d, 1970c, 1974) and the Building Performance Research Unit (1972) as well as upon theoretical assumptions outlined in Part I, it was predicted, at the outset of Survey VIII, that the following General Correlations about Living-room Settings could be confirmed as having some degree of significance:

(i) Satisfaction correlates with a living-room setting's 'Enclosure', 'Privacy', 'Intricacy', 'Friendliness', 'Pleasantness', 'Complexity' and 'Comfort'.

(ii) Satisfaction correlates with respondents' experience and awareness of domestic architecture.

(iii) The judged Salient Dimensions of Meaning of a given setting will differ between categorically distinct Respondent Groups. (A variation of Hypothesis C).
(iv) The judged Salient Dimensions of Meaning of a given Setting will relate to its perceived 'General Utility' (or, Satisfaction-in-use) - this perception being conditioned by evidence of activities, their apparent congruence with the Setting, and their socio-cultural enrichment by that Setting.

(v) The more 'Complex' and 'Allusive' Settings will be judged as conveying widely sought meanings more strongly than 'Simpler' more 'Explicit' Settings. (A variation of an aspect of Hypothesis B).

(vi) A dominant dimension of meaning sought in Living-Rooms is 'Friendliness'.

(vii) A major determinant of Living-Room 'Friendliness' is 'Architectural Gesture', and, in conveying 'Friendliness', 'Architectural Gesture' anthropomorphically signifies 'Social or Personal Gestures'.

(viii) The dominant Architectural Element in architectural gestures of 'Friendliness' is the Ceiling, ahead of Floors, Window-walls and Furniture-Arrangement.

These eight predictions about respondent-setting correlations formed an interest that was secondary to the five main objectives of Survey VIII, described earlier, and were not necessarily catered for specifically in the experimental design.

However, to the extent that the experimental results might confirm or deny these correlations, they were to be dealt with in the discussion of the results.
3.82 Simulations

Simulations are representations. Increasingly in Environmental Psychology, and in numerous other fields of Architectural Research, simulations are resorted to as a means of investigating man-environment interactions in realistic and holistic ways. Representations of environments are made typically with drawings or photographs or slides or movie-film or video-tape or 3-dimensional modes. The usefulness of simulations lies in their ability to represent environments either wholly or partly. Investigation may then be made of whatever aspect or combination of aspects of the environment which interests the researcher or designer, with a minimum of cost and delay, and a maximum of control over any variables under study.

Winkel and Sasanoff (1966) have pioneered the exploration of the use of Simulations in Architectural Psychology, suggesting that successful simulation requires only that one be able to reproduce the system under study as accurately as possible without actually employing the system itself. While simulation by means of two-dimensional media is prevalent and well established in recent man-environment research, that by means of three-dimensional models is less so, having been developed only recently in scale-model form by Appleyard (1974) and Anderson (1972), for example, using techniques of remote controllability and video-monitoring, and in elementary full-size form by the writer in 1972, at this School of Architecture.

The simulator developed for this experimentation, is a full-size one and possibly unique. Founded and constructed in elementary form during 1972, intentionally for the principal research project of this thesis, (Survey VIII), it was initially used in trial architectural studies relating to Surveys IV and VIII, as well as, concurrently, in the basic psychological research for Venter's (1974) M.A. Thesis, under the writer's supervision. It has since been further elaborated in its production facilities, 'props' and recording equipment, to achieve a higher degree of 'reality' needed for Survey VIII. In essence, this simulator is a small 'theatre-stage', drawing together the techniques, the rigging, the production lighting and sound systems.
of the stage, and combining these with video and audio tape-recording systems of a sufficient standard to record high quality experimental or educational programmes. The space-enclosing elements of this facility are modular. Panels for ceilings, walls, and floors are swiftly and radically adjustable, and, together with furnishings, and lighting, including artificial daylighting, provide a widely adaptable interior, capable of 'staging' - with 'actors' - many settings for everyday human activities. The full-size simulator thus offers, at once, common ground for interdisciplinary research, as well as aids to designers, where studies are centred on the relationships between interior environments and human behaviour, perception and cognition.

It should be noted that this full-size Simulation Studio can achieve a degree of 'reality' and 'naturalness' in a setting, which renders it very nearly 'real' as an experience. In these circumstances, the setting itself may not be perceived as a simulation to a very marked degree, and, indeed for research purposes, any simulation of which respondents are aware is likely to be confined to that which is inherent in the media of representation, - viz. video-tape, colour-slides and audio-tape - to which they are invited to respond.

For this reason, the assumptions and findings on simulations, from the literature of Environmental Psychology have less bearing on the full-size room simulator than they do on the two-dimensional media by which the staged setting is later represented elsewhere.

A theory of simulations - which are seen as a group of 'descriptive models' - has evolved from Operational Research. Broadbent (1973) traces this evolution by reference to Churchman, Ackoff, and Arnoff (1957) and Echenique (1968). Winkel and Sasanoff (1966) discuss it by reference to Larsen's theories. This literature provides an account of the different ways in which simulations may represent 'Reality'. Briefly, these ways of representing reality range from the 'isomorphic' in which the simulation is so close to reality that it may be substituted for it, to the 'homomorphic', in which simulation relates only to the gross effects of interaction in the
real situation rather than the detailed effects. Most modes of simulation employed in Environmental Psychology consist of blendings of both extremes of modelling. They are both isomorphic and homomorphic in varying ratios which, in turn, depend upon the particular levels of response or analysis being sought through the simulation.

This family of 'descriptive models', of which the simulations used in Architecture and Environmental Psychology, are a part, may be reconciled with the three broad categories of 'model' recognised in Operational Research: 'iconic models', 'analogue models' and 'symbolic models'. Thus:

(i) Iconic models look like that which they represent, but are scaled down in size. Examples of these are photographs, toy replicas, models of building projects. They necessarily represent single cases.

(ii) Analogue models are typically based upon some convenient transformation or abstraction of certain properties of reality, in accordance with some specified rules. Such models are used to describe and manipulate dynamic processes, and can be applied to more than one case.

(iii) Symbolic models are identified by their use of numbers or symbols from logic. They consist of equations expressing the relationships between the entities which are being modelled.

Now, against this background of modelling theory, a classification of the simulations employed in Survey VIII can be inferred.

Firstly, the full-size, three-dimensional Living-Room Settings as simulated, have a one-to-one relationship with what they represent, and, in their extreme closeness to reality, have been substituted for it. Therefore it may be inferred that this experimental simulator is extremely 'Isomorphic', and furthermore, since it largely succeeds in its isomorphism by virtue of its
experiential accuracy - that is, it looks and feels rather like a real room to an occupant - it may also be classified as broadly 'Iconic'. However, it is not precisely 'Iconic', in the general sense, since it does not involve any scale reduction of size as is normally associated with 'Iconic' models. Thus it can be seen as being only just a 'model', if indeed it is useful to term it a 'model' at all. A more faithful classification of this room simulator would be: 'a Staged Representation of Reality', or a 'Pseudo-Reality'.

Secondly, and similarly, the two-dimensional media of simulation used to represent the settings to respondents on later occasions, may be classified by comparing them with the foregoing Typology of descriptive models'. The media used were one-inch monochrome video-tape and 35mm colour-slides. Both media achieve projections of two-dimensional images of the experimental settings, which generally substitute for them, and look like real rooms. They are both, therefore, isomorphic, but, again like the full-size simulator itself, not clearly 'iconic', although related most to that class of model. Here too, in that a high degree of imagined experience of the settings can be variously drawn from them - in the case of video-tape, by virtue of the occupants' behaviour re-enacted, or, in the case of colour-slides by virtue of the coloured, enlarged and wider-angled projections offered - they appear to form a class of 'descriptive models' which may be inferred to lie between the 'iconic' and the 'pseudo-real'.

Regarding the use of these two-dimensional media of simulation in Environmental Psychology, the relationship between the Simulation and the Reality it represents, has preoccupied researchers. Here, three main issues have emerged:

(i) the validity and information-content of the simulation,

(ii) the effectiveness of simple and complex simulations, and,

(iii) the issue of the scale of the simulation in relation to reality.
Regarding the first issue, validity, a number of researchers have reported their tentative findings about the possible distortions of reality caused by these two-dimensional media. Winkel, Malek and Thiel (1969) consider that the use of monochrome photographs, representing Roadside Environments, influences judgements of those environments. On the other hand, Coughlin and Goldstein (1971) find sufficient evidence in their studies to expect that responses to colour slides of environments will be consistent with responses, in-situ, to those real environments. Hershberger and Cass (1973) investigated differences in responses to different media representations of the built environment. They compared responses to colour-slides projection, multiple colour-slide projection, coloured movie-film, monochrome movie-film and monochrome video-tape. The order in which these different media were found to most validly represent reality was:

1st: Coloured movie-film  
2nd: Monochrome movie-film  
3rd: Monochrome video-tape  
4th: Colour-slide projection  
5th: Multiple colour-slide projection

They see coloured movie-film as coming closest to reproducing the same 'dimensions of meaning' as reality holds, when measured by the Semantic Differential, although it may not necessarily represent the environment an experimenter may mean it to – depending on the bias of his enquiry. They consider that the best two-dimensional method of representing the environment validly and realistically, is by a combination of coloured movie-film and colour-slides. Accordingly, for both validity and practical reasons, the two-dimensional media selected for use in Survey VIII were monochrome video-tape and colour-slide projections.

Thus, while it is acknowledged that there exists a 'presentation effect' attributable to each of the above five media, the consequence of this effect is not an issue of investigation in this research programme. Indeed, since a basic phenomenological tenet in Environmental Psychology, as propounded, for example, by Proshansky,
Ittelson and Rivlin (1970b) holds that "behaviour springs not from the objective properties of the stimulus world 'out there', but from that world transformed into an 'inner world' or 'psychological environment' by an inherently cognizing organism", the consequence of such 'presentation effects' are here assumed to be largely insulated from respondent judgements by the normal processes of cognition which reconcile specific perceptions with the subject's enduring conceptual resources and his personal constructs. In other words, irrespective of any illusory component of a respondant's experience - whether in a cinema, a theatre, or, for that matter, a simulation studio - it is postulated that a subject, in his own interests, will tend to suspend his disbelief in any simulated setting, and, by his acquired transactional processes of perception and cognition, tend to construe an experience of that simulated setting, whose 'reality' matches both the intentional concept represented and his role at the time.

The second issue about Simulations to be identified by recent researchers, is that of the extent to which the simplicity or complexity of any simulation, may influence its relationship with reality. Kaplan et.al. (1974) found that detail and complexity do in fact influence judgements about the architecture of a simulated setting, and that architecture students acting as respondents were more influenced by simulated detail in the setting, than were non-architecture students. It appears from this research, that respondents who have experienced architectural education respond more discerningly than others to the detail or complexity of any simulation of an architectural setting. The prospect of this discernment which arose with the enlisting of two groups of architecture students as respondents in Survey VIII, led to the decision to construct and furnish the experimental settings in considerable detail, and to represent them, not only by the medium of video-tape but also by means of high-definition colour-slide projections.
The third and final issue of importance arising from research on simulations is that of scale. While Lau (1970), studying judgements of lighting quality in full-size and scale-model rooms, and Holmberg et al. (1967), investigating the perceptions of volume in full-size and scale-model rooms, both conclude that, for their respective purposes, scale-models adequately represent full-size rooms Bonsteel and Sasanoff (1967) found, on the contrary, that for certain detailed elements in a setting, the effects of scale changes were of crucial importance. They concluded from studies of a scale-model simulation of a museum space, that, because scale-models of the exhibits in the museum could not be rendered accurately enough to form adequate representation of their real counterparts, then respondents judged televised images of not only the exhibits, but the museum space as-a-whole, as 'unreal'. In so doing, they were recognising the images as the scale-models they in fact were, rather than 'real' settings.

Two lessons may be had from these findings about the scale of simulations:

(i) Scale-reduction should result in models no smaller than those which permit the smaller visual-cue objects and features of a setting, to be rendered accurately enough to be convincing in any later media representation.

(ii) The choice of scale in any simulated setting should be governed by the principle of 'consistency' of visual cue information. In other words, the same standard of perceived accuracy of simulation should be adhered to in all of the elements of a setting as well as its contents, large and small.

In simulating the experimental settings of Survey VIII, the use of a full-size rather than a scale-model simulator has avoided not only the problem caused by inaccurately modelled smaller objects and features tell-taling of 'non-reality', but also the problem
of inconsistency of visual cues. Since only the spatial boundaries of the settings are artificial, whereas the detailed features such as windows, lighting and furnishings are actually real - as too, are the acting occupants - then neither of the above two problems are encountered. Illustrations of the full-size simulator are shown in Appendix 3.

3.83 Method of Survey VIII

The method used to acquire the data from the two selected respondent groups, consisted of the administering of Instrument No. 8, a structured attitude-scaling questionnaire, to two groups of full-time, Auckland University Architecture Students - one, a senior class of 'Design and Building Evaluation' students, who participated in the staging, the acting out and the video-tape recording of the sequence of Living-Room simulations, these being the independent variables in the experimentation; the other, a class of 1st Professional Year Architecture Students who volunteered just to be respondents, towards the close of their initial year in the School of Architecture. Each of the two groups responded, through the questionnaire and a tape-recorded follow-up debate, to a sequence of twenty-one Simulations of Living-Room Settings, presented to them visually by means of a simultaneous presentation of monochrome video-tape and 35mm colour-slides. Group 1 - the participant and respondent group - differed from Group 2 - the respondent-only group - in two important ways: firstly, they were culturally and professionally conditioned, in understanding and modifying the designed environment, by four years of full-time experience in the B.Arch. course; secondly, they had knowledge and experience of the experimental full-size room simulations - some as 'co-producers', some as 'actors' and others as 'co-readers' - all prior to taking up roles as respondents at the video-tape/colour-slide presentation.
The Questionnaire

The structured questionnaire was a development of previously used Semantic-Differential type instruments, and consisted of two consecutive parts:

(i) an introductory and demographic part, explaining the purpose of the survey, and recording basic personal data about the student respondents, and,

(ii) the survey questionnaire part, explaining in detail, the process of completing the questionnaire, and recording the respondents' assessment scores as they did so.

Exactly the same form of questionnaire was administered to both respondent groups.

The survey questionnaire in Instrument No. 8 was made up of a sequence of thirteen bi-polar adjectival scales. These descriptive scales were all selected, a priori, from those employed by Canter (1967, 1969c, 1969d, 1971) and Kasmar (1970), as well as from a number of untried scales specifically devised for application in this experimentation. The final selection of descriptive scales was a subjective judgement, based generally, upon the Semantic relevance of each chosen scale to the concept 'Living-Room', and, more specifically, to the major dimensions of satisfaction and meaning, implicated by the correlationship interests outlined in Section 3.81, 'Objectives of Survey VIII'. The scales: 'Comfortable', 'Adaptable', 'Relaxed', 'Complex', 'Friendly', 'Pleasant' and 'Inviting' are all selected from Canter's repertoire, while the scales: 'Convenient', 'Comfortable', 'Complex', 'Pleasant' and 'Inviting' are all to be found in Kasmar's 'Lexicon of Environmental Descriptors'. The remaining scales: 'Intriguing', 'Private', 'Enfolding', 'Inward-Oriented' and 'Ideal' were all freshly devised for this survey and, as far as was known, untried.

The sequence of 'Living-Room Settings' - the independent variables - to which both subject-groups responded, was a series of twenty-one
room 'Conditions', pre-selected from a total of thirty-four, previously staged, acted and recorded for later representation on the two survey occasions through the media of monochrome video-tape and colour-slide projection. In addition to these twenty-one simulated room conditions, an imagined 'Ideal Living-Room' was added to the sequence on the questionnaire form, for scoring by the respondents. The intention here was to introduce an objective measure of respondents' judgements on the relative 'idealness' of each of the twenty-one room-conditions. Similarly, the inclusion in the series of descriptive scales, of the 'Ideal' scale, was intended as an objective measure of how relatively synonymous with 'Ideal', the respondents judged each of the other scales to be.

The twenty-one pre-selected room conditions were chosen from the total of thirty-four actually staged, using the criterion of 'consistent distinctiveness'. This criterion was subjectively applied to the entire series to eliminate those room-conditions which were not felt to be significantly or consistently distinct from others. While the practical production limit of this factorially-designed series of settings was held at thirty-four, the theoretical number of possible combinations of the four room elements, or factors, was in fact forty-eight. This theoretical potential was made up of four ceiling-conditions, two window-conditions, three floor-conditions and two furnishing-conditions \((4 \times 2 \times 3 \times 2 = 48)\). However, because some of these combinations involved conflict between their sloping-ceiling-condition and window-condition, they were classed as absurd and not staged. Thus, by discarding absurd and trivial cases a production series of thirty-four was adopted, to be finally trimmed by pre-selection to an edited media representation of twenty-one conditions. The edited video-tape and colour-slide sequence used in the survey is available for reference on request. The following monochrome photographs, Plates 8.01 to 8.21, copied from the original colour-slides, illustrate the sequence as surveyed.
It should be noted that the resulting survey-questionnaire was an elaborate one. In making it so varied and lengthy, compared with other attitude-scaling questionnaires, it was hoped to take advantage of student respondents' mental stamina as well as their vocational commitment to design-investigations, in order to acquire a rich fund of data about 'realistic', multivariate interactions between respondents and architectural settings. Yet, for all its elaborateness, the questionnaire still lacks twenty-seven factorial combinations that theoretically existed in the complete factorial design. Questions of architectural interest dominated the selection of the chosen twenty-one alternative room-conditions, as well as, earlier, the selection of the number of alternative conditions by which each room-element or factor would be represented. In the event, replications of these room-elements under investigation were unequal, there being four ceilings, two windows, three floors and two furnishings.

Hence on two matters the experimental design became unbalanced in the interests of either practical or architectural questions, but nonetheless, against the interests of clearcut statistical analysis. Compensating analytical measures, which were adopted to diminish the effects of this imbalance, included firstly, a computer-programmed missing-data-estimation procedure modelled on the actual recorded data, to make up for the factorial combinations omitted from this survey, and, secondly, a deliberate equalising of the number of replications of the room elements (equalised at two of each), to enable paired comparisons of the relative importance of these four room-elements, in affecting respondents' judgements.

As to the sequence by which alternative Living-room conditions were represented to respondents, it was decided to adopt a sequence which grouped the conditions into four - one group for each of the four ceiling conditions. (The ceiling factor had the greatest number of conditions). Thus one ceiling condition was held constant while the other factor conditions were varied against it, before proceeding likewise, with the next ceiling condition. Apart from
this, there was a slight progression, within each group of conditions, towards increasing complexity. Details of the sequence of room conditions as presented to the respondents together with a legend of room-element or factor conditions are given in plates 8.01 - 8.21.

The questionnaire did record a small range of demographic data, but no correlation checks were intended with other questionnaire responses. Rather, since each group was fairly homogeneous and the main interest lay in the way each group-as-a-whole responded, comparisons about judgements of satisfaction and meaning were to be restricted to a group by group basis. The main interest, concerning data interpretation, lay in the prospect of carrying out a suitable multi-variate analysis of variance with the semantic-differential data, acquired through the survey questionnaire.

Sampling Method

Survey VIII was administered to two discreet groups of full-time Auckland University, Architecture Students - one a senior class of eighteen 'Design and Building Evaluation' students, the other, eighteen volunteers from a class of 1st Professional Year Architecture Students. These two groups differed in known ways, both by their educational level and by the extent of their involvement in the research project, all as described in Section 3.83: 'Method of Survey VIII'.

The attitude-scaling survey-questionnaire in Instrument No: 8 involved respondents in reactive measurement by scaled verbal scoring responses. It was self-administered after respondents had read detailed instructions on the process of completing it. Before either of the groups commenced their responses to the media representations, the nature and procedure of the questionnaire was further explained, and a quick-run preview of all of the slides in the series was projected to reveal the scope of the evaluations the respondents were being invited to make, and thus, hopefully, to nullify any undue over-reaction.
For the survey proper of both respondent groups, the sequence of room-conditions was represented both by monochrome video-tape on two 23 inch screens (without sound), and by the colour-slide projections. Each condition was screened through both media for a duration of two minutes. During this time each room-condition was portrayed by the same video-camera shooting plot: during production, the camera initially covered the whole set from an unvarying, implied entry-door position, continued by panning the vertical and horizontal extent of the set, and then proceeded to move part-way into the set and inspect some of its features and the activities of its occupants. Simultaneously, the corresponding single colour-slide projection was screened. Because the lens, used on the 35mm camera was of a wider angle than the lens on the video-camera, the slide projections gave more comprehensive views of each setting than did the video-tape images. This deficiency in the video-tape image, for the purpose of room-evaluation, was not compensated for by the measures of panning and dollying around the room. In fact, a consensus opinion by the respondent groups, strongly favoured the colour-slide projections over the video-tape. There were several reasons for this: the colour-slide images were more definitive than the video images, and their single wide-angle representation was more comprehensive. Related to this fact, was the need for more judgement time in rating rooms by the video-tape. Given our everyday experiences with dramatised television broadcasting, the methodical video-taping procedure used here for depicting each room condition, complete with its sedate social occasion in progress, was found to be comparatively dull and especially so without soundtrack. It would appear that when the topic for evaluation is primarily a motionless architectural environment - as compared with absorbing human activities or other events - then, the average quality monochrome video-tape image, lacking somewhat in definition by comparison with good slide projection, is at a disadvantage and would even seem to introduce a new and unwanted element of unreality into the Simulations. Great improvement was considered likely here, by the use of wider-angle lenses and fully professional colour equipment standards to improve comprehensiveness and definition.
Finally with regard to the sampling procedure in Survey VIII, it was apparent that - despite 'student stamina' and 'vocational commitment' - the forty-five minute experience of completing the extensive response matrix, especially under the pressure of the two minute video time ration, was more trying than it ideally should have been. As a consequence a small fraction of returned questionnaires were either incomplete or flawed. As a supplement to the Survey questionnaire, an informal, aftermath discussion was held with the respondent group of senior year Architecture Students, in order to record their thoughts on the experience in general, and on some questions about the 'Living-rooms' intended to elaborate on the structured responses recorded through the attitude scales. All of this discussion was tape-recorded, and an edited transcription of it is given in Appendix 4.
This questionnaire is aimed at determining your attitudes towards a variety of living room shapes and arrangements. Please give your attitudes to the combined room-and-furniture arrangement. The social occasion seen in progress is to be regarded as a typical one of many accommodated in living rooms, and should be seen solely, as an illustration of a setting's typical use. Before you read the instructions and begin the questionnaire would you please provide the following information:

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
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</tr>
<tr>
<td>Please indicate whether</td>
<td>Male</td>
</tr>
<tr>
<td></td>
<td>Female</td>
</tr>
<tr>
<td>What level of previous tertiary education have you obtained? (e.g. Arch Int., B.A., M.A. etc)</td>
<td>4</td>
</tr>
<tr>
<td>Have you had any previous vocational experience? (e.g. Architects office, Engineer's office etc.)</td>
<td>5 Yes</td>
</tr>
<tr>
<td></td>
<td>6 No</td>
</tr>
<tr>
<td>If yes please specify</td>
<td>7</td>
</tr>
</tbody>
</table>

Turn over
INSTRUCTIONS: Please indicate your score for EACH of the 12 living room designs on EACH of the 13 descriptive scales below by deciding the number (1 to 7) which you think aptly rates the room and writing it in the box below the appropriate design number. For example, if you feel the room is cluttered you would decide on one of the numbers towards the left, i.e. 1, 2 or 3. If you feel the room is uncluttered you would decide on one of the numbers towards the right, i.e. 5, 6 or 7.

The more cluttered you feel the room is the further to the left your chosen number would be.
The more uncluttered you feel the room is the further to the right your chosen number would be.

If you consider the room to be neutral on the scale, both sides of the scale equally associated with the room, or the scale completely irrelevant to the room, then you would decide on the middle number, i.e. 4.

Do not spend too long over any one descriptive scale. Please treat each of your responses separately. Any apparent repetition is for statistical control. Please ensure you have completed every item. Any comments you may like to add at the end about this questionnaire or the designs would be very welcome.

Thank you for your co-operation.

<table>
<thead>
<tr>
<th>COMFORTABLE</th>
<th>1 2 3 4 5 6 7</th>
<th>UNCOMFORTABLE</th>
<th>1 2 3 4 5 6 7</th>
</tr>
</thead>
<tbody>
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<td>UNADAPTABLE</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
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<td>TEDGE</td>
<td></td>
</tr>
<tr>
<td>COMPLEX</td>
<td>1 2 3 4 5 6 7</td>
<td>SIMPLE</td>
<td></td>
</tr>
<tr>
<td>FRIENDLY</td>
<td>1 2 3 4 5 6 7</td>
<td>UNFRIENDLY</td>
<td></td>
</tr>
<tr>
<td>INTRIGUING</td>
<td>1 2 3 4 5 6 7</td>
<td>UNINTERESTING</td>
<td></td>
</tr>
<tr>
<td>PRIVATE</td>
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<td>PUBLIC</td>
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</tr>
<tr>
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<td>1 2 3 4 5 6 7</td>
<td>UNPLEASANT</td>
<td></td>
</tr>
<tr>
<td>INVITING</td>
<td>1 2 3 4 5 6 7</td>
<td>UNINVITING</td>
<td></td>
</tr>
<tr>
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<td>1 2 3 4 5 6 7</td>
<td>NON-ENOUGH</td>
<td></td>
</tr>
<tr>
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<td>1 2 3 4 5 6 7</td>
<td>OUTWARD-ORIENTED</td>
<td></td>
</tr>
<tr>
<td>IDEAL</td>
<td>1 2 3 4 5 6 7</td>
<td>NON-IDEAL</td>
<td></td>
</tr>
</tbody>
</table>
: SECTION
SEQUENCE No. 2
CONDITION No. 3a
COMPONENTS: Ceiling 1/Window 1/floor 2/Furnishing 1

PLATE : 8.02 'LIVING-ROOM' DESIGNS
SEQUENCE No. 3
CONDITION No. 3
COMPONENTS: Ceiling 1/Window 1/Floor 2/Furnishing 2

PLATE: 8.03 'LIVING-ROOM' DESIGNS
SEQUENCE No. 4
CONDITION No. 4
COMPONENTS: Ceiling 1/Window 1/Floor 3/Furnishing 1

PLATE: 8.04 'LIVING-ROOM' DESIGNS
SEQUENCE NO. 5
CONDITION No. 5
COMPONENTS: Ceiling 1/Window 2/Floor 1/Furnishing 2

PLATE: 8.05 'LIVING-ROOM' DESIGNS
SEQUENCE No. 8
CONDITION No. 1a.1
COMPONENTS: Ceiling 2/Window 1/Floor 1/Furnishing 1

PLATE: 8.08 'LIVING-ROOM' DESIGNS
SEQUENCE No. 9
CONDITION No. 1 b 1
COMPONENTS: Ceiling 2/Window 1/floor 1/Furnishing 2

PLATE: 8.09 'LIVING-ROOM' DESIGNS
SEQUENCE No. 10
CONDITION No. 3.1
COMPONENTS: Ceiling 2/Window 1/Floor 2/Furnishing 2

PLATE: 8.10 'LIVING-ROOM' DESIGNS
SEQUENCE No. 12
CONDITION No. 1.2
COMPONENTS: Ceiling 3/Window 1/Floor 1/Furnishing 1

PLATE: 8.12 'LIVING-ROOM' DESIGNS
SEQUENCE No. 14
CONDITION No. 3b.2
COMPONENTS: Ceiling 3/Window 1/Floor 2/Furnishing 2

PLATE : 8.14 'LIVING-ROOM' DESIGNS
SEQUENCE No. 15
CONDITION No. 4.2
COMPONENTS: Ceiling 3/Window 1/Floor 3/Furnishing 1

PLATE: 8.15 'LIVING-ROOM' DESIGNS
: SECTION  SEQUENCE No. 16
CONDITION No. 3.3
COMPONENTS: Ceiling 4/Window 1/Floor 2/Furnishing 2

PLATE : 8.16 'LIVING-ROOM' DESIGNS
SEQUENCE No. 17,
CONDITION No. 5.3
COMPONENTS: Ceiling 4/Window 2/Floor 1/Furnishing 2

PLATE: 8.17 'LIVING-ROOM' DESIGNS
: SECTION
SEQUENCE No. 19b
CONDITION No. 7.3
COMPONENTS: Ceiling 4/Window 2/floor 2/Furnishing 2

PLATE: 8.19 'LIVING-ROOM' DESIGNS
SEQUENCE No. 21b
CONDITION No. 8°.3
COMPONENTS: Ceiling 4/Window 2/floor 3/Furnishing 2

PLATE: 8.21 'LIVING-ROOM' DESIGNS
3.84 Results of Survey VIII - including Discussion of the Results

The results of Survey VIII are presented in eight parts, each with its supporting data tables, each with its own graphical output, and each with its discussion of results. The topics of the eight parts are as follows:

A. The Living-Rooms assessed by Group 1.
B. The Living-Rooms assessed by Group 2.
C. The Living-Rooms assessed by the combined groups.
D. Ceiling-conditions 1, 2, 3 and 4 assessed by the combined groups.
E. Window-conditions 1 and 2 assessed by the combined groups.
F. Floor-conditions 1, 2 and 3 assessed by the combined groups.
G. Furnishing conditions 1 and 2 assessed by the combined groups.
H. The comparative effects of the four architectural elements: Ceiling, Window, Floor and Furnishing, assessed by the combined groups.

Parts A and B were done in order to meet the Survey's 1st and 5th objectives, explained in Section 3.61, viz., the 1st objective: to make a comparison between the two student groups' assessments of the satisfactions and meanings they saw in the Living-Rooms, and, the 5th objective: to identify any patterns in their use of the questionnaire's bi-polar semantic scales.

Part C was done in order to further meet the 5th objective, as well as the 4th objective, viz., to make a comparison between the Living-Rooms in terms of the satisfactions and meanings assessed by the combined groups.

Parts D, E, F and G of the results were done in order to meet the 2nd objective of the Survey, viz., to compare the effects on the assessments of the combined groups of each of the alternative
'conditions' of the four architectural elements comprising the Living-Rooms.

Finally, Part H of the results was done in order to meet the 3rd objective, viz., to compare the effects on the assessments of the combined groups of each of the four architectural elements taken as-a-whole.

All of the results in the series are the products of computer analysis. The main procedure adopted throughout, was a Multivariate Analysis of Variance (MANOVA). This analysis provided the data printouts, from which were extracted the data tables shown with each set of results. These selected data tables uniformly present:

(a) The Mean Scores of All Subjects on Each of the Descriptive Scales, against Each of the Design Alternatives.

(b) A Factor Analysis, showing the Loadings, or Cumulative Proportion of Total Response for the thirteen Descriptive Scales, dispersed through all of the Factors analysed.

(c) A Factor Analysis, showing the Loadings or Cumulative Proportion of Total Response for the Alternative Designs, dispersed through all of the Factors analysed.

(d) A Correlation Matrix showing the Correlation Coefficients calculated for the relationship between each Descriptive Scale and every other Descriptive Scale, according to the way they were used by the respondents.

Like the data tables, the graphical representations of the results too, are the products of computer analysis. Here a Discriminant Analysis has made a series of transformations and rotations of the results in order to visualise them on a two-dimensional graphical projection. In these graphs, a multi-dimensional space is depicted, in which all of the descriptive-scales are located, their inter-relationships being defined precisely according to
the way the scales were used by the respondents. All of the
descriptive-scale vectors shown are of the same true length,
- their apparent length depending on their respective angles
of projection onto the graph plane - and all of them share
a common point of origin in the graph which corresponds to the
neutral position score of four on each scale. The extremity
of each descriptive scale vector corresponds to a score of one
on its scale. For simplicity of representation, the vectors
are not projected from the point of origin back to their other
virtual extremities, corresponding to a score of seven on the
scales.

In addition, each graph depicts a field of points representing
the independent variables (for example, Living-Room alternatives
or various 'conditions' of room elements). These too, are
interrelated, as analysed from the respondents' assessment data,
in a multi-dimensional space, sharing the same point of origin
as the scales, and, like them, shown by projection onto the graph
plane. Thus the various items of architectural interest - the
rooms, or elements of rooms - may be viewed in their inter-
relationships, and with reference to the various interrelated
vectors of 'meaning' in precisely the way they were judged to
be by the respondents, whether group by group or combined.

As a further elaboration of this graphical output, each graph
includes a pair of scaling circles:

(i) the larger circle being a guide to the variance of respondent
scoring, such that when placed on any 'design-point', a
circle of that radius will encircle 50% of the respondents
as they judged the particular issues, and

(ii) the smaller circle being a similar guide to respondent
scoring, such that when placed on any 'design-point',
a circle of that radius will encircle 50% of the mean
scores for each design.
By way of clarification of the interrelationships embodied in these graphs, a more 'realistic' sample-view of Part C of the results is included. This is a three-dimensional perspective view of the interrelated twenty-one Living-Room designs seen in a Semantic Space defined by the combined groups' own use of the interrelated descriptive-scales. All of the graphical outputs were drawn by a Hewlett-Packard Graphic Plotter.

There were two computer programmes used in the analysis of Survey VIII, and, indeed, for all surveys incorporating the Semantic Differential. Initially a complete analysis and graphical output was completed using 'Teddybear', a programme by J.B. Wilson, V.D. 1976, November 1st. However, 'Teddybear' was accurate, but a bit clumsy with his graphics. The graphical output achieved with this programme contained a serious distortion, in that the point of origin and the semantic space of the descriptive-scale vectors could not be reconciled with those of the designs. Comparisons, as visualized, were misleading.

Advisedly, another programme was sought which would achieve a congruence of the graphed points of origin of the two sets of variables. The programme adopted and used for all of the final, presented versions of the results was the BMD programme of the Health Sciences Computing Facility, UCLA: BMD 12V for all Multivariate Analyses of Variance, and, BMD 07M for all the Discriminant Analyses underlying the graphical outputs.

A note on each of the above analysis procedures - 'Multivariate Analysis of Variance', and 'Discriminant Analysis' - is presented in Appendix 5.
RESULTS OF SURVEY VIII

Part A - The 'Living-Rooms' assessed by Group 1

### TABLE 8A

(a) **Mean Scores (over all subjects) for each Design Alternative on each Descriptive Scale**

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>GROUP 1</th>
<th>GROUP 2</th>
<th>GROUP 3</th>
<th>GROUP 4</th>
<th>GROUP 5</th>
<th>GROUP 6</th>
<th>GROUP 7</th>
<th>GROUP 8</th>
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(b) **Principal Factors on each Descriptive Scale**

### Ephemeral Proportion of Total Dispersion

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(c) Alternative Designs on the Factors

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### GROUPS CORRELATION MATRIX

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FIGURE 8A: 'LIVING ROOMS' BY GROUP 1
Discussion of the Results of Part A, Survey VIII.
The 'Living-Rooms' assessed by Group 1.

Figure 8A displays the interrelationships between the twenty-one designs and the thirteen descriptive-scales as assessed by Group 1.

Bearing in mind the fact that the descriptive-scale vectors all have the same true length in the multi-dimensional space depicted in the graph, and, that since the greatest variation in the subjects' responses, here, is accounted for by the two largest factors which form the two axes of the graph (34% and 24% respectively), then, we may conclude that those descriptive-scales of greatest plotted length in the graph, are those which contribute most to these two factors, and hence, themselves account for the greatest variation in the subjects' responses.

Thus it is revealed that the scales measuring 'Intrigue', 'Complexity', 'Convenience', 'Idealness' and 'Adaptability' were responsible for most of the variation in Group 1's assessments of the designs. In other words, these scales represented the attributes of these particular designs which enabled respondents to distinguish them the most, apparently being notably strong in some designs but notably weak in others.

By contrast, it seems that 'Privacy', 'Pleasantness', 'Comfort' and 'Inward-Orientedness' were not significant attributes of the designs in affecting assessments. This may be due to either of two reasons:

(i) these attributes are not considered by the respondents to be important in their assessments of 'Living-Rooms',

or

(ii) these attributes are considered important but they were absent or present in the series of designs with such consistency that, in terms of those attributes, the designs were not particularly distinguishable, one from the other.
Previous research, mainly by Canter and Wools together with a subjective appraisal of the comparative characteristics of the designs, suggests that the latter reason is the one which prevailed in this survey, and that these attributes were present.

Returning to the more dominant scales in the analysis, it appears that 'Complexity' holds a special place, in being not only the second to paramount scale, (after 'Intriguing'), but also the one closest in direction to the axis of the biggest factor (34%) in the overall analysis. The other interesting aspect of 'Complexity' is that it lies relatively closely to the 4th strongest scale: 'Idealness', which is assumed to be the most all-embracing measure of 'Satisfaction' in the whole series of scales. 'Idealness' holds its strong position in the overall assessment, about mid-way between 'Complexity' and another strong scale, namely, 'Convenience' (3rd strongest). Thus, an insight is gained into the meaning of 'Idealness' as it relates to these 'Living-Rooms': a blend of 'Convenience' and 'Complexity', with the inference of a kind of spatial and formal complexity that is associated with 'Intrigue'. Also related to 'Idealness' but lying further out of the plane of the graph, are the scales of 'Friendliness', 'Relaxedness' and 'Comfort'. The scale of 'Adaptability' is 5th strongest, and is not unexpectedly assessed in opposition to 'Intrigue' and 'Complexity'. In other words it is confirmed as being related to the attribute: 'Simplicity'.

Into this multi-dimensional space of scale-meanings - associated or disassociated, according to their usage by the respondents - is interspersed the twenty-one alternative 'Living-Rooms', all interrelated according to the degree to which they were likewise assessed as possessing any of the thirteen meanings, or attributes, identified by the descriptive-scales. The blends of meaning, attributed to the designs, are described by the graph. Those judged to be most 'Ideal' are numbers 17, 21, 20, 16, 3, 15 and 19, with the latter pair being seen also as very 'Friendly'. Design numbers 6 and 2 are the most 'Complex' and 'Intriguing' respectively, while numbers 5 and 1 are the least - but nonetheless the most 'Adaptable'. Design number 14 is considered to be the near neutral alternative.
RESULTS OF SURVEY VIII

Part B - The 'Living-Rooms' assessed by Group 2

**TABLE 8B**

(a) Mean Scores (over all subjects) for each Design Alternative on each Descriptive Scale

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(b) Principal Factors on each Descriptive Scale
(c) Alternative Designs on the Factors

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</table>

(d) Correlation Matrix of Descriptive Scales
FIGURE 8B: 'LIVING-ROOMS' BY GROUP 2
Discussion of the Results of Part B, Survey VIII.

The 'Living-Rooms' assessed by Group 2.

Figure 8B displays the interrelationships between the twenty-one designs and the thirteen descriptive-scales as assessed by Group 2. Here 60% of the total variance occurs in the plane of the graph defined by the two axes or factors. (33% and 27% respectively).

Again, as in Figure 8A, 'Intrigue' and 'Complexity' are the two paramount attributes, very closely followed by 'Idealness', with 'Convenience' now ranked 4th. 'Idealness' has become very strongly associated with 'Complexity', while 'Friendliness' has become more removed and weaker than for Group 1, to be replaced by 'Pleasantness'.

'Adaptability' is now opposed to both 'Complexity' and 'Idealness', but 'Comfort' has a closer association with them than before. 'Enfoldingness' has grown in importance, and in its association with 'Intrigue'. However, in general it is apparent that there are important similarities between the assessments of Groups 1 and 2.

As for the designs, examination of Figure 8B reveals a design field also, of a similar pattern to that in Figure 8A. Here, however, for Group 2, the most 'satisfying' cluster of designs are not balanced so evenly about 'Idealness' as they were for Group 1. Rather, these designs lie between 'Idealness' and 'Pleasantness'. Apart from a retraction of designs 2 and 6, the pattern of leading designs holds very closely to that for Group 1. Design number 14 has retreated even further to a neutral position and number 1 continues in a sort of oblivion.

Thus, it can be concluded that there is a great deal of similarity in the way the two groups of respondents discriminate between each of the twenty-one designs - despite a significant difference in their familiarity with architectural matters.
This conclusion is supported on two counts: firstly, the pattern of the distribution of designs is of the same order, and, secondly, the spread of this pattern is of the same order too, which indicates that both groups made their assessments with approximately equal levels of discernment and fastidiousness about Living-Rooms. In comparing as they do, these results for Groups 1 and 2 tend not to support General Correlation No. (ii) discussed in Section 3.81: 'Objectives of Survey VIII', in which it is held that: 'satisfaction correlates with respondents' experience and awareness of domestic architecture'. Alternatively, it is probable that there was insufficient difference in the two groups' experience and awareness of domestic architecture to form a valid test of this particular correlation, in which case, it can be neither confirmed nor denied. Similarly, in considering the General Correlation No. (iii), that: 'the judged salient dimensions of meaning of a given setting, will differ between categorically distinct respondent groups', there is found to be little difference in 'judged salient dimensions of meaning'; but neither, on the other hand, is there a significant 'categorical distinction' between the two respondent groups to permit a testing of General Correlation No. (iii).
RESULTS OF SURVEY VIII

Part C - The 'Living-Rooms' assessed by the Combined Groups

TABLE 8C

(a) Mean Scores (over all subjects) for each Design Alternative on each Descriptive Scale

<table>
<thead>
<tr>
<th>MEANS</th>
<th>THE LAST COLUMN CONTAINS THE GRAND MEANS OVER THE GROUPS USED IN THE ANALYSIS</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
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<td>VARIANCE</td>
<td></td>
<td>4.7756</td>
<td>4.5573</td>
<td>3.95564</td>
<td>2.44141</td>
<td>3.80569</td>
<td>3.86569</td>
<td>4.75689</td>
<td>5.30569</td>
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(b) Principal Factors on each Descriptive Scale
(c) Alternative Designs on Factors

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<tr>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<th>7</th>
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</table>

(d) Correlation Matrix of Descriptive Scales

```
WITHIN GENDER CORRELATION MATRIX

VARIABLES | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9
----------|---|---|---|---|---|---|---|---
VARIABLE 1 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000
VARIABLE 2 |       | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000
VARIABLE 3 |       |       | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000
VARIABLE 4 |       |       |       | 1.000 | 1.000 | 1.000 | 1.000 | 1.000
VARIABLE 5 |       |       |       |       | 1.000 | 1.000 | 1.000 | 1.000
VARIABLE 6 |       |       |       |       |       | 1.000 | 1.000 | 1.000
VARIABLE 7 |       |       |       |       |       |       | 1.000 | 1.000
VARIABLE 8 |       |       |       |       |       |       |       | 1.000
VARIABLE 9 |       |       |       |       |       |       |       |       

VARIABLES 10 | 11 | 12 | 13 |
----------|----|----|----|
VARIABLE 10 | 1.000 | 1.000 | 1.000
VARIABLE 11 | 1.000 | 1.000 | 1.000
VARIABLE 12 | 1.000 | 1.000 | 1.000
VARIABLE 13 | 1.000 | 1.000 | 1.000
```
FIGURE 8C: 'LIVING-ROOMS' BY COMBINED GROUPS
Discussion of the Results of Part C, Survey VIII.
The 'Living-Rooms' assessed by Groups 1 and 2 Combined.

Figure 8C displays the mean of the assessment by both groups. Here 68% of the total variance occurs in the plane of the graph defined by the two axes or factors. (34% and 33% respectively).

With the remarkable conformity of assessment by the two groups, as observed in Parts A and B above, there can be little to expect other than consolidation from the graphed results in Figure 8C. The three attributes of meaning: 'Intrigue', 'Complexity' and 'Idealness' continue to dominate the other attributes as the 'yardsticks' of these particular Living-Rooms. Moreover within this bunch, 'Idealness' and 'Complexity' clearly have a closer affinity, in the eyes of architecture students, than do 'Idealness' and the other 'Convenience' group of attributes, including 'Comfort' and 'Pleasantness'. 'Friendliness' continues to be of secondary concern in these particular Living-Rooms, and 'Adaptability' continues to be the antithesis of 'Complexity' and 'Intrigue'.

The dominant designs, numbers 21, 20, 6, 17, 16, 19 and 3 - those strongly related to 'Idealness' - tend to be the more intricate settings of the sequence. Five of them have sloping ceilings (in fact Ceiling No. 4), two have flat ceilings (Ceiling No. 1), while all of them have one or other of the two floor-level changes (Floor Nos. 2 and 3).

Reviewing now, those of the eight General Correlations posited in Section 3.81: 'Objectives of Survey VIII', which are relevant, it can be stated that, in terms of this sequence of Living-Rooms and these student respondents:

(i) 'Satisfaction' - represented in overall terms by the 'Ideal' scale - correlates strongly with 'Complexity' and to a limited extent with 'Comfort', 'Convenience' and 'Pleasantness', (and to an unexpectedly lesser extent with 'Friendliness'.)
(iv) In that 'Idealness' closely relates to 'Convenience', and 'Comfort', there is some support for holding that 'the judged salient dimensions of meaning of a given setting (here for one, 'Idealness'), will relate to its perceived 'general utility' (here represented by the attribute of 'Convenience').

(v) It appears true that the designs which have proved to be the most 'Ideal' and at the same time, most 'Complex', 'Intriguing', 'Comfortable', 'Convenient', 'Pleasant' and 'Friendly', are also, indeed, the more 'complex' and 'allusive' of the range of settings judged.

(vi) It has not been found in this experimentation, that a dominant dimension of meaning sought in these Living-Rooms is 'Friendliness', possibly because they mostly possessed it to a fairly consistent degree and hence were only moderately distinguishable by the Friendliness-scale.
RESULTS OF SURVEY VIII

Part D - Ceiling-Conditions 1, 2, 3 and 4 assessed by the Combined Groups

TABLE 8D

(a) Mean Scores (over all subjects) for each Design Alternative on each Descriptive Scale

<table>
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<tr>
<th>HEAT</th>
<th>CONVEH</th>
<th>CONFOD</th>
<th>ADAPTA</th>
<th>RELATE</th>
<th>COMPTE</th>
<th>ENFIND</th>
<th>RATING</th>
<th>PRIVAT</th>
<th>PLEASA</th>
<th>INVITI</th>
<th>ENFOLD</th>
<th>INVINC</th>
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</table>

(b) Principal Factors on each Descriptive Scale

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<tr>
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CANONICAL DISCRIMINANT ANALYSIS (Cumulative % of the Variance accounted for by each component, and the Reliability of each component, and the Correlation coefficients between the variates and the components).
(c) Alternative Designs on the Factors

THE POSITIONS OF THE TREATMENTS ON THE COMPONENTS

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(d) Correlation Matrix of Descriptive Scales

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<th></th>
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<th>INTRIG</th>
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Discussion of the Results of Part D, Survey VIII.
The 'Ceilings' assessed by the Combined Groups.

Figure 8D displays the interrelationships between the four Ceiling Conditions and the thirteen descriptive-scales, as assessed by the two groups combined. Here 86% of the total variation occurs in the plane of the graph defined by the two principal factors (52% and 34%). The graphical output here is from the 'Teddybear' programme and shows the scale vectors in a relationship comparable with that analysed by the BMD programme except that the array is inverted about the 'Ideal' scale.

However, Ceiling No. 4 is shown clearly to be the most 'Ideal', Ceiling No. 1 the most 'Adaptable' but least 'Enfolding', and Ceiling No. 2 ('the Garret') the least 'Adaptable' or 'Convenient'. 
RESULTS OF SURVEY VIII

Part E - Window-Conditions 1 and 2 assessed by the Combined Groups

TABLE 8E

(a) Mean Scores (over all subjects) for each Design Alternative on each Descriptive Scale

| Window | COVEN | CHIND | ADAPTA | RELAXE | COUPLE | FREINO | INTRIG | PRIVAT | PLEASA | INVITI | EMPEX | INWAR |
|--------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|--------|

(b) Principal Factors on each Descriptive Scale

**CANONICAL DISCRIMINANT ANALYSIS** cumulative % of the variation accounted for by each component, and the correlation coefficients between the variates and the components.

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- **COLM. %**: Cumulative percentage of the variation accounted for by each component.
- **PROP.**: Proportion of the variation accounted for by each component.
Alternative Designs on the Factors

The positions of the treatments on the components:

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W2 &= 0.25712
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\]

Correlation Matrix of Descriptive Scales

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<td>0.00000</td>
<td>0.04684</td>
</tr>
<tr>
<td>EQUINOX</td>
<td>0.04684</td>
<td>0.00000</td>
<td>0.04684</td>
<td>0.00000</td>
<td>0.04684</td>
<td>0.00000</td>
<td>0.04684</td>
<td>0.00000</td>
<td>0.04684</td>
<td>0.00000</td>
<td>0.04684</td>
<td>0.00000</td>
<td>0.04684</td>
</tr>
</tbody>
</table>

Simple Correlation Coefficients and the Probability that There is a Relation

d)
FIGURE 8E: WINDOW CONDITIONS 1 & 2 BY COMBINED GROUPS
Discussion of the Results of Part E, Survey VIII.
The 'Windows' assessed by the Combined Groups.

Figure 8E displays the interrelationships between the two Window-Wall Conditions and the thirteen descriptive-scales, as assessed by the two groups combined. Here 100% of the total variation is defined by a single factor.

Window-Wall No. 2 is shown as judged to be the more satisfying of the two conditions, but nevertheless is regarded as being far from 'Ideal' and singularly weak on those attributes of meaning which were most intensively involved in the judgments of the windows (or for that matter the other elements and the room-as-a-whole).

Window-Wall No. 1 has been judged as possessing negative values of all of the scale attributes, which leads to the view that since it wasn't clearly in-view from the camera-zone of the setting, respondents remained sceptical of its possessing any positive qualities.
RESULTS OF SURVEY VIII

Part F - Floor-Conditions 1, 2 and 3 assessed by the Combined Groups

TABLE 8F

(a) Mean Scores (over all subjects) for each Design Alternative on each Descriptive Scale

<table>
<thead>
<tr>
<th>MEAN</th>
<th>CONVEX</th>
<th>CONVEX</th>
<th>APARTA</th>
<th>APARTA</th>
<th>APARTA</th>
<th>COUPLE</th>
<th>COUPLE</th>
<th>PLEAS</th>
<th>PLEAS</th>
<th>INVIT</th>
<th>INVIT</th>
<th>URBAN</th>
<th>URBAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>61</td>
<td>4.70</td>
<td>2.21</td>
<td>4.20</td>
<td>4.19</td>
<td>4.30</td>
<td>4.70</td>
<td>4.30</td>
<td>4.00</td>
<td>4.30</td>
<td>4.00</td>
<td>4.30</td>
<td>4.70</td>
<td>2.21</td>
</tr>
<tr>
<td>52</td>
<td>4.70</td>
<td>5.70</td>
<td>3.20</td>
<td>3.20</td>
<td>3.20</td>
<td>5.70</td>
<td>3.90</td>
<td>3.90</td>
<td>3.90</td>
<td>3.90</td>
<td>3.90</td>
<td>3.90</td>
<td>3.90</td>
</tr>
<tr>
<td>3</td>
<td>5.70</td>
<td>3.20</td>
<td>5.70</td>
<td>5.70</td>
<td>5.70</td>
<td>3.20</td>
<td>3.20</td>
<td>3.20</td>
<td>3.20</td>
<td>3.20</td>
<td>3.20</td>
<td>3.20</td>
<td>3.20</td>
</tr>
</tbody>
</table>

(b) Principal Factors on each Descriptive Scale

<table>
<thead>
<tr>
<th>CANONICAL DISCRIMINANT ANALYSIS</th>
<th>TOLERANCE</th>
<th>OF THE VARIANCE ACCOUNTED FOR BY EACH COLUMN</th>
</tr>
</thead>
<tbody>
<tr>
<td>CULM: 2</td>
<td>0.00000</td>
<td>100.000</td>
</tr>
<tr>
<td>PROB 1</td>
<td>0.00000</td>
<td>0.00000</td>
</tr>
<tr>
<td>CONVEX</td>
<td>0.03716</td>
<td>0.55471</td>
</tr>
<tr>
<td>COUPLE</td>
<td>0.07463</td>
<td>0.55050</td>
</tr>
<tr>
<td>PLEAS</td>
<td>0.34071</td>
<td>0.55680</td>
</tr>
<tr>
<td>INVIT</td>
<td>0.29466</td>
<td>0.55731</td>
</tr>
<tr>
<td>URBAN</td>
<td>0.28528</td>
<td>0.55381</td>
</tr>
<tr>
<td>IDEAL</td>
<td>0.22049</td>
<td>0.55906</td>
</tr>
<tr>
<td>PLEASA</td>
<td>0.33634</td>
<td>0.55732</td>
</tr>
<tr>
<td>IDEAL</td>
<td>0.31973</td>
<td>0.55927</td>
</tr>
<tr>
<td>INVIT</td>
<td>0.44976</td>
<td>0.55927</td>
</tr>
<tr>
<td>APARTA</td>
<td>0.40759</td>
<td>0.55874</td>
</tr>
<tr>
<td>APARTA</td>
<td>0.40759</td>
<td>0.55874</td>
</tr>
</tbody>
</table>
(c) Alternative Designs on the Factors

```
<table>
<thead>
<tr>
<th>Positions of the Treatments on the Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
</tbody>
</table>
```

(d) Correlation Matrix of Descriptive Scales

```
<table>
<thead>
<tr>
<th></th>
<th>COMPON</th>
<th>ADAPTIA</th>
<th>PRIVAY</th>
<th>RELAXE</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPON</td>
<td>0.649716</td>
<td>0.000004</td>
<td>0.43724</td>
<td>0.44973</td>
</tr>
<tr>
<td>ADAPTIA</td>
<td>0.649716</td>
<td>0.545779</td>
<td>0.000004</td>
<td>0.43724</td>
</tr>
<tr>
<td>PRIVAY</td>
<td>0.43724</td>
<td>0.545779</td>
<td>0.000004</td>
<td>0.43724</td>
</tr>
<tr>
<td>RELAXE</td>
<td>0.44973</td>
<td>0.44973</td>
<td>0.000004</td>
<td>0.43724</td>
</tr>
</tbody>
</table>
```

Discussion of the Results of Part F, Survey VIII.
The 'Floors' assessed by the Combined Groups.

Figure 8F displays the interrelationships between the three Floor Conditions and the thirteen descriptive-scales, as assessed by the two groups combined.

Here 100% of the total variation occurs in the plane of the graph defined by the two principal factors (66.6% and 33.3%).

Again, the graphical output here is from the 'Teddybear' programme and shows Floor No. 3, raised at the near-end, to be judged the most 'Convenient' and 'Comfortable', but also here, moderately 'Inviting', 'Relaxed', 'Pleasant' and 'Ideal'. Floor No. 2, raised at the far-end, is judged to be the most 'Complex', 'Enfolding' and 'Inward-oriented' - which is as expected - while the flat Floor No. 1 was seen as having negative qualities on all attributes.
### RESULTS OF SURVEY VIII

Part G - Furnishing-Conditions 1 and 2 assessed by the Combined Groups

**TABLE 8G**

(a) Mean Scores (over all subjects) for each Design Alternative on each Descriptive Scale

<table>
<thead>
<tr>
<th>Mean</th>
<th>Comfort</th>
<th>Adept</th>
<th>Relia</th>
<th>Compl</th>
<th>Friend</th>
<th>Intro</th>
<th>Privat</th>
<th>Please</th>
<th>Inviti</th>
<th>Enfold</th>
<th>Inward</th>
</tr>
</thead>
</table>

(b) Principal Factors on each Descriptive Scale

<table>
<thead>
<tr>
<th>Canonical Discriminant Analysis (Cumulative % of the Variation Accounted For by Each Component)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Proportion of Each Component and the Correlation Coefficients Between the Variables and the Components</td>
</tr>
<tr>
<td>- Comfort: 0.2937</td>
</tr>
<tr>
<td>- Adept: 0.3136</td>
</tr>
<tr>
<td>- Relia: 0.3265</td>
</tr>
<tr>
<td>- Compl: 0.3551</td>
</tr>
<tr>
<td>- Friend: 0.3662</td>
</tr>
<tr>
<td>- Intro: 0.3674</td>
</tr>
<tr>
<td>- Privat: 0.3710</td>
</tr>
<tr>
<td>- Please: 0.3710</td>
</tr>
<tr>
<td>- Inviti: 0.3710</td>
</tr>
<tr>
<td>- Enfold: 0.3710</td>
</tr>
<tr>
<td>- Inward: 0.3710</td>
</tr>
</tbody>
</table>

- Total: 0.9958
(c) Alternative Designs on Factors

The position of the treatments on the components

\[ \begin{align*}
    r_1 & = 1/2 \\
    \theta & = 0.12/42
\end{align*} \]

(d) Correlation Matrix of Descriptive Scales

<table>
<thead>
<tr>
<th>SIMPLE CORRELATION COEFFICIENTS</th>
<th>AND THE PROBABILITY THAT THERE IS A RELATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>VARIABLES</td>
<td>P</td>
</tr>
<tr>
<td>EDFRTU</td>
<td>0.564372</td>
</tr>
<tr>
<td>ADAPTA</td>
<td>0.472301</td>
</tr>
<tr>
<td>RELFLY</td>
<td>0.545350</td>
</tr>
<tr>
<td>LUMPLY</td>
<td>0.494400</td>
</tr>
<tr>
<td>ENEDU</td>
<td>0.109600</td>
</tr>
<tr>
<td>INTHIG</td>
<td>0.470957</td>
</tr>
<tr>
<td>PRAVAT</td>
<td>0.518150</td>
</tr>
<tr>
<td>PLEASA</td>
<td>0.537870</td>
</tr>
<tr>
<td>FRAVAT</td>
<td>0.509650</td>
</tr>
<tr>
<td>PLEASU</td>
<td>0.444444</td>
</tr>
<tr>
<td>IDEAL</td>
<td>0.439730</td>
</tr>
<tr>
<td>LIMOU</td>
<td>0.509650</td>
</tr>
<tr>
<td>DRAVAT</td>
<td>0.518150</td>
</tr>
<tr>
<td>IDAL</td>
<td>0.541050</td>
</tr>
</tbody>
</table>

The correlation matrix is shown above, with correlation coefficients ranging from 0.44 to 0.57 and probabilities ranging from 0.0000 to 0.0000.
FIGURE 8G: FURNISHING CONDITIONS 1 & 2 BY COMBINED GROUPS
Discussion of Part G, Survey VIII.
The 'Furnishings' assessed by the Combined Groups.

Figure 8G displays the interrelationships between the two Furnishing Conditions and the thirteen descriptive-scales, as assessed by the two groups combined. Here 100% of the total variation is taken up by a single factor.

Furnishing Condition No. 2 is judged the most satisfying with strong attributes of 'Idealness', 'Inward-orientedness', 'Pleasantness', 'Comfort' and 'Convenience'. For the Furnishing element of the room, 'Complexity' was a very strong concern in respondents' judgements.

Condition No. 1 was clearly unsatisfying but nevertheless had some attributes of 'Enfoldingness' and 'Privacy'.

RESULTS OF SURVEY VIII

Part H - Relative Effects of 'Living-Room' Elements
Assessed by the Combined Groups

TABLE 8H

SUMMARY OF EFFECTS:

<table>
<thead>
<tr>
<th>% Proportion of Effect</th>
<th>% Probability of Effect</th>
<th>No. of Significant Factors at 10%</th>
<th>Cumulative % Variation accounted for by Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Group</td>
<td>26.4</td>
<td>100</td>
<td>1</td>
</tr>
<tr>
<td>Design</td>
<td>-</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>Ceiling</td>
<td>33.7</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>Window</td>
<td>15.8</td>
<td>100</td>
<td>1</td>
</tr>
<tr>
<td>Floor</td>
<td>16.9</td>
<td>100</td>
<td>2</td>
</tr>
<tr>
<td>Furnishing</td>
<td>7.2</td>
<td>99</td>
<td>1</td>
</tr>
</tbody>
</table>
Figure 8H: RELATIVE EFFECTS OF 'LIVING-ROOM' ELEMENTS ASSESSED BY THE COMBINED GROUPS.
Discussion of the Results of Part H, Survey VIII.
The Relative Effects of the 'Living-Room' Elements,
Assessed by the Combined Groups.

Figure 8H presents two pie-charts which display the percentage proportion of Effect recorded in Table 8H, accounted for by each of the four architectural elements which were the independent variables in the 'Living-Room' experiment.

The Ceiling Element has been found to be the most effective in accounting for the various meanings and satisfactions prompted by the various settings. The Ceiling is approximately twice as effective as the Floor Element, which in turn, is only slightly more effective than the Window-Wall Element.

The relative effects of these four elements were as predicted by General Correlation No. (viii), Section 3.81. The result confirms the findings of Wools (1970) as far as the importance of the Ceiling is concerned, but rates Furnishing arrangement distinctly less effective than in his results.
PART 4

SUMMARY AND IMPLICATIONS OF THE RESEARCH
4.10 SUMMARY OF THE RESEARCH

4.11 Summary of All Survey Results

The significant findings about attitudes to dwelling environments from all eight of the surveys described in Part 3, are here reviewed with a varying emphasis derived both from the surveys' relative importance as distinct research projects in themselves, and from their place in the hierarchy of concerns which the Thesis as-a-whole induces.

Thus, the two main concerns of the Thesis, to which the array of surveyed findings is most pertinent, are firstly, its Subordinate Hypotheses A, B, and C, which posit various man-environment interrelationships between respondents and dwellings, or between groups of respondents themselves, and, secondly, - going beyond these Hypotheses - the Thesis's investigations both of the meanings and satisfactions attributed by people to dwelling environments, and of the architectural elements which correlate with those meanings.

Accordingly, the surveys which have greatest pertinence to these main concerns of the Thesis are, on the one hand, the major Survey IV, augmented by the preceding preliminary Survey II, which together deal primarily with the Hypotheses A, B, and C, and, on the other hand, the major Survey VIII augmented by its preceding Survey II/2, which together are concerned primarily with satisfaction and meaning in dwelling environments. In comparison with these four surveys, the other four made smaller contributions to the main concerns of the Thesis.

Thus, Survey VI on Farmhouse Design, investigated rural attitudes towards country homes, and added knowledge to that obtained, through the major Survey IV, about Auckland Household attitudes to suburban homes. At the same time it provided a
methodological exercise in the use of the Semantic-Differential, preparatory to its applications in the major Survey VIII.

Survey V, on Domestic Outdoor Spaces, complemented the findings of Survey IV concerning Householders' preferences, (but not Students'), as well as providing knowledge of existing dwelling-site layouts and uses.

Survey III, on Auckland Residential Streets, further amplified Students' preferences about existing dwelling environments and examined the validity of some tentative assumptions about the judged value of different street forms.

Finally, as the initial inquiry into Students' modes of accommodation, Survey I was seminal in shaping the three hypotheses and the strategies for Surveys II, III and IV.

Now, summing up the significant findings of these eight surveys, it can be stated that:

(i) Survey I showed a strong latent desire by students in 1971 and 1972, to live away from home. This desire was restrained by their financial restrictions and a lack of alternatives to staying at home.

Furthermore, this latent desire, if catered for at all, would see a student demand overwhelmingly dominated by preference for living in 4, 5 or 6 person households, in private 'Houses' as against 'Blocks of Flats' or 'Hostels'. The trend against Hostels was then very strong. It was, indeed, this combined evidence which spawned Hypothesis A (that housing requirements of students and the population at large were similar).

Qualifying this student housing prospect, there was the further evidence of marked preference for 'Old Houses' over 'Modern Houses', a finding which prompted Hypothesis
B (that students prefer detached, traditional, intriguing and informal housing, cheaply rented). Survey I thus confirmed that widely held impressions about students' housing ambitions, nurtured through the late 1960's, were actually correct, and even more radically so than could have been expected or attained. This confirmation set the course of much of the research to follow.

(ii) Survey II resolved some of this revealed pattern of stated demand and preference about student accommodation into tangible architectural identity. It uncovered a habitat of low to medium rental accommodation, that visibly resembled that of the wider population of Auckland's inner suburbs. Moreover, it found clear preference by students for dwelling character that tended to be 'traditional' 'intriguing' and, in its manner of use, 'informal', and, in so doing, provided strong support for Hypothesis B as well as limited support for Hypothesis A.

Such limited support for Hypothesis A is all that could be reasonably expected since, the outcome of student house or flat-hunting from amongst the existing stock could scarcely be expected to reveal a selection that would differ much from the larger set it was a part of. However, such strong support for Hypothesis B, (and for many of Survey I's findings), was another matter. Its tacit acclaim and preference for generous, robust dwellings, of more or less traditional - not novel - style, with abundant formal and spatial character and some intrigue and intricacy of detailed design, amounted to a clear 'design directive' for an important sector of any future inner-suburban housing policy.

Finally, from the findings of Survey II, it is of interest to note the greater tolerance by Architecture
Students than by General students, for the more 'modern' examples of Student dwellings. This is not necessarily a comment on the comparative livability or other interior facilities of these modern examples, - although experience of this could not be wholly suspended from judgements made about them. However, it can be confidently assumed that this tolerance is directed towards these examples, primarily in their capacity as Symbolic components of the residential environment. In semiotic terms they are considered to signify (like the components of other socially contracted languages), recognisable ideas, or references, in this case about 'home', 'culture', 'values', 'life-style', 'socio-economic rank' etc. Recognition of such 'language' references in such cultural artifacts is, likewise, a matter of cultivation, in which the group of Architecture Students, - by their own commitment- were more advanced than the others.

(iii)Survey III, about Auckland residential streets, exposed a level of student taste that matched the evidenced higher-income family-backgrounds they came from. Their preferences distinctly favoured the conservative street environments of the Establishment, and correspondingly showed prejudice against the more impoverished, (but often student-inhabited) ones.

Socio-economic signals about 'inferred household income' in these dwelling environments, appeared to register more tellingly than purely spatial and relational (architectural) ones. For example, while the attributes of spatial enclosure, climatic shelter, and socially centripetal place-identity were strongly present in the highly preferred 'Townhouse' precincts, they were equally present in the bottom ranking class of street - the impoverished 19th Century working-class residential
streets. In other words purely relational attributes of streets, which are widely recognised as desirable in both the theory and the experience of good Architecture and Planning, were tested in Survey III and shown not to influence preference in a consistent way. Neighbourhood and household attributes such as status, class, life-style and income presumably occupied higher ranks in respondents' hierarchies of criteria than did purely formal and spatial attributes. Until further testing of street-design criteria can be held with the above social and psychological variables held fairly constant across all street cases, no fair findings for planners and designers can be expected.

(iv) Survey IV was committed to a thorough testing of the three Hypotheses A, B and C, with respect to two groups of respondents: Students and Householders.

In testing Hypothesis A, (that housing requirements of Students and the population at large were similar), Survey IV found confirmation from compared group-assessments of the more 'functional' or 'planning-oriented' topics (Topics 1, 4, 6.1, 6.2, 6.3 and 6.4), but no confirmation from the more 'Character-and-Image-oriented' topics (Topics 2, 3, 5 and 6.5). However, the Tests of Association showed that by separating out the subgroup of Younger Householders, and comparing their assessments with those of the Students, significantly close agreement was shown to have occurred even on these latter topics relating to 'Character' and 'Image'.

Furthermore, the very findings which tend not to confirm Hypothesis A (the overall group-assessments of 'Character' and 'Image' topics), are those which provide strong confirmation of Hypothesis B (that, amongst other things, Students prefer housing that is intriguing in character and
informal in use). Again, it is largely this same evidence which enables strong confirmation of Hypothesis C (that different group occupations and pre-occupations will correlate with different assessments).

But notwithstanding these overall group differences which the strong confirmation of Hypotheses B and C together support, it is most interesting and fruitful to note that, as the Tests of Association persuasively showed, (sufficiently, within the 5% confidence level, but even more numerously within the 10% confidence level), Students' judgements compare closely with the judgements of Younger Householders and may thus be distinguished as a group, (other than by their classification of activities namely Full-time Studies) — simply by their classification of ages — namely Young Adulthood.

Since this is shown to be the case, three important assertions can be made:

(a) Firstly, as a refinement of Hypothesis A:

STUDENT HOUSING REQUIREMENTS FOR NEW
ZEALAND URBAN UNIVERSITIES CAN BE MET
SATISFACTORILY BY THE LOW TO MEDIUM-
RENTAL DWELLING FORMS AND ARRANGEMENTS
OF MEDIUM-DENSITY INNER-SUBURBAN HOUSING
ESSENTIALLY SIMILAR IN PLANNING AND
CHARACTER TO THOSE OF THE YOUNGER
POPULATION AT LARGE.

(b) Secondly, as a refined corollary of Hypothesis C:

THE SIMILARITIES IN PRE-OCCUPATION
BETWEEN RESPONDENT GROUPS OF STUDENTS
AND YOUNG-ADULT HOUSEHOLDERS IN AUCKLAND
ARE SUCH THAT THEY CORRELATE WITH
SIGNIFICANT SIMILARITIES IN THEIR
RESPONSES TO MEDIUM-DENSITY HOUSING
LAYOUT, HOUSING IDENTITY AND INTERIOR
DESIGN.
(c) And consequently, as a generalisation:

FOR THE PURPOSES OF PREDICTING THE DESIRABILITY OF EXISTING OR PROPOSED DWELLING ENVIRONMENTS, STUDENT OPINIONS OR PREFERENCES ARE VALID AND ACCURATE INTERPRETATIONS OF THOSE OF THE YOUNGER POPULATION AT LARGE AND THUS, OF THEIR GENERATION AS-A-WHOLE.

These assertions, especially (b) and (c) obviously have an important bearing on the wider validity of the findings, not only on student preferences from Survey II about existing Student Housing, and from Survey III about Residential Streets, but also on students' assessments of satisfaction and meaning from Survey II/2 about Student Housing and from Survey VIII about Living-Rooms. All of these findings may be held out, by inference, as indicators of wider, young-public opinion and attitude.

Finally it is encouraging (predictively) to be able to observe the taste-reflections illustrated weekly in the property-market section of the daily Auckland Press of 1978 and recognise in them, the highly-ranked preferences of the Students and Young Householders surveyed back in 1973.

(v) Survey V examined Auckland suburban, residential site-usage in 1976. The districts of New Zealand cities into which medium-density housing redevelopment must inevitably infiltrate, have a general abundance of private domestic outdoor space. In these circumstances, the effects of the changes due to increased dwelling densities must inevitably be felt most acutely in these familiar outdoor areas. The survey's findings present a clear case for elaborating the use of Rear Site-Areas. This case rests upon the strong preferences revealed for intensifying
the everyday usage of Rear Areas able to cater for a full range of both customary utilitarian activities, as well as a wide range of leisure ones.

Dominating all other activities in all three outdoor areas - Front, Rear and Side - is Gardening, although there was some opinion in favour of reducing it, except in the Front Area.

In this Front Area, Gardening together with a high importance assigned to Visual Relief, Relaxation and Talking, confers a strongly Formal, Aesthetic and Display role on it. Indeed, it appears that subdivisional and locality-rehabilitation policies which pursue increased dwelling-densities, or increased communal areas, should acknowledge the fact that, where Gardening as a major domestic pass-time is not exaggeratedly sought after in site-layouts, then prevailing land-use ordinances are likely to cause major site redundancies, especially in Front Areas; to some extent in Side Areas, although not in Rear Areas. Rear Areas it seems, are for everything and forever.

The particular benefits which accrue from these findings are highly relevant to the formation of medium-density housing policy, for, in mapping more factually the intensities and locations of domestic outdoor activities, they contribute a necessary flexibility to the process of more intensive land-use planning - both private and public - to which medium-density dwelling environments are committed.

(vi) Survey VI about Farmhouses, was unrelated to any of the subordinate hypotheses of this Thesis but served it mainly by extending experience of the Semantic-Differential technique applied here for the first time in the research programme to new dwelling designs.
However, the results are a useful index of farmers' discernment about home design and some of the values they would wish embodied in their dwellings. Outstanding, was the finding that, in assessing farmhouse design, farmers' concern focused sharply on three important components of satisfaction and meaning which were perceivable in the designs:

primarily, on a dominant, 'mildly-aesthetic' component,

secondly, on a strong component which blends 'social-gesture' with 'orderliness' and

thirdly, on a lesser component comprising 'functional' and 'morale-affecting' issues.

Seemingly, farming families have clearly resolved intentions towards environmental qualities in their homes, that are every bit as 'supra-utilitarian', 'gesture-laden' and 'image-laden' as those of their suburban counterparts. The ten farmhouse designs were clearly distinguished by them in terms of these three generalised components or attributes. Moreover, in drawing their distinctions between the designs, respondents were able to show vivid appreciation of such attributes as 'impressiveness' or 'uniqueness' of form - especially in two virtuoso designs - while emphatically rejecting those attributes in those designs, as totally 'unsuitable' and 'bad'. These conspicuous attitudes of farming people stand somewhat in isolation in this series of surveys, but will compare interestingly with a future survey, along similar lines, directed at New Suburban Housing.
(vii) Survey II/2, about two student groups' assessment of the satisfaction and meaning of Existing Student Housing, resulted in conclusions that the two respondent groups, (Architecture and General Students), substantially agree about what attributes or meanings they recognise and regard as important, in assessing a range of actual student dwelling exteriors; and, furthermore, that they agree about their ratings of the various dwelling examples of that range, when assessed in terms of these attributes and meanings.

The four dominant attributes of dwelling exteriors over which the two groups find close agreement, are 'Characterfulness', 'Status', 'Friendliness' and 'Beauty'. Only the attribute of 'Characterfulness' differs in its connotation between groups. For the Architecture Students, 'Characterfulness' connotes a larger fraction of 'Friendliness' than of 'Beauty'; for the General Students its connotation is the reverse: a larger fraction of 'Beauty' than of 'Friendliness'. This group bias over the key attribute, 'Characterfulness', seems to infer a distinctive difference in its concept as held by each group. For Architecture Students it takes on a sociable aspect, indicating that in assessing it, these students include estimations from the man-environment setting as-a-whole, of the character of occupants and events as well as of the purely architectural context these occur in. For General Students, this wider social concern appears not to be experienced integrally with the architectural context in their assessment of 'Characterfulness'. It seems, instead, to be dealt with more independently of the architectural context, and, it is in fact this architectural context, as a manifestly aesthetic phenomenon, which underlies this group's conception of 'Characterfulness'.

Another, less significant group-difference centres on the meaning of 'Goodness'. The Architecture Students associate it, to a degree, with the aesthetic attributes - whereas the General Students associate it with the sociable attributes, thus inferring that their own dominant and heavily aesthetic brand of 'Characterfulness' is, at the same time, not so 'Good' - a way of faintly implying that, while they are responding vigorously to the Architectural Character of the setting, and indeed, admiring it in the highly ranked examples, they are inclined to be putting-up-with-it just a little.

Nevertheless, apart from these group divergences relating to 'Characterfulness' and 'Goodness', there is an altogether marked agreement between the two groups, firstly, about the attributes of the dwellings they consider important and the semantic relationships which they conceive of these attributes holding to one another; and secondly, about their ratings of the actual dwelling examples when they assess them in terms of those attributes. Thus, Hypothesis C, (linking group-differences with differences in group-response), was not confirmed, but, because of group similarities arising from many shared preoccupations as students, nor was it able to be denied.

Moreover, exemplifying this essential unanimity of group assessment, it is clear from an appraisal of group rankings, that both groups consider that the greatest satisfaction is present in those dwelling examples whose architectural style tends to be traditional rather than modern, and whose spatial and formal identity is characterful and comparatively complex rather than just superficially decorative. To the extent that this identity is further construed as being 'intriguing', then confirmation has also been found for aspects of Hypothesis B (that students prefer detached houses of traditional and intriguing character informally used).
(viii) Survey VII was a major experimental series focused on five main objectives together with eight secondary interests involving correlations between respondents and settings, two of which were variations of Hypotheses B and C.

In meeting the first, fourth and fifth objectives, (the satisfactions and meanings perceived, in the 'Living-Rooms', by the separate and combined groups, as well as any constancies in their perceptions of these), it was found that four attributes of meaning: 'Intrigue', 'Complexity', 'Idealness' and 'Convenience', were the most dominant ones of all, as perceived by both groups and as prompted by this particular sequence of settings.

Overall satisfaction was presumed to be measured by the 'Idealness' scale. For the Senior Architecture Student (Group 1), 'Idealness' is seen as an approximately even blending of both 'Complexity' and 'Convenience', the latter being reinforced by other sociable attributes like 'Friendliness' and 'Comfort'.

On the other hand, for the 1st Year Architecture Students, (Group 2) 'Idealness' is seen as much more closely related to 'Complexity' and thus also, to 'Intriguing'.

It can thus be inferred that, whereas the Senior Architecture Students see 'Idealness' as a compound concept embracing both visual/aesthetic and social/functional considerations, the 1st Year Architecture Students are content to regard it as a more strictly visual/aesthetic concept, shaded in meaning as it is, by its closer associations with 'Complexity' and especially the sort of spatial and formal complexity that may be inferred from 'Complexity's' relationship with 'Intrigue'. 
There is thus, tentative evidence from two Surveys - II/2 and VIII - that as vocational maturity grows, the concept 'Satisfaction' (or 'Idealness') develops, in addition to visual/aesthetic considerations, an increasing fraction of concern for the social/functional attributes of the environment.

Of the four dominant attributes, it is 'Intrigue' which is paramount for both respondent groups. It is also slightly coupled with 'Complexity', by both groups. Together with 'Idealness' these two attributes are shown to be the salient 'yardsticks' of both groups of students who assessed the 'Living-Rooms'. Moreover, this preoccupation with 'Intrigue' and 'Complexity' is almost certainly not arbitrary, but arises inevitably from the inherent range of combinations of room elements, and their various conditions, deliberately included in the experimental design. Since, at the outset, the theoretical assumptions and General Correlations posited in Section 3.81, influenced the experimental design, and, since several of these assumptions and predicted correlations invoked, directly or indirectly, some degree of physical complexity in the setting, it is not surprising that the settings were broadly seen to be characterised by 'Complexity' and 'Intrigue'. For example, in attempting to embody in the range of settings, connotations of attributes like 'Enclosure', 'Privacy', 'Intricacy', 'Friendliness', 'Complexity', 'Comfort' and even 'Social-Gesture' - in order to investigate General Correlation numbers (i), (v), (vi), (vii) and (viii) as outlined in Section 3.81 - it was necessary and natural to create an array of spatial and formal conditions which were considered capable of evoking feelings of these attributes. Thus it is not surprising to find that necessary complexity in some of the room conditions evoked impressions of 'Complexity'. What is surprising is the finding that this necessary
complexity was so simply interpreted by respondents as 'Intrigue', (and to a lesser extent 'Enfoldingness'), rather than other attributes that it was expected to support. Such attributes as 'Invitingness', 'Friendliness', 'Inward-orientedness' and 'Privacy' were all found to be only remotely associated with it and furthermore, relatively unimportant in assessing and discriminating between settings. A probable explanation is that the attributes of 'Intrigue', 'Enfoldingness' and 'Complexity' are being used by respondents as substitutes for the above attributes, although perhaps not always knowingly. Then, as substitutes, these dominant attributes render the affected others seemingly redundant.

Taking the results of both group assessments as-a-whole, and apart from their divergence over the meaning of 'Idealness', it was found that there was a great deal of similarity in the way the two groups discriminated between the twenty-one designs and, that this probably reflected the close similarity between the two groups, as far as their experience and awareness of domestic architecture was concerned. In relation to this life-experience, their difference in level of vocational education was not significant.

Consequently, neither General Correlation Number (ii) that, 'satisfaction correlates with respondents' experience and awareness of domestic architecture', nor, General Correlation Number (iii) that, 'the judged salient dimensions of meaning of a given setting, will differ between categorically distinct respondent groups' ... were able to be tested convincingly in this survey.
General Correlation Number (i), that, 'Satisfaction correlates with a Living-Room setting's 'Enclosure', 'Privacy', 'Intricacy', 'Friendliness', 'Pleasantness', 'Complexity' and Comfort', was fairly tested and found to be partly upheld, in that 'Satisfaction', which was represented in overall terms by the 'Ideal' scale, was found to correlate very strongly with 'Complexity' and to a limited extent with 'Comfort', 'Convenience' and 'Pleasantness', but, unexpectedly to a much lesser extent with 'Friendliness'.

General Correlation Number (iv) holds that, 'the judged Salient Dimensions of Meaning of a given setting will relate to its perceived 'General Utility' (or, Satisfaction-in-use) - this perception being conditioned by evidence of activities, their apparent congruence with the setting and their socio-cultural enrichment by that setting'.

In that the survey found that 'Idealness' closely relates to 'Convenience' and 'Comfort', there is probably some support for upholding the above Correlation, with, in this case, one 'Salient Dimension of Meaning' being 'Idealness', and the perceived 'General Utility' it relates to being the attributes of 'Convenience' and 'Comfort'.

Regarding General Correlation Number (v), the fact that the three most dominant meanings identified by respondents were 'Intrigue', 'Complexity' and 'Idealness', spearheaded as it were by 'Complexity' (which lies on the principal factor of the graph), and the fact that the leading designs were closely related to the 'Complexity' attribute, means that it can be emphatically confirmed that the more 'Complex' and 'Allusive' settings will be judged as conveying widely sought meanings more strongly than 'Simpler' more 'Explicit' settings.
General Correlation Number (vi), namely, that 'a dominant dimension of meaning sought in Living-Rooms is 'Friendliness', has not been upheld for these 'Living-Rooms'. The probable reasons for this are twofold: Firstly, all of the various settings contained a 'friendly' occasion involving a group of room occupants, and, secondly, most of the settings themselves possessed a fairly consistent level of 'Friendliness', and hence, were only moderately distinguishable on the Friendliness-scale.

Because the above correlation concerning 'Friendliness' was not upheld, it follows that General Correlation Numbers (vii) and (viii), which relate 'Friendliness' with 'Architectural Gesture', can not be tested.

As to the nature of the most satisfying 'Living-Rooms', these have predominantly sloping ceilings, (especially Ceiling Condition No. 4), and changes in floor-level, (led by Floor Condition No. 3). Of the leading twelve settings only three have flat ceilings and only one is without change of floor-level, and it has been mainly these factors which have contributed to the ratings of these rooms.

This conclusion is born out by the findings gathered in meeting the Second and Third Objectives of Survey VIII, viz. seeking the relative effects of each Condition of the Architectural Elements of the settings, and the relative effects of each Architectural Element as-a-whole as judged by the Combined groups.

Among Ceilings, Condition No. 4 - the less lowering of the two side-pitched ceilings - was clearly the highest rated of the four.
Between Windows, Condition No. 2 - the end-window - was
the higher rated of the two.

Among Floors, Condition No. 3 - the floor with raised
section in foreground - was the highest rated of the
three.

Between Furnishing arrangements, Condition No. 2 - the
arrangement with divans on the right-hand-side - was the
higher rated of the two.

Regarding the relative effect of the four Architectural
Elements (factors) as-a-whole, the hierarchy was as
partly predicted in General Correlation Number (viii).

The Ceiling Element has been found to be the most
effective in accounting for the various meanings and
satisfactions. It is approximately twice as effective
as the Floor Element, which is in turn only slightly more
effective than the Window-Wall Element, which is itself
twice as effective as the Furnishing Element. This
dominance held by the Ceiling of the settings is evidently
due to its total perceptibility, or obviousness as compared
to the other architectural elements, which, to some extent,
become obscured by both occupants and other elements.
Furthermore, the Ceiling's inherent affect is all the more
potent because it is 'out-of-reach' and hence, seldom
subject to the vagaries of occupant whim in personalising
his environment. The designer's responsibilities and
potential gains here, are all the greater for this.

Clearly too, the ceiling reigns for two other important
reasons:

Firstly, it may signify by its planar direction, height,
angle, and extent, an architectural gesture of singular
power and simplicity: many forms of social harbourings
may be made explicit by means of it.

Secondly, it is able to convey to occupants, with less confusion than other room elements, many of the powerful symbolic meanings and associations which underlie human expectations of the dwelling environment.

4.12 The Results reconciled with the General Thesis: - Aspect B

The question as to whether or not Aspect B of the General Thesis is upheld, turns mainly on the success or failure of the research programme in recording evidence of inhabitants' tendencies to seek dwelling environments which express mainly traditionally-evolved and understood images, values, satisfactions and meanings, rather than environments which express mainly novel or unfamiliar ones.

It is considered that the evidence acquired from Survey II as well as II/2, dealing with a representative range of existing student housing; from Survey III, concerning residential streets; from Survey IV - especially in so far as it gave evaluations of street, dwelling and room character; from Survey VI, about farmhouse designs, and from Survey VIII about living-room design, all convincingly confirms these tendencies towards seeking more traditional dwelling character, amongst Auckland inhabitants.

Moreover, a degree of clarity is achieved in interpreting just which classes of inhabitants show the strongest tendencies in this matter and why.

Accordingly, it can be confirmed that the General Thesis - Aspect B, is strongly upheld.
In addition, on the strength of this confirmation, it is equally possible to infer that the principle of 'Social Contract' together with the Theory of Semiology and its pervading philosophical stance towards Phenomenology are correspondingly supported too.

1. The General Thesis - Aspect B states that:

IF THE PRINCIPLE OF 'SOCIAL CONTRACT' IS PERTINENT TO THE SIGNIFICATIONS OF THE BUILT-ENVIRONMENT, AND HENCE, IF THE THEORY OF SEMIOLOGY THEN HOLDS FOR THE PHENOMENON 'ARCHITECTURE', AS IT IS ASSUMED TO DO FOR OTHER SOCIALLY-CONTRACTED LANGUAGES, THEN, EVIDENCE SHOULD BE OBTAINABLE OF INHABITANTS' TENDENCIES TO SEEK DWELLING-ENVIRONMENTS WHICH EXPRESS MAINLY TRADITIONALLY-EVOLVED AND UNDERSTOOD IMAGES, VALUES, SATISFACTIONS AND MEANINGS, RATHER THAN ENVIRONMENTS WHICH EXPRESS MAINLY NOVEL OR UNFAMILIAR ONES.
4.13 Review of the Evaluative Survey Techniques

The discussion about the pros and cons of assessing Preference, Satisfaction and Meaning, which was presented in Part 2: 'Scope of the Research', is here briefly extended with a review of the evaluative techniques associated with each of them, compiled in the light of the experience of applying these techniques in the eight surveys of this Thesis.

By so doing it is hoped to identify the relative effectiveness of these various techniques of research, as contributors towards knowledge about human interaction with the built-environment. Based upon this assessed effectiveness of the research techniques, a reconciliation can then be made with The General Thesis - Aspect A that:

EVALUATIVE TECHNIQUES FROM THE SOCIAL SCIENCES

(a) OFFER MEANS OF EXTENDING AND DEEPENING OUR KNOWLEDGED AND INTERPRETATION OF MAN-ENVIRONMENT INTERRELATIONSHIPS, THAT ARE SWIFTER, MORE THOROUGH, AND MORE FAITHFUL TO HUMAN ASPIRATIONS, THAN THE TRADITIONAL MEANS USED BY THE DESIGN PROFESSIONS OR BUILDING AGENCIES, AND HENCE,

(b) FACILITATE BETTER MORE COMPREHENSIVE CONCEPTS AND PREDICTIONS IN THE DESIGN OF THE BUILT-ENVIRONMENT.

In the course of the eight surveys, the following Evaluative Survey Techniques were used:

(i) For assessing Preference and Opinion in Survey I, a questionnaire was used to record written preferences and opinions chosen by subjects in response to questions offering alternative responses.
(ii) For assessing Preference only, in Surveys III, IV, and V, questionnaires were used to record written preferences chosen by subjects in response to questions offering alternative responses based upon graphic or photographic displays.

(iii) For assessing Satisfaction and Meaning in Surveys II/2, VI and VIII, Semantic-Differential questionnaires were used to record subjects' numerical scoring of displays of environmental alternatives, on bi-polar descriptive scales, using colour-slide projections, and, in Survey VIII, video-tape screenings. Atypically, this technique was also used in Survey II for assessing 1st preferences in Student Housing.

(iv) For the analysis of data enabling comparisons of two or more subject-groups with their preferences, as in Surveys I, and especially IV, Tests of Association were made using computer-printout Contingency Tables and Tests of Significance using the Chi-squared Statistic.

(v) For the analysis of data from the Semantic-Differential type of questionnaires, involving numerous variables, as in Surveys II/2, VI and especially VIII, a Multivariate Analysis of Variance (MANOVA), was used to identify Salient Attributes of Meaning, General Satisfaction, the Effects of Group Responses, the Effects both of Design Alternatives, and of various Components of the Design Alternatives on respondents' judgements. These MANOVA results were further displayed by means of computer-aided graphical plottings.
The following commentary summarises the essential findings about the use and effectiveness of these evaluative techniques as experienced in the Thesis Research.

Techniques (i) and (ii), which record various preferences, demand a keen sense, on the part of the researcher, of what issues are relevant to the inquiry, together with carefully conceived and constructed questions to test these issues.

The issues raised in Surveys I and III, for example, (dealing with Accommodation Modes, and Residential Streets), were familiar to respondents, were interpreted easily and answered clearly. By contrast, the issues raised in Survey IV and to a certain extent in Survey V, were not always familiar - details of dwelling design and site planning seldom are familiar to laymen. Especially in the case of the lengthy Survey IV, the initial questionnaire 4A addressed to Students, was considered overly long in its coverage of issues, and too verbose in its wording of explanations and questions. This questionnaire, still covering the same topics as 4A did, was greatly simplified for administering as Questionnaire 4B to Households. The inherent complexity of the major Questionnaire 4A and 4B was a reflection of the extent of its investigations on medium-density dwelling design. The resulting burden of decision-making and response which respondents are asked to accept, in this type of preference - seeking questionnaire, seems to be irreducible, but nevertheless, was found to be well tolerated by those people (the majority), who were persuaded the project was a worthwhile one.

The aspect of Survey V which brought some criticism, was its boring repetitiveness. In the interests of clarity, each of the three dwelling-site areas - Front, Rear and Side - was presented in the questionnaire with an identical series of questions repeated three times. The resulting questionnaire appeared dauntingly lengthy and tiresome. A systematic
surveying of the three site areas together, one question at a time - as adopted in presenting the results of the survey in Section 3.53 - would have alleviated this problem.

Technique (iv), the Test of Association, analyses the results of such preference data as are derived from Survey IV, in three ways:

Firstly, it results in a computer printout showing, for each question in the questionnaire, the tally of responses to each preference alternative, thus revealing the raw preference-rankings for each question.

Secondly, it assembles in table-form, the incidence of responses for each alternative concept in a question, as preferred by respondents with various distinct demographic characteristics, which are identified by each of the questions in the demographic section of the questionnaire. In other words, it presents a matrix of 'who prefers what?'.

Thirdly, by calculation of the Chi-squared Statistic, it reveals any bias in the preferences of respondent sub-groups (of whatever demographic characteristics), by comparing their observed response with a theoretical, bias-free expected response, and testing this bias against Degrees of Freedom to determine its significance and the level of confidence in that significance.

In Survey IV, the technique was refined, so that the computer was programmed to printout only those contingency tables of the many hundreds processed, which had significant associations. The significant preference/group associations discussed in Section 3.43 are only those with a confidence level of 95% (P = 5%) or better. Many more associations were found at the 90% level (P = 10%) but were deemed to be not clearly significant enough for inclusion in the discussion. The
technique is certainly found to be an effective one, adding greatly to the possible depth of interpretation of preference survey data. Care is necessary, in predetermining the number of categories of respondent demographic data, to ensure that sub-group-versus-preference tallies remain large enough, (a minimum of 5), to render the Chi-squared statistic valid. But overall, as a technique applied to the investigation of man-environment interactions, wherein correlations rather than causal relationships must be the basis of knowledge being sought, it reveals rich information about such correlations and does it (by computer) in an untroublesome way.

Technique (iii), the Semantic-Differential, offers even richer promise than the foregoing techniques, because of its capability of measuring or scaling the magnitude of a subject's response as well as its particular character in terms of Satisfaction and Meaning (Preference too may be bluntly extracted but this, alone, is to underexploit the technique).

As has been explained in Section 3.84 and Appendix 4, the Semantic-Differential technique, — together with Technique (v) (viz. suitable computer programmes to carry out multi-variate analyses of variance and graphical plottings of computed relationships) — provide extensive and profound insights into people's concepts of and attitudes to the phenomenon under investigation, (here dwelling environments), as well as its constituent components. While the computational and statistical skills needed for the computer analysis stage, are considerable and crucial in the whole investigation, a researcher's lack of them is no impediment, since they are increasingly available in company with the other technical aids centred on the computer, and may be enlisted as was done for this Thesis.
In some contrast with the marvellously tangible, and sophisticated manner in which respondents' highly subjective attitudes and feelings are rendered graphically manifest by this analysis technique, the manner by which the data is gathered (i.e. the administering of the bi-polar descriptive scales to respondents) is less elegant, and, because unfamiliar, tends to dismay subjects at first encounter. The experience is intensely personal, almost confessional, in its psychological demands. At the same time, if the extent of the assessment matrix of concepts and scales is kept roughly within the limits of subjects' nervous energy and concentration, then there is a likelihood that the assessment experience will seem incomplete or eccentric and hence often frustrating to subjects. This was the experience of farmers judging Farmhouses-as-a-whole in Survey VI. On the other hand, the thirteen scales in the questionnaire for Survey VIII on 'Living-Rooms', more adequately covered the perceptible issues of those more finite settings, and thus provoked less frustration but decidedly more nervous exhaustion. This conflict of interests inherent in this technique, appears to need supplementary measures in compensation. Whichever horn of the dilemma one rests on, some compensation seems to be available by supplementing the attitude-scaling procedure with a free-discussion-and-comment experience. This experience, in both Survey VI and Survey VIII, seemed to be 'therapeutically' welcome by respondents, but also provides 'back-up' and 'infill' information and opinion about issues both included in and neglected by the structured questionnaire. Moreover, the state of awareness reached by respondents about the concepts they have just assessed, is so heightened by the Semantic Differential process that any endeavours to have them discuss their reactions further are greatly rewarded. At this moment the techniques of interviewing and debate are extremely effective, meaningful and satisfying.
Regarding the procedures of administering survey questionnaires, distinction can be drawn between the two broad classes of structured questionnaire used in this research - the Preference Survey Instrument as in either Techniques (i) or (ii), and the Satisfaction/meaning Survey Instrument as in Technique (iii).

The Preference Survey Techniques (e.g. Questionnaire 4^A or 4^B), require elaborate effort in preparation, distribution and retrieval, but, being entirely self-administered, are tolerant of whatever rate and timing of completion, subjects elect to impose on themselves. The sample size is limited only by field-working and questionnaire reproduction resources. The technique is most useful for probing issues and confirming research tasks.

On the other hand, the Satisfaction/meaning Survey Techniques (The Semantic-Differential as in say Survey VIII), require equally elaborate effort in preparation, but differ vitally from the Preference Survey Techniques in that their self-administering must be conducted at a pre-determined time and place, accompanied by a 'live show' involving the researcher with supporting visual or audio-visual presentation. This obviously limits the sample size to the capacity of the place and facilities available for the presentation. But this constraint lends itself to the practice of sampling, for comparison, a number of discreet respondent groups, each one on a different presentation occasion. Moreover, this attraction serves to exploit the mobility of such audio-visual presentations which represent to subjects, not the reality of a topic itself, but simulations of that reality.

Finally, concerning the selection and use of descriptive-scales in the Semantic Differential technique, the experience of this research work led to the view that great care is needed in the blending of scales used to make up a questionnaire.
As was pointed out in the Summary of the Results of the Surveys, Section 4.11, there was probably a relegation by respondents of certain scales because of the precedence attached to others. The tendency for one or two scales, (or attributes) to 'dominate' or 'substitute for' other related scales, seemed to occur because the 'level of generality', or alternatively, the 'level of particularity' of the related scales was not as consistent as seems desirable. For example, in Survey VIII, the scales of 'Complexity' and 'Intrigue' - both referring to comparatively high-level abstractions or generalisations, - seemed to swamp or substitute for more figurative or particularised scales like 'Friendliness', 'Invitingness', 'Privacy' and 'Inward-orientatedness'. As a consequence, these latter scales were generally less 'activated' in making judgements of the settings while the former were in fact the dominant ones in doing so.

On the assumption that these scales referring to higher level abstractions are less demanding to score with than the others, it may be inferred that respondents are adopting the easiest course open to them under survey conditions of severe constraint.

If those neglected scales are to receive greater attention in the assessment process, then the researcher must ensure that easier, generalised substitution scales are excluded from the particular scale-group.

It is worth briefly noting that the process and experience of doing multivariate analyses of response-variance, especially as in Survey VIII, resulted in 'Salient Meanings' being identified simply by the proportion of total response variance they accounted for. These Salient Meanings themselves became the basis of interpreting both group evaluations and room-design attributes. No attempt was
made to 'name' the two principal factors forming the
two axes of the graphical plots, nor was there a
straining after principal 'Dimensions of Meaning'
representative of broader clusters of similar meanings
however closely 'similar' respondents may have judged
these meanings to be.

Finally, in amplification of the comments made in Section
3.83 about the irregularities adopted in the factorial
design of the 'Living-Room' sequence, it should be pointed
out that, for the ideal experiment, every possible
combination of design factors (conditions) should be used
so that every factor is assessed with the others held
constant. For example, in Survey VIII, involving the
experimentation on 'Living-Rooms', such ideal factorial
design would involve 48 combinations as follows:

Ceiling 1 Window 1 Floor 3 Furnishing 2
Ceiling 2 Window 1 Floor 3 Furnishing 2
Ceiling 3 Window 1 Floor 3 Furnishing 2
Ceiling 4 Window 1 Floor 3 Furnishing 2
etc.

This means that a proper difference between each of the
factors can be assessed and sound conclusions can thus be
drawn.

If certain combinations are left out, then it may be
misleading to test for differences between say, Windows
alone: e.g. in the case of missing assessments, say as
follows:

<table>
<thead>
<tr>
<th></th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>W2</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>
Here, an apparent difference between W1 and W2 may just be due to differences between C1, C3 or C4.

If economies of sampling are desired, and provided that all combinations of design factors are constructed, (say 48) then a sound analysis can be derived from a Balanced Incomplete Sampling, where each respondent is presented with a carefully selected subset of the designs, in such a way that each design is assessed by the same number of subjects. This procedure is known as a Balanced Incomplete Factorial Design, and offers a useful reduction in the load and stress imposed on respondents in such typically complex multivariate-assessments as are encountered in environmental design and research.

4.14 The Results reconciled with the General Thesis: Aspect A

The question as to whether or not Aspect A of the General Thesis is upheld, turns mainly on the success or failure of the research programme both in effectively applying the various survey techniques from the Social Sciences, and, in achieving by them, fruitful findings of relevance to the design of the built-environment.

It is considered, on the evidence of the reported survey projects, notwithstanding any acknowledged deficiencies in the selection, adaptation or administration of the survey techniques, that the general research programme is successful. The degree of this success is varied and not always of a uniform professional standard, since the research programme tended at all times to be concerned primarily with exploratory experience in adapting the techniques to research in Architecture.
It appears that numerous worthwhile findings have been made, as the survey results disclose. Many of these have been shown to be applicable in many areas of current housing policy.

Accordingly, it can be confirmed that the General Thesis - Aspect A, is upheld.
4.20 IMPLICATIONS OF THE RESEARCH

4.21 Theoretical Implications of the Thesis Results

In this section, a concise summary is presented of those major implications from the Thesis results which appear to have most relevance for Theory. Firstly, regarding survey-findings:

1. Students' attitudes to dwelling environments represent the attitudes of the younger adult suburban population at large. Their preferences and opinions provide an index of those of their generation.

2. There is good evidence that, while Dwelling Character, as an aspect of architectural 'Language', is read more discerningly by Architecture Students than by General Students, their readings are not contradictory. The cultivation of skill and discernment as acquired by students of Architecture does not appear to foster attitudes which contradict widely held attitudes - rather it highlights them.

3. As student vocational maturity grows, the concept of 'Satisfaction' (or 'Idealness') with respect to dwelling design, appears to acquire, in addition to a range of aesthetic criteria, an increasing fraction of criteria concerned with the social and functional attributes of the environment.

4. In residential streets, relational attributes such as 'spatial enclosure', 'climatic shelter', and public or communal 'place-identity', which are widely recognised as being desirable in both the theory and experience of good Architecture and Planning, were shown not to influence preference in a consistent way.
It appears that these attributes are overshadowed in respondents' hierarchies of criteria, by attributes like 'status', 'class', 'income' and 'life-style'.

5. In the Living-Room designs investigated, it is emphatically confirmed that more Complex and Allusive settings are judged as conveying widely sought meanings more strongly than Simpler more Explicit settings.

6. It was found in the Living-Room series, that of the thirteen attributes by which the rooms were assessed, the four attributes of 'Intrigue', 'Complexity', 'Idealness' and 'Convenience' were the most dominant for students. For these settings it can be inferred that these four dominant attributes are the ingredients of 'Satisfaction', with 'Idealness' the most synonymous with the concept 'Satisfaction'.

7. In these Living-Room designs, the hitherto paramount attribute of 'Friendliness' has not been upheld as one which dominates assessment; probably because, all of the settings housed friendly occasions, were themselves essentially friendly in arrangement, and hence, were only moderately distinguishable one from the other in terms of 'Friendliness'.

8. Regarding Dwelling Exteriors, the greatest satisfaction is seen in dwelling examples whose style tends to be traditional rather than modern, and, whose spatial and formal identity tends to be characterful and complex rather than just superficially decorative. It seems that architecture of such strength-of-character is capable of not only conveying more or less abundant meanings and associations from the past, but also of stimulating agreeable fresh ones
of the present. The four attributes which students recognise as dominant in judging the surveyed dwelling exteriors are 'Characterfulness', 'Status', 'Friendliness' and 'Beauty'. Thus, for this range of dwellings, it can be inferred that it is these four attributes which are the ingredients of 'Satisfaction'.

9. The overall findings from those surveys which sought judgements of meaning in the respective environments and semantic relationships among their perceived attributes, provide strong support for a principal contention of the Thesis, namely that, the Theory of Semiology is a crucially valid theory in any explanation of human experience of the architectural environment.

10. Referring now to theoretical aspects of the research methodology - the survey processes - the findings about the Semantic Differential technique fully meet the expectations with which it was used. The technique is highly effective in gathering information of great richness about satisfaction and meaning perceived in dwellings. However, because, when the technique is kept to manageable scope, it is felt to be too limiting or, alternatively, because when it is made more comprehensive it is felt to be exhausting to take part in, it is therefore a process which requires supplementing by open discourse or in-depth interviewing.

11. Because of certain broad limits in mounting and accommodating a Semantic-Differential survey, it is found to be more appropriate for smaller populations of respondents than can be enlisted in say Preference surveys.
12. A cautionary finding about Semantic Differential questionnaires is that, unless careful 'scale-blending' is done to ensure consistency in the degree of 'generality' or 'particularity' of the selected descriptive-scales, then it appears that respondents tend to avoid discriminating and scoring responsibly on 'difficult' scales, and seek out 'easier' scales to discriminate between concepts with. A form of 'substitution' is practised.

13. In connection with general preference survey questionnaires, it is confirmed that for large sample populations of elaborate demographic characteristics, Tests of Association and Significance by means of an appropriate statistic (for example the 'Chi-squared Statistic'), are a very important means of establishing correlations between preferred concepts and respondent group characteristics.

4.22 Implications of the Results for Architectural Design and Planning

This section gives a concise summary of the main implications from the Thesis findings, which will be of prospective importance to the policies and practices of Architecture and Planning. A considerable number of design implications are left unreviewed here, but are fully dealt with in the context of the various surveys in which they were discovered.

1. Probably the most fundamental implication of the research findings of relevance here, is that, in view of both the abundance of those findings about dwelling environments, and the effectiveness and
readiness by which those findings were systematically obtained, the preferences and attitudes of potential and existing householders may now, and in the future, be explicitly known and re-affirmed. Some suggested procedures and efforts needed to obtain this knowledge, have been tentatively demonstrated, and could usefully be taken further. The value of this accessible knowledge has rarely been seen as anything accountable in housing or urban development policy. The prospect of national crisis discussed in Section 1.1. promises to change that, and show more and more, the value of this knowledge as a benefit whose cost-to-obtain appears increasingly slight in comparison with the costly problems it can help to alleviate.

2. Of some interest to architects, builders and promoters of housing, is the finding that students interpret on behalf of other young adults in preferring dwellings of somewhat traditional rather than novel character. Student respondents appear to be a reliable and willing 'early-warning' force in forecasting dwelling design trends of good quality which eventually become adopted by the housing market. Dwelling-preference amongst students is found to embody generous, robust houses, of more or less traditional rather than novel style, with ample formal and spatial character and some intrigue and intricacy of detailed design. While this order of accommodation is feasible in fully subsidised, student-housing projects, it is not procurable at low-cost under open-market conditions. Students and their generation at large, appear to strongly dislike 'new' low-cost housing but instead, favour 'old' low-cost housing.
The findings clearly resolved that student housing - including that in student-village schemes - is desirably not 'specialised' housing, but is broadly the kind of housing sought by young adults in general.

3. The implications of the foregoing conclusions are firstly, that for inner suburban medium-density housing, (or housing anywhere else where land-value or demand induces medium-density development), new dwellings will be created for the comparatively wealthy and the comparatively subsidised. Secondly, in preferring and being able to afford only 'old' low-to-medium-rental housing, the city-oriented young adults - including students - will continue to seek a range of existing, even aging dwelling stock of robust, generous character, all in reasonable proximity to the city centre.

Thirdly, in order that a proportion of aging robust 'town-housing' be available and maintained in use to satisfy this long-term young-adult demand, it must obviously have been continuously formed in advance. This normally commonplace process of natural degeneration and regeneration has been thwarted in Auckland as elsewhere, by motorway and other large-scale works, and consequently now requires deliberate management to revive it. The process outlined above is precisely the 'trickle-down' process as pointed out by Michelson (1970). It is a natural process which provides something old, something new, something for everyone. Regrettably now the 'trickle' of old stock is almost imperceptible.

Fourthly, this principle of expecting and building central housing stock of long endurance potential (like the better Victorian stock now enjoyed) is a policy commitment unconnected with any prevailing
low-cost housing problem, which in turn, may now be seen as a problem to be solved primarily by the management of 'old', sought-after and cheaper existing dwelling stock, which from time-to-time and generation to generation is treated to a process of rehabilitation.

4. Of importance to policies of subdivision, land-use, use-mix and locality rehabilitation are the findings on the uses and requirements of domestic outdoor space. The results show a vital utilisation of the Rear Areas of dwelling sites and that even fuller leisure use of them is sought. The Front Area is regarded as primarily a display and viewing territory with associated heavier gardening commitments. Indeed, it appears that subdivisional and rehabilitation policies which wish to pursue either increased dwelling densities, or increased communal areas, should acknowledge the fact that where Gardening as a major domestic pass-time is not exaggeratedly sought after in site-layouts, then prevailing land-use ordinances, if maintained, are likely to cause major site redundancies, especially in Front Areas; to some extent in Side Areas although not in Rear Areas.

5. Of design interest concerning rural dwellings, is the finding that farming families, in considering farmhouse design, show clearly resolved intentions towards environmental qualities in their homes that are just as biased towards 'Gesture' and 'Image' as those of their Suburban counterparts - this in spite of their genuine voiced concerns for important 'utilitarian' aspects of designing for farm-life.
6. Finally regarding Interior Architecture, as revealed by the survey of Living-Room Simulations, the Ceiling Element has been found to be the most effective in accounting for the various meanings and satisfactions attributed to the rooms. It is approximately twice as effective as either the Floor Element or the Window-Wall Element. Of the twelve most 'satisfying' Living-Room settings in the survey, nine had a form of sloping Ceiling, (only three had a flat ceiling) and eleven had changes of floor-level (only one had a flat floor). Thus these preferred, more complex forms of ceiling and floor are shown to dominate the meaning and satisfaction of the Living-Rooms.
4.23 Implications of the Results for Further Research

In this final forecast, a summary is made of the more provoking implications for further research. These implications stem both from the research results or experiences, and from some of the wider national issues-of-the-day, with which these researchings are linked. There are two factors of national scale which currently provide a frame of reference for assessing the validity and applicability of research in matters of the built-environment.

Firstly, there is the factor of crisis discussed in Section 1.11: the depressed, unyielding state of the economy, with its associated investment cut-backs, unemployment and depopulation trends. In this situation, housing demand and housing production are both unusually low - a state of affairs which is not expected to revert quickly, if ever, to former levels. An occasion exists, and may even persist indefinitely, for a compulsory stocktaking of resources, production and consumption. In the built-environment specifically, the habit of having ourselves housed in such luxury as has been the practice since World-War II, will not be regained while we persist with overseas deficits, high internal consumption and low productivity-levels, which fail to boost foreign credit. Conceivably in this era, one luxury for the underemployed should emerge in the prospect of engaging in a process of housing oneself. This of course implies many major adaptations, as yet unresearched adaptations by owners in the way they 'constructively' contribute, as well as adaptations to the nation's dwelling-stock regarding the way its alterations and additions are designed and built. However, there seems to be more than mere economic-emergency-value in such a prospect, for in it, 'Environmental-Man' is wholesomely helped towards rehabilitation as well as his dwelling environment.
A second factor of vital relevance to any research prospects, is the comparatively small scale and temporariness of national problems here.

New Zealand is youthful enough, small enough and becoming aware enough to manage itself out of impasses. For these same reasons it is, in a world view, an enviable experimental base, an unmatched environment for carrying out trials and researchings of alternative concepts and realisations of all sorts - none more so than those within the dwelling-environments of our major cities. The conditions necessary for effective, applicable research are with us.

Turning now to some salient implications for further research stemming from the Thesis:

1. As a follow-up of Survey III about Residential Streets, a further survey is called for which examines the range of architectural and urban-design street-variables considered in Survey III, in a manner which holds constant the factor of socio-economic level, status, class, etc., in order that responses are obtained which permit a measurement of the various built-environment relationships unclouded by sociological indicators.

2. Again as a follow-up study, a research project, akin to Survey VI about Farmhouse design, is needed to investigate suburban assessments of meaning and satisfaction in new suburban house designs. This project should furthermore permit an evaluation of the relative merits both of new medium-density dwellings (for example, as surveyed for preference in Survey IV) and of new detached dwellings.
3. Arising from a group of hypothetical relationships which were evolved mainly during the planning stages of Survey VIII, about Living-Room design, and of Surveys VI and II/2 about the meanings and satisfactions of dwellings, a series of Theoretical Assumptions were defined with the intention of possibly testing them in an appropriate semantic survey. These Assumptions postulated numerous General Correlationships about settings and their perceived meanings and satisfactions. Eight of these General Correlationships were adopted, tested and discussed in Survey VIII. The rest were discarded because they were untestable in the experimentation finally adopted.

Together these remaining General Correlationships make up a series of potential hypotheses or assumptions for further research investigations, and are therefore grouped below:

Group 1: mainly concerning connotative and denotative dimensions of meaning and their relative significance in experiencing architecture.

(a) The initial satisfaction of a setting will be primarily signified and judged by both its denotative and connotative meanings, combined in a varying ratio which reflects the experiential awarenesses and other preoccupations of the perceiver.

(b) Connotative dimensions of environmental meaning serve mainly the enduring interactions between users and settings, these interactions being the ones which culminate in strongly felt associative or symbolic interpretations of those settings.
(c) **Denotative dimensions** of environmental meaning serve mainly the introductory interactions between users and settings, these interactions being the ones concerned with immediate identification, orientation and familiarisation.

(d) **Denotative meaning** defines any built-environment objectively and quantitatively; i.e. it **identifies** that environment.

(e) **Connotative meaning** alludes to any built-environment's experiential nature subjectively and qualitatively; i.e. it **interprets** that environment.

(f) While **denotative meaning** tends towards the 'figurative gesture', **connotative meaning** tends towards 'abstract symbolising'.

(g) Urban and architectural 'imageability', and 'sense-of-place' will vary directly with the environment's connotative meaning-content.

Group 2: **mainly about** the variability of meaning in relation to the perceiver, his **discriminating skill** and the environment's symbolic content.

(a) The perceived meanings of any given environment will vary in their elaborateness and abstraction, according to the **discriminating skill** of each individual perceiver.

(b) The perceived meanings of any given environment will consist of a combination of component-meanings which reflect each individual's personal characteristics, his previous awareness and experiences pertinent to that environment, his current preoccupations, as well as his future goals and objectives.
(c) An individual's discriminating skill will vary directly according to his insight, experience and ability in either the evaluation or the design of the built-environment.

(d) The universality of perceived meaning in any environment will vary directly with the degree of universality attributed by perceivers to its spatial, formal and detailed identity.

(e) The higher the public content of a built-environment, the more culturally defined its meanings should be, and conversely, the higher the private content, the more personally defined its meanings may be.

Group 3: mainly about meanings and their architectural correlates.

(a) A major determinant of denotative-meaning is architectural-gesture, and, in conveying denotative-meaning, architectural-gesture signifies social gestures or occasions anthropomorphically.

(b) Another major determinant of connotative-meaning is architectural-symbolism, and in conveying connotative-meaning, architectural-symbolism mediates appropriate, culturally-defined values, attitudes or behaviours subjectively.
4. Based on the initial findings of the three surveys of 'meaning' in this Thesis, a number of further studies are implicated. These arise from the issue of 'plurality-of-attitudes' in society today, and focus upon the relationship between 'environmental-meaning' or 'satisfaction', and such perceiver-variables as:

(i) the degree to which the perceiver owns the environment whose meaning is defined;

(ii) the degree to which he is a participant in the experiencing of that environment;

(iii) the degree to which he is a participant in the design and formation of that environment, and,

(iv) the degree of perceivable design-quality in the environment under study.

It is expected that, depending upon which particular perceiver-relationships predominate in any setting, and also depending upon the degrees to which they apply in any setting, a broad classification of kinds of meanings could be resolved in relation to a broad classification of distinctive human attitudes and situations. In short, tentative answers might be sought to questions of "Whose environmental-meaning, what meaning, how much of it and where?"

5. Stemming from the interests in 'meaning' described above, further applications of the Semantic-Differential technique would be appropriate, and, especially when related to experimental investigations of meaning and satisfaction which require simulation techniques, the
Experimental design could be developed more effectively than was the case in, say Survey VIII, by applying the procedure of Balanced, Incomplete Factorial Design described in Section 4.2.

Furthermore, in seeking the satisfaction/perceiver relationships suggested for study in subsection 4 of the above implications, a full use of the Repertory Grid technique, briefly outlined in Section 1.31, is called for.
4.30 Conclusion

As already noted, the processes of research which made up one of the twin preoccupations of this Thesis, were indeed productive; not effortlessly so, but still effectively enough. If there is a single overriding impression that arises from the experience of applying these research procedures, it is that the process of gathering data was mostly done with more haste than it should have been - since opportunities for gathering it had to be grasped and met with limited resources - whereas the analysis and evaluation of data was seldom hasty enough.

This research trait, while not uncommon in academic research, would be anathema to the professional researcher, whose need to identify and then to urgently predict relationships in practice, would be seriously thwarted by any shortage of either data or time to predict with.

The strategies, the techniques, and the analytical procedures for 'man-environment' research, described in this Thesis, do not differ appreciably from those used in equivalent problem-oriented or professional research. However, the resources and the rate at which such research may be carried out, clearly do differ. Thus, in any professional research, a processing-momentum, much greater than was achieved in the majority of these surveys, is essential if results, no matter how accurate, are to be applied predictively. It now seems clear from the experience of this Thesis research, that meeting this professional requirement of prediction is largely a question of assembling sufficient man-power: for, the other resources, the techniques, the strategies and the direction are resolved and at hand.
As some compensation for the long elapsed time of this research programme it is rewarding to find that five years on, the housing market in Auckland, has evolved in its design characteristics, to match many of those preferences which were ascertained by Survey IV in 1973. Thus some retrospective confidence can be attributed to the predictive strengths of the research techniques employed.

Taking a broad look back at the research, it may be concluded that, while the General Thesis - Aspects A and B were, neither of them, very contentious or theoretically daring, they were nonetheless strategically necessary and fundamental to long-term architectural research and, in being strongly upheld by the findings, they pave the way for, among other things, more theoretically-adventurous hypotheses such as those relating to the significance and meaning of environmental components, which are suggested in Section 4.23.

On the other hand, the results of the subordinate Hypotheses A, B and C, their corollaries and their refinements, together with the results of numerous General Correlationships, - all of which link human subjective assessments of preference, satisfaction and meaning to attributes and components of the built-environment - altogether provide a fund of insights and directives of immediate value to the design professions. The more notable of these findings, with predictive validity, were those which identified the comparative unanimity of students and young adults at large, in their assessments of, and preferences for various aspects of medium-density housing; those which demonstrated the predictive value of student attitudes as interpreting the attitudes of the wider urban population of their generation - and even older; and, again, those findings which identified the architectural character of the most preferred exterior and interior dwelling environments.
A view was put forward of the urgent need to mount a policy of continually providing new, good-quality medium-density housing, built-to-last, and ultimately to be managed under rehabilitation procedures along with other housing stock, to ensure an 'ecology' of dwelling-environments of suitable variety and of suitable costs.

Relevant to housing prospects in general, were the detailed findings about Living-Room design-character, which disclose very significant correlations between salient architectural room elements - especially the Ceiling - and room meanings as perceived by people consciously assessing the rooms.

Of more relevance to planning for medium-density housing, was the conclusion from the survey of domestic outdoor spaces, that; Front Areas of residential sites are, in their low utilisation, highly negotiable for the purpose either of increasing dwelling densities, and dwelling accommodation within the bounds of the existing services infrastructure, or, of developing communal outdoor places. This practical bonus-prospect for dwelling sites, is one which strikes a particularly heroic chord in the face of the urban crisis prospects commented upon in Part 1.

But probably the most satisfying architectural outcome of the Thesis research - the outcome illuminated by the results of the Surveys dealing with the meaning and satisfaction of dwelling-environments, and their architectural elements - is the very tangible prospect of a well-confirmed core-vocabulary of meanings or attributes, which, in this age are evidently sought-after in both the interior and the exterior domains of the home. This core-vocabulary of meanings, together with the strongly correlated architectural components of these dwelling-environments, are evidently the
fundamental ingredients of the phenomenon 'Architecture',
which are sought after by Aucklanders in satisfying their
wider goal-seekings and self-actualisations related to the
phenomenon 'Home'. In other words, there is now for the
dwelling-environment, a tangible prospect of the designer
cooperating with the dweller in constituting and managing
'man's semantic-place'. And, especially for the designer,
dedicated to human consciousness and its appropriately
responsive habitats, as well as for Environmental Man who
would occupy those responsive habitats - for both of these
people, this tangible prospect of 'man's semantic-place'
is one of compelling importance.
APPENDIX 1: Survey IV Sampling Procedure

The sample for this survey was established in conjunction with the Heylen Research Centre and their brief included the following requirements: firstly, that the research should refer to the population of urban Auckland; secondly, that a range of socio-economic groups within the suburban area be sampled and thirdly, that students be used as field workers. The research centre provided ten "localities" selected from their frame of the Auckland area and provided streets as starting points randomly selected from the frame. The students were required to follow a predetermined route from the starting point and to call on households at set intervals, in this case every other household. The interviewers were briefed before the survey and the questionnaires edited and coded in the normal fashion. Of the two hundred questionnaires in the quota, 163 were suitable for coding for final analysis. This drop off rate is to be expected with novice interviewers.
APPENDIX 2: SIMULATION STUDIO - Floor Plan
APPENDIX 3

SURVEY VIII : LIVING ROOM DESIGNS

EDITED TRANSCRIPT OF A TAPE-RECORDED DISCUSSION FOLLOWING COMPLETION OF THE SURVEY VIII QUESTIONNAIRE

Key: P. Bartlett, upper case letters.
Group 1 Students, lower case letters.

JUST FOR A FEW MINUTES, AS A FOLLOW UP TO THE COMPLETED QUESTIONNAIRE WE WOULD LIKE TO GET YOUR IMPRESSIONS OF SOME OF THE GENERAL ISSUES OF THOSE ROOMS. A BUNCH OF STUDENTS WHO WERE INVESTIGATING INTERVIEWING AND SURVEYING WORKED OUT A FEW QUESTIONS. WHAT WE PLAN TO DO IS JUST TAKE NOTES OF WHAT YOU SAY. WE HAVE GOT THE TAPE GOING SO THAT WE CAN HAVE THE INVESTIGATING TEAM RUN THROUGH IT LATER AND ELABORATE ON THE NOTES TAKEN NOW.

STARTING WITH THE GENERAL QUESTIONS THEY CONSIDERED:- "ARE THERE PARTICULAR ASPECTS OF THE ROOM DESIGNS WHICH STRONGLY IMPRESSED YOU AS CREATING THE RIGHT ATMOSPHERE FOR A LIVING ROOM?". IF SO, "WHAT ASPECTS ARE THERE AND WHY DO THEY CREATE THIS?".

The conversation pit.

THAT COMES TO MIND, DOES IT?

The ceilings that slope down at the ends (not the ones at the sides) I find quite uncomfortable.

THE SIDE ONES, THE ONES RUNNING PARALLEL TO THE AXIS?

Those are good!

YOU THINK THE END SLOPES ARE UNCOMFORTABLE?

Yes.
The conversation pit depends, not just on the ceiling, but where it is and its relation to the floor levels and its relation to the ceiling.

Yes and also I think the success of the pit might have something to do with the axis of the ceiling, I don't know, particularly the ones that came up from the left hand side.

That looked horrible.

WELL THAT CEILING NO. 2 WAS MUCH MORE STRONGLY SENSED THAN THE OTHERS. IT LOWERED OVER YOU MORE.

IT HAD THAT SORT OF MAKESHIFT LOOK ABOUT IT.

Yes, it looked like a garret rather than a living room.

I thought in most of those living-room cases, the windows and doors were almost irrelevant.

I think so too.

But not the window, you could see in the end wall.

I don't think even that was very relevant.

I don't feel it was a major point of the whole room.

Sometimes it divided the room though; you had a clear passage down to the window at the end, with seats on either side.

When you have those doors on the end wall of the room it looks absolutely terrible, you divide the room into 2 halves.

Yes/Yes.

Quite often when you had that situation with the door in the end wall people tended to almost sit inside the space that was defined by one of those projecting screens.

There wasn't much space between projecting screen (or steps) and the far wall.
There weren't many cases where people were on both sides of that screen, or of the change in floor level.

The projecting screen appeared to cut the light out behind the french door and made it a night living room and it changed the conversation pit aspect quite a bit.

I wondered whether the definition of the seating arrangement was clear enough. It seemed to be quite clear looking at those situations where the seating was in the foreground - you know, either with a changing level down the far end or a little subdividing partition. When you could see the group in the foreground you got a very emphatic impression of a seating arrangement whether it was a pit or not, but when it was down the other end either up on stage or on the flat it didn't seem to have quite such a clear distinguishing character. The seating seemed to fade for me then.

Sometimes the whole of the furniture layout appeared far too complex.

The seating didn't clearly show up its distinguishing layout with people sitting on it. When the room was empty, you could see the bank of black seats, with their continuous squab arrangement, contrasting with the single chairs or light tables.

The actors merged with the seating. It was hard to pick the difference in seating arrangement.

I found it really difficult with the narrow partition there.

One end of the room would rate on one end of a descriptive-scale, the other end would rate on the other end of the scale.

You had to take each on its own.

Over 50% of those rooms had no one feeling right through them.

Half of it was inward looking and half of it was outward looking.
RIGHT.

YOU HAVE TO ASSESS THE PART THAT WAS NOT PARTICULARLY INWARD OR OUTWARD LOOKING - A SORT OF KERNEL.

But that was the whole room.

YES BUT EVERY ROOM HAS THAT SORT OF THROW AWAY ASPECT. LIKE A LIVING ROOM - YOU HAVE GOT PLACES THAT YOU KNOW ARE JUST FOR MOVEMENT. BUT THEN THERE ARE THE STABLE USE-SPACES TOO.

Some of the people were not relaxed but it was probably because of the people more than the situation. Some of them knew each other, and the whole thing looked more relaxed.

It is very hard to make an assessment of a room just by looking at a TV screen. We perceive a room by involvement in it.

THAT IS ANOTHER ISSUE I THINK.

If we walked in and sat down and saw how we behaved in it, it would be more realistic.

I think people talking naturally would have added a little bit more reality to it. It gets bloody boring without sound.

Like a TV on the blink!

WHILE WE ARE ON THIS QUESTION OF THE MEDIUM OF REPRESENTATION AND SO ON, DID YOU FEEL IT WAS A STRAIN THAT THE ROOMS WERE IN SEQUENCE, THAT YOU COULDN'T RETRIEVE. WOULD YOU RATHER HAVE HAD A STACK OF PICTURES OR MULTIPLE SLIDES, SOMETHING INSTANTANEOUS WHERE YOU SAW A WHOLE LOT AT ONCE AND YOU HAD THE OPPORTUNITY OF SORTING AS WELL AS SCALING?

No!

I reckon that that would have been just too confusing.
Except for that one where we just changed the seating from one side to the other.

I think one advantage of having a retrievable system is that the first examples could be revised.

I think it would be interesting to see how much less extreme you get as you go along. I know I started off like that too.

Another point about the medium is that there was not much movement. TV is a movement medium. There was no sound, there was no colour. You are more or less stuck with a fairly static black and white situation.

There is an interesting opposition, you have got a terrible sort of stolid experience to watch if you are thinking of it as just a visual experience, as if you are being entertained, terrible! - as you say boring! but at the same time the concentration you need and the scanning effort you have to put into finding out the facts of the room are probably at full stretch - would that be right? The boringness of it is clear if you are looking at it just as a spectacle. But the fact that it is boring - rather similar things one after another - is in a way perhaps aiding you to making decisions. If you had a more vivid and more lively entertainment, do you think you could make consistent judgements?

There would be more information being given to us, the colour, movement, sound.

And you would make decisions easier?

Not necessarily easier but a bit better. I don't know, we are just not getting enough information out of that video screen.

The slides were better. They showed the whole room.

The problem with the video is that it goes narrowly in from the corner and you try and get down to the problem about the whole room, and you think - now how was the room?
WE NEED A WIDER LENS FOR THE VIDEO TO BE COMPARABLE WITH THE
SLIDES FOR SCANNING.

The actors in the room are monitors of the room themselves, they
are reacting to it.

RANDOMLY YES.

We had that one with the living room, that actual living room,
people talking, I don't think it affected my judgement although
we didn't move around, but it just helped atmosphere.

What about that one with the 3 living rooms and as background,
one had the goon show, another had music, and one had a domestic
argument.

Of course, that's going to affect judgements. We would react to
the 'event'.

YOU ARE TALKING NOW ABOUT THE VERACITY OF THE JUDGEMENT. WHAT WE
SEEM TO HAVE IS THIS TREMENDOUS PROBLEM, THIS UNREAL TORMENT OF
GOING THROUGH AN HOUR OF SITTING THROUGH THESE SEQUENCES AND HAVING
TO PLUG THROUGH THIRTEEN SCALES AND HAVING TO ANSWER THE BEST YOU
CAN. DO YOU THINK THAT A SOUND-TRACK WOULD HELP IT?

Yes I do!

IF YOU GO INTO THE 'REAL' ROOM YOU HAVE A DIFFERENT IMPRESSION
COMPAred WITH WHEN YOU LOOK AT A VISUAL SEQUENCE LIKE THIS, AT
ANOTHER TIME, NOT IN THE 'REAL' SITUATION. SO TO THE EXTENT THAT
WE HAVE GOT COMMENTS FROM YOU ON THE TAPE, IT IS GOING TO BE
INTERESTING TO SEE HOW THOSE JUDGEMENTS AND THIS SORT OF FORMAL
PROCESS COMPARE. BUT I AGREE THAT IT WOULD HAVE BEEN BETTER FOR
THE 'REALITY' OF THE SCENE TO HAVE HAD A CONVERSATION THAT WOULD
HAVE SAY COME UP JUST AROUND A TEAPOT, OR WHATEVER, RATHER THAN
BEING FOCUSED ON THE ROOM WHICH WAS A RATHER UNNATURAL TOPIC OF
CONVERSATION.
In the video tape you just lost the whole effect of the ceiling.

**THE LENS ANGLE ISN'T WIDE ENOUGH.**

**QUESTION TWO:** "**WHICH CHARACTERISTICS OF THE VARIOUS LIVING ROOM CONDITIONS DO YOU FEEL CONTRIBUTE TO A SENSE OF CONVENIENCE, A SENSE OF COMFORT, TO A SENSE OF PRIVACY, TO A SENSE OF FRIENDLINESS, AND TO A SENSE OF PLEASANTNESS?**"

What did you mean by convenience?

**THIS IS A GENERAL SORT OF CONVENIENCE, PRACTICALITY.**

All I could think was when you were lying with your legs all sprawled out over the steps whether someone entering the room was going to fall over your legs.

I thought that ceiling was inconvenient, the one where you couldn't walk under it, you know. It had seats all round but if it was an open space you could walk through.

Those three partitions that kept poking out.

**THOSE WERE INCONVENIENT?**

We are getting into a semantic definition of the word convenient.

**IT IS POSSIBLE THAT THE CONVENIENCE ISSUE ISN'T VERY CRITICAL IN A LIVING ROOM, IN WHICH CASE YOU WOULD HAVE BEEN SCORING SOMETHING PRETTY MEDIUM, 3 OR 4 OR 5. THERE AREN'T MANY OCCASIONS THAT WOULDN'T FIT INTO THAT ROOM - UNLIKE INTO A KITCHEN OR A BATHROOM.**

But when you decide on an ideal room you score a one for convenience.
DO YOU?

Yes, well you don't want an inconvenient room do you?

BUT DO YOU WANT IT TOTALLY CONVENIENT? MAYBE YOU DON'T, PERHAPS YOU DO.

Well why not?

WELL IT MAYBE A LITTLE TOO CATEGORICALLY, SELF EVIDENTLY PRACTICAL. IT COULD ALMOST BE CLINICAL BY VIRTUE OF HAVING TOTAL CONVENIENCE.

No, not if all the other things were favourable.

IF IT HAD THOSE TOO, IT MIGHT NO LONGER BE TOTALLY CONVENIENT.

CONVENIENCE? - EASE OF USE, EASE OF CIRCULATION, EASE OF CHANGING THE ROOM TO SOME EXTENT?

That was covered surely in adaptability.

VERY CLOSELY, AS WE SAID SOME OF THESE WORDS HAVE ALMOST SYNONYMOUS MEANING AND THAT'S ANOTHER INTEREST.

- WELL, WHAT CONTRIBUTED TO THE SENSE OF COMFORT?

Seating arrangements.

Distances from one person to another and interactions.

Surface textures and things like that.

WELL THEY WERE FAIRLY COMMON TO THE WHOLE SAMPLE RANGE.

But there were carpets and vinyl textures.

THERE WERE SOME OPEN SEATING POSITIONS VERSUS SOME VERY CLOSED OR ALCOVEY ONES - AND THE IMPLICATION OF HAVING MORE SPACE THAN YOU PERHAPS NEED IN SOME OF THE RATHER SQUARER OPEN FURNITURE ARRANGEMENTS.
I noticed somebody sitting on the floor made the room look a lot more comfortable.

More relaxed but not necessarily more comfortable.

The person didn't necessarily need to look comfortable, but it just makes the room look more comfortable. Makes the person look more comfortable in the room.

You are not necessarily more comfortable in this position but you are more relaxed.

DID THE IMPLICATION THAT YOU WERE WITHDRAWN FROM THE WINDOWS, THE DOORS, - THE OUTSIDE IF YOU LIKE - BY COMING ACROSS AND DOWN SOME STAIRS FROM THAT HIGHER LEVEL, CONTRIBUTE TO COMFORT?

Not for a day room.

THE HEIGHT OF THE WALLS FOR INSTANCE AS AGAINST THE CEILING - DID THEY HAVE ANYTHING TO DO WITH COMFORT. CLEARLY THE FURNITURE AND THE RUGS ARE REALLY POTENT CONDITIONERS OF COMFORT.

I think it has more to do with being relaxed.

The living room is a place where you sit, you don't play golf in the living room, you don't need too much space.

What about the psychological comfort?

I think comfortable is more a physical thing. I think you are talking more in terms of friendly - unfriendly, pleasant - unpleasant, inviting - uninviting and involving or uninvolving, which are more subjective things. I think ceiling slopes are more to do with those things.

There's a whole range of things you did not cover when making the rooms, you could have left bare walls or had walls full of posters - the difference is quite extraordinary. A bunch of young people might have the walls covered in posters or something, but those were fairly blank walls.
WE DELIBERATELY TRIED TO KEEP THE RANGE OF INTERIOR FITTINGS AS LIMITED AS POSSIBLE SO THAT THE WALLS, THE ARCHITECTURAL FEATURES WOULD PROVOKE YOUR JUDGEMENTS.

I kept wanting to answer the cluttered-uncluttered one you used as an example!

IT SHOULD SHOW UP IN COMFORT SOMEWHERE.

- ALL RIGHT. "WHICH CHARACTERISTICS OF THE VARIOUS LIVING ROOM CONDITIONS DO YOU FEEL CONTRIBUTE MOST TO A SENSE OF PRIVACY?"

Those walls.

Detachment from the outside world. Position in relation to the windows, the doors.

Also the space going right through it, seemed more public.

YOU SAW THE FRENCH DOORS AS BEING A SORT OF THOROUGHFARE?

Well, in one it was.

RIGHT WHAT ABOUT FRIENDLINESS - CONTRIBUTING TO A SENSE OF FRIENDLINESS?

You can't divorce them like that I don't think.

In one example, people were leaning over like this to talk, they were obviously too far away in relation to a friendliness situation.

I think an informal room is more friendly than a neatly set up one - you know, just things lying around the place.

YES, AND PERHAPS MORE COMFORTABLE AS WELL AS FRIENDLY?

Yes informality.

When the black seats were lined up down one side and the loose seats were lined up down the other side its unfriendly.
SEE IF YOU COULD IMAGINE THE ROOM WITHOUT THE ACTORS IN IT,
SO THAT THEIR EVIDENCE OF FRIENDLINESS OR OTHERWISE WOULDN'T
BE A FACTOR. YOU COULDN'T RELY ON THE CONVERSATION OR WHERE
SOMEONE SHIFTED THEIR CHAIR TO, OR SOMETHING LIKE THAT. DO YOU
HAVE ANY IDEA OF THE QUALITY OF FRIENDLINESS IN THAT SITUATION -
WHEN THE ROOM IS UNINHABITED? DID YOU THINK OF THE ROOM AS
BASICALLY STANDING FOR THESE SITUATIONS OF FRIENDLY CONVERSATION
OR NOT? DO YOU THINK IT'S BETTER OR WORSE IN CERTAIN CONDITIONS?

It wasn't a solo thing it was a combination.

OH YES, IT'S A COMBINATION.

I think the level of the end of the room when it was higher made
it much more unfriendly, you couldn't approach it.

If you were coming into a room that was an empty standing space,
it would be more welcoming.

Friendly and welcoming are very closely linked, and if you feel
you can go into a room comfortably, and go down a few levels or
something it just feels a bit friendlier.

I think a space being friendly to walk into is different from being
friendly once you get into it. Sometimes a room that is not
friendly to walk into is friendly once you get into it. A very
enclosed space once you're in it is friendly but from the outside
approaching, it seems unfriendly.

YOU SHOULD THINK OF IT, FROM THE POINT OF VIEW OF COMING IN.
FROM THE ARRIVAL VIEW POINT IN THESE IMAGES DO YOU THINK THE ROOM
STANDS FOR SOME DEGREE OF FRIENDLINESS? - WITH THE PEOPLE, BUT
INDEPENDENTLY ALSO? I SUPPOSE WHAT YOU HAVE TO DO IS IMAGINE
WHETHER, ONCE YOU GOT INTO THAT ROOM AND SAT DOWN LIKE PEOPLE DO,
it would become more conducive to friendly conversation or
behaviour than you imagine it would be just standing at the door
looking at this image we see. I DON'T THINK THERE WOULD BE A
MARKED DIFFERENCE REALLY, NOT IN THIS ROOM.
I think there was in those ones that went up and around the corner of the partitions. They felt good to sit in but they looked pretty funny in those projections.

IT LOOKED CRAMPED UP THE FAR END?

Yes it did!

"WELL WHAT ABOUT A SENSE OF PLEASANTNESS?" - THAT'S THE LAST QUESTION.

I think that has something to do with lighting.

PLEASANTNESS COVERS THE BASIC AESTHETIC AREAS - WHAT YOU PROBABLY CALL CHARACTER OF A ROOM. IT'S A VAGUER SORT OF CONSIDERATION THAN ANY OF THE MORE SPECIFIC CONCERNS OF SAY PRIVACY OR CONVENIENCE OR FRIENDLINESS EVEN. IT'S A MORE GENERALISED CONSIDERATION. I THINK ITS WHAT YOU SAW, AS WELL AS, WHAT YOU THOUGHT YOU MIGHT DO ONCE YOU GOT INSIDE WITH OTHER HUMAN BEINGS. IT'S A MORE ABSTRACTED JUDGEMENT, IT'S PROBABLY MAINLY ABOUT AESTHETIC AND SOCIAL IDEAS.

Things like how high the paintings were hung or where the cane chair was.

AND THE PROPORTION OF THE WALLS DEPENDING ON THE CEILING SLOPE OR NOT. WHETHER THERE SEEMED TO BE A KIND OF WHOLESOME RIGHTNESS ABOUT THE LAYOUT OF SEATS. SOME AREAS HAD FAIRLY FORCED SEATING IN SOME CONDITIONS. OTHER CONDITIONS HAD A FAIRLY NATURAL ASSEMBLY OF CHAIRS. PROBABLY NOTHING ACUTELY BAD ABOUT ANY OF THE ROOMS ON THIS CONSIDERATION OR ACUTELY VERY GOOD.
THIS FOLLOWING QUESTION IS ONE WE THOUGHT WAS PRETTY RELEVANT TO THESE ROOMS: "A LIVING ROOM MAY BE DESIGNED TO HAVE SPECIFIC AREAS FOR SPECIAL ACTIVITIES OR TO ACCOMMODATE THEM ALL IN A MORE GENERALISED ARRANGEMENT. WHICH EMPHASIS DO YOU THINK IS PREFERABLE AND WHY, AND HOW DO YOU THINK THEY SHOULD BE ARTICULATED?"

YOU KNOW THE NOTION - YOU HAVE 'AREAS' OR 'ZONES-OF-USE' AND THEREFORE ZONES OF FURNISHING AND FITTING OUT.

I think there is a good range of subjective answers to that question.

OH YES, THIS TALK-OUT IS ALL SUBJECTIVE.

Perhaps they should be tailor-made for each individual activity.

I personally prefer flexibility, you get many different approaches.

A suggestion is tolerable but any physical definition is bad.

THE ROOM COULD ENHANCE YOUR SENSE OF DRAMA, IF IT IS DONE WELL, IF IT MATCHES THE OCCASIONS IT CATES FOR. (WE KNOW WHAT SORT OF DRAMATIC SITUATIONS CAN RESULT). BUT, FOR AN OVERALL SATISFACTION IN LIVING ROOMS (AND THEY VARY SO MUCH) WE THINK THERE IS A CHALLENGE FOR DESIGNERS TO NOT BE TOO EXTREME IN TAILOR-MAKING - PERHAPS EVEN TO MAKE IT A MATTER OF PERSONAL OR FAMILY OR OWNER-IMPLEMENTATION WITHIN A SPACE WHICH IS ARCHITECTURALLY GENERALISED, AND NOT TOO COMMITTAL.

I think it is very important to consider those aspects of activity in any design. You're talking about a family living in there for 10 years not one cold winter's night.

BUT THAT'S NOT THE WHOLE ANSWER BECAUSE WE KNOW THAT PEOPLE TEND TO OWN THINGS OR HAVE THEM MADE IF THEY ARE BUILDING, IN FAIRLY DEMONSTRATIVE WAYS. THEY TEND TO BE FAIRLY COMMITTED TO A WAY OF LIFE, AND MAKE GESTURES ABOUT THAT WAY OF LIFE IN TERMS OF BUILDINGS AND OTHER THINGS THEY OWN, WHICH ARE PROBABLY MORE EXTREME THAN THEY SHOULD BE IF YOU ARE THINKING SANEly AND VERY
OBJECTIVELY ABOUT THEIR WAY OF LIFE OVER A PERIOD OF 10 OR 15 YEARS. BUT WHEN IT STARTS TO WEARY THEM, THEY TEND TO CHANGE IT OR BUY OUT AND GO SOMEWHERE ELSE. THERE'S OBVIOUSLY A RANGE OF SITUATIONS THAT ONE CAN FIND PEOPLE NEEDING, THAT CAN ACCOUNT FOR A WIDE SPECTRUM OF HOUSING DESIGN.

I think an interesting survey could be done about Mr X's houses - see how long people can survive in them before having to change. They are so finicky in minute detail I think I would crack up after 2 years.

He looks at what furniture you've got and designs a place to put the dresser with an inch clearance on each side and there's nowhere else in the house where that dresser will fit.

THAT'S RIGHT.

I wonder how long they last. I'm seriously interested.

I AM TOO.

I think the people that would last there are probably people who are fairly stable.

I think that people with slow movements might get on better. I think this whenever I go to one of his houses. I really feel that you would have to be a fairly slow person otherwise you would be knocking into things.

Too many drinks and you've had it.

A friend was going to have a house designed by him and he went and looked at some of his houses, he just couldn't stand it.

ANYWAY WE HAD A SAMPLE LIVING-ROOM THAT WENT IN FOR SOME OF THOSE EXTREMES. WE HAD THE NOOKINESS AND THE UP-AND-DOWNNESS AND RATHER PRESCRIPTIVE CEILING, (THOU SHALT SIT HERE) - IT WAS TOWARDS THAT PHILOSOPHY, YET WE STARTED OFF IN A FAIRLY BLAND ROOM WHICH WAS JUST A CUBE WITH A WINDOW AT ONE END OR TOWARDS ONE END. YOU COULD OBVIOUSLY SEE A REARRANGEMENT OF THAT IN LOTS OF WAYS.
There are people I know who have actually nothing in their living rooms, just a seat or a table and there are people who put up photos of their great-great-grandmother, or keep a dog in it.

- "DO YOU ASSOCIATE ANY OF THE FOREGOING ROOM CONDITIONS WITH ANY PARTICULAR TYPE OF DWELLING?"

The last couple of rooms with that small corner were just like a bach. Of course everybody said it's a doctors waiting room.

I think it was more like a town house than a house - very much a town house size.

You got the impression that that door went out to a balcony or was it out to the garden.

It was definitely like a ground floor.

When I saw that slide with the ceiling sloping up from the left, I thought it was an attic.

- "LASTLY, DID YOU NOTICE A SEATING ARRANGEMENT THAT YOU PARTICULARLY PREFERRED?" "WHICH INDIVIDUAL SEAT IN IT WOULD YOU PERSONALLY CHOOSE?"

THERE ARE 2 ISSUES, THE SEATING ARRANGEMENT WHICH YOU THOUGHT WAS GOOD FOR A CONVERSATION GROUP LIKE THE SORT BEING ACTED, WHICH IS A GENERAL JUDGEMENT; AND SECONDARY TO THAT, WHICH INDIVIDUAL SEATING POSITION IN THAT SEATING ARRANGEMENT WOULD YOU PERSONALLY CHOOSE AND WHAT CHARACTERISTIC OF THE ROOM MAKES THAT SEATING POSITION SO DESIRABLE?

I personally like sitting around on the various levels of the floor - I'm much happier there than sitting on a specific chair like this, but that's a personal feeling.

I also prefer sitting up against the wall to sitting on those modern chairs.
The various steps and levels seem to encourage people to sprawl over the steps.

I thought they were rather pleasant.

THAT'S AN INTERESTING ONE, WHY DO YOU LIKE SITTING ON STEPS?

Get the best of both worlds.

YOU HAVE SOME OPTIONS: TO GET OUT IF YOU WANT TO, YOU HAVEN'T GOT THE TRADITIONAL CORNER, IT'S RATHER EXPOSED, BUT YOU HAVE A COMMANDING POSITION. YOU CAN BE IN OR GET OUT. IT'S A SORT OF LOW CROUCH, PHYSICALLY ITS NICE TO GET DOWN LOW AND SIT. IT'S VERY INFORMAL.

It's very pleasurable.

The ceilings for example influence seating choice.

I wanted to get in underneath.

It's nice to get under the ceiling.

YOU FELT OPPRESSED, WHEN OUTSIDE LOOKING IN.

I felt excluded rather than oppressed.

WELL WE'VE RUN OUT OF TIME. THESE RESULTS WILL BE ANALYSED AND YOU WILL SEE WHAT KIND OF JUDGEMENTS YOU MADE.
APPENDIX 4

Analysis Procedures applied to Data acquired through Instruments which incorporated the Semantic Differential (from a note by K. Worsley)

A. Multivariate Analysis of Variance:

This type of analysis is a multivariate extension of univariate analysis of variance. Its working hypotheses are the same, but because the multivariate technique treats the several variables (scales) jointly, it can take into account any correlations between the variables. The hypotheses that have been examined in applying the Semantic Differential in this thesis, are straightforward tests of treatment (or design) differences. If there were treatment differences, then the variation in the response to those treatments has been condensed into a two-dimensional graphic representation, based upon the two largest canonical variables, using modified discriminant analysis techniques. This permits an interpretation of the differences between the treatments (designs), in a condensed form. The correlations between the variables indicate their degree of association.

A more detailed explanation of the techniques involved is given below:

The Model

A response by one subject, (S) to one design, (D) on each of the descriptive-scales, is considered as a vector in a multi-dimensional space: the response to the ith scale is the ith component of the vector, and the dimension P, of the space is the number of descriptive-scales used (for example ten or thirteen). Thus the data-set, consisting of many subjects and designs, gives a set of vectors which may be thought of as a 'cloud' of points in P-dimensional space. The following is an example using just two scales:
If we take a single subject and a single design, and (theoretically) ask him to repeat his assessments on all scales, then we assume that the set of vectors from all his responses has a P-variate normal distribution, with a certain mean vector $\mu$, and a certain covariance matrix $\Sigma$. This distribution of vectors can be visualised as a set of points forming a 'cloud', centred at $\mu$, with a P-dimensioned elliptical shape which is determined by $\Sigma$. The elements of $\Sigma$ are in fact functions of the correlations between the variables. For example, in two dimensions:
In the above distribution, we may say that 'Friendliness' is correlated with 'Goodness'. Note that, if we draw a contour map of the density of points in the 'cloud', then we find that the contours all have the same elliptical shape, and increase in their density towards the centre.

Next, we assume that Ε is the same for all subjects and all designs, but that the centre μ may be different. Taking a single subject, this means that his responses to the different designs, may themselves be different, on the average, for one or all of the variables, but that the correlations of his responses are the same. For example, we may have this:

---

**Hypotheses**

We first set up the most complicated - that is the most free - model, and test it with a series of hypotheses, to see if it can be simplified or restricted. In order of increasing complexity these hypotheses are:

**Hypothesis 1**: "There is, in fact, no difference between the mean points of the 'clouds' for either subjects or designs". For example:
Hypothesis 2: "There is no difference between the mean points of the 'clouds' for the subjects, but there is a difference between them for the designs". For example:

Hypothesis 3: "There is no difference between the mean points of the 'clouds' for the designs, but there is a difference between them for the subjects". For example:
Hypothesis 4: (A combination of 2 and 3)

"For each combination of subject and design, the mean point of the 'cloud' is the sum of an effect due to the subject, plus an effect due to the design".

For example:

\[ \begin{align*}
 +S1/D1 & + S2/D1 \\
 +S1 & + S2 \\
 +S1/D2 & + S2/D2
\end{align*} \]

Results:

In the results of all of the surveys involving the semantic-differential technique, it was found that:

1. The assumption that \( \bar{E} \) is the same for all 'clouds' of points was justified.

2. Hypothesis 4 - a combination of 2 and 3 - was found to hold good.
B. Graphical Output (Discriminant Analysis)

In order to visualise the results, the following transformations were made:

1. Because there was an effect due to the subjects, then this effect was removed by subtracting each subject mean, or, his bias, (over all the designs), from each subject response. The resulting clouds show no subject effect.

The mean for each subject, over all designs, is now zero. That is, the bias due to each subject has been subtracted out.

2. The P-dimensional space was transformed by a linear stretching or compressing along the axes of the average design 'cloud' of points, so that all the 'clouds' were then nearly spherical. For example:
3. The resulting 'cloud' centres are regarded as points that, themselves, form a 'cloud'. For example:

Furthermore, the P-dimensional space is rotated so that the longest axis of the 'cloud' becomes the horizontal axis of the graph and the next longest becomes the vertical axis. (If desired, the third longest axis can become the 'depth' axis, normal to the plane of the graph). For example:
4. The original axes, or descriptive scales, can be redrawn using the 'neutral' response score of 4 to each descriptive-scale as an origin. For example:

5. The original 'cloud' of points can be recorded, for reference, as a circle with a radius \( r \), determined so that, on the average, 50% of the points of the 'cloud' fall within this circle.

Alternatively, the variation of the means for the designs can be recorded in a smaller circle with a radius \( \frac{r}{\sqrt{n}} \) (where \( n \) = number of subjects) so that 50% of the means for each design will fall within this circle (theoretically).
Interpretation

This graph represents the maximum amount of variation between the designs. Expressed as a percentage, this variation is the ratio of the lengths of the two longest axes of the ellipse, to the sum of all the axes of the complete ellipse. Then:

1. The distance between any two designs may be seen as a measure of their 'separateness' as perceived by the subjects. Here, the '50% cloud' provides a sort of scale for measuring this 'separateness'.

2. The length of an original axis, or descriptive-scale, in the plane of the graph, indicates how important that descriptive-scale was in determining the differences between the designs.

3. The projection of a design onto an axis, or descriptive-scale, will approximate the original measurement of that design on that descriptive-scale.
APPENDIX 5:

An Interpretation of the Town Planning concept of 'Amenities' and its attributes of 'Pleasantness', 'Harmony' and 'Coherence'.

ARCHITECT
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26th September 1977

IN THE MATTER OF : The Town and Country Planning Act 1953 and Amendments

AND : The City of Wellington Operative District Scheme

AND : Proposed Change No DSC 118/1

RE : Nauranga Park

AND : An Appeal Lodged Under Section 26(1) by the AMP Society

STATEMENT BY : Peter John BARTLETT
1. **INTRODUCTION**

1.1 Name: My name is Peter John BARTLETT.

1.2 Qualifications: I hold a Bachelor's Degree in Architecture from the University of New Zealand. I am a Fellow of the New Zealand Institute of Architects and an Associate of the Royal Institute of British Architects.

1.3 Experience: I further studied architecture in Europe and the United Kingdom under a one year post-graduate Bursary awarded by the French Government in 1953. I designed large-scale reconstruction projects in France during the ensuing three years. I have been in private practice as an architect in New Zealand since 1957. During this period I have won a housing competition (1958), two national design awards from the New Zealand Institute of Architects (1968 and 1975) and the Inaugural Award for environmental design from AHI Fibreglass (1975).

I have taught architectural and urban design theory and practice at the University of Auckland School of Architecture since 1964 and conducted research there since 1968 in the field of human response to architectural form and space, especially to its aesthetics and its meanings.

I am Professor of Architectural Design at the School of Architecture, University of Auckland.

1.4 Purpose of Evidence:

This evidence will seek to assert that the implementation of the AMP Society's proposals for the Special Development Zone on the South Bench based upon the limits of building envelope and traffic generation (but not the limits of office space) already approved by the Wellington City Corporation will enhance the amenities of the area. Furthermore it is asserted that this enhancement will be significantly greater and more general than that which would otherwise result from proposals embodying the restrictive limits of office space now included in the proposed scheme change and amendments of the Wellington City Corporation.

.../2.
2. **CRITERIA OF EVALUATION**

2.1 In reaching an evaluation of the development proposals in terms of the stated purpose of this section of evidence, it is necessary to examine the concept "amenities" referred to in Section 18 of the Town and Country Planning Act, which states:

"...every district scheme shall have for its general purpose the development (and where appropriate the redevelopment) of the area to which it relates, in such a way as will promote the health, safety, convenience and the economic and general welfare of the inhabitants and preserve and enhance the amenities of the district". (emphasis added)

The "amenities" are taken to be those matters which make up the pleasantness, harmony, and coherence of the environment concerned. Moreover, these three components of the concept "amenities" are, I believe also included in the constituent components of the concept "general welfare" since they have been isolated in a number of semantic research findings as key attributes of users' environmental satisfaction whether that satisfaction has been judged in terms of the general functional and practical performance of the surroundings or in terms of their aesthetic effects. Thus I think enhancement of "amenities" may be taken to contribute significantly to "general welfare" too.

2.2 Pleasantness:

User studies involving a wide range of adjectival scales aimed at the identification of environmental meaning have been carried out in Britain, the U.S.A. and by myself here in New Zealand.

These researchings have sought to identify amongst the adjectives commonly used by people at large in describing their surroundings, the principal components of meaning and of satisfaction attributed to various built and natural environments.

These principal components or dimensions of meaning and satisfaction are identified by a survey technique known as the Semantic Differential and by a statistical procedure known as Factor Analysis.

Findings show "pleasantness" to be the dominant component of respondents' concern in judging a wide range of environments both interior and exterior.

"Pleasantness" is a keyword amongst a major group of descriptive words making up this "pleasantness" component. This component comprises words like "good", "interesting", "beautiful", "subtle", "impressive" and "lively". Analysis has also shown "pleasant" to bear a strong relationship to a "friendliness" component comprising words like "welcoming", "informal" and "familiar".
Thus the "pleasantness" component of amenities can be interpreted as comprising a dominant aesthetic tone reflecting agreeable sensory impressions and experiences as well as agreeable implications of inherent activities inferred while at the same time suggesting a degree of familiarity, informality and welcome.

2.3 Harmony and Coherence:

The other two components of "amenities", viz. "Harmony" and "Coherence", again prove to be consistent ingredients of respondents' concern about environments as revealed in the research findings previously referred to.

However, they are markedly subordinate to the "pleasantness" component, varying between one half and one quarter of the judged importance of the more dominant concern of "pleasantness", depending on the type of environment being judged. Moreover, they tend to be used by respondents in a way which combines them into a single component.

"Coherent" is the key word amongst a small group of descriptive words making up this "coherence" component. Other words in this group are: "tidy", "stable", "harmonious" and "simple".

Thus the "coherence" and "harmony" component of amenities may be interpreted as comprising a balance of concerns for (a) structural stability, and/or material integrity, (b) operational tidiness and/or functional clarity, and (c) an aesthetic orderliness and/or harmony of formal composition.

While under (c), an aesthetic orderliness or harmony of simple character fits consistently into the "coherence" component, it can be seen that in cases of greater complexity and subtlety this "harmony" ingredient could relate more strongly to the "pleasantness" component than to the "coherence" one.

2.4 Special Considerations:

Further to the above criteria concerned with "amenities" and to a lesser extent with "general welfare", there is the need for a thorough examination of the nature and extent of the environment to which these amenities and general welfare pertain.

The importance of the Nauranga Park site, especially the South Bench, is testified to in other statements. This importance can be plainly seen to arise from:

.../4.
2.4 continued...

(a) The site's nodal position with regard to movements between Wellington City, the Hutt Valley, and all suburbs and regions to the north accessible via the Nauranga Gorge.

(b) The site's visual importance as an accompaniment to the geographically dramatic experience of landforms and water while entering and leaving Wellington either via Highway no. 1, or via the Shipping lanes.

(c) The site's social and symbolic importance in offering the only occasion for building a suitably scaled gesture of urban importance at the place of arrival and indicative of the city's character and concern for the manner in which its visitors are welcomed and guided through its principle entrance.

Thus in the light of this view of the site's three dimensions of unique importance, I believe that the environment to which the amenities and general welfare pertain must also be held to envelope these three dimensions of site importance. Each and every modification to the site whether by building, landscaping or public works should be evaluated in terms of its effects upon the environment seen in at least these three dimensions. In other words the City of Wellington can be seen to hold a "contract" of unusual significance with Nauranga Park, in pursuing the enhancement of that locality's environmental amenities along these three dimensions: circulatory, visual, and symbolic.

These three "environments" overlap but each involves spatial extensions, communities of perceivers, and conceptual frameworks which while differing between themselves, none the less all stretch far beyond the boundaries of the two Nauranga Park sites.

Similarly, the evaluation of amenities and general welfare will not be adequate unless pursued far beyond the site boundaries and with respect to these wider environments and awarenesses.

.../5.
3. DESIGN APPRAISAL

3.1 Building Uses:

Considered in the wider urban-scaled environments outlined in 2.4 Special Considerations, the pursuit of an enhancement of amenities and general welfare at Nauranga Park leads, I believe, to a richer more urban mixture of uses than is currently permissible. The developed sites must be seen to be accountable in the mixture of uses they support to those three dimensions of urban environment which pivot around the sites.

Predominantly warehouse and light-industrial uses are clearly embarrassed by this challenge of regional accountability.

Again, in wishing to preserve or enhance the "pleasantness" of the developed site, a variety of uses is preferable especially those uses which are relatively familiar and of immediate relevance to the public and which generate interesting or delightful architectural character and user activity.

Furthermore, the resulting built environment for a maximised variety of occupancies is potentially more aesthetically pleasing, lively and subtle.

Hence, if these criteria associated with pleasantness are adopted in assessing development projects, I consider that the presently permitted balance of uses on the South Bench is over-restrictive and banal.

As to the enhancement of the "coherence" and "harmony" of the developed site in its environment, in so far as they are influenced by building uses, I suggest that these criteria will be best met by permitting a varied mix of activities, rather than the predominantly industrial range now permitted.

For it is by enriching the mixture of uses that the character and public experience of the Nauranga Park development can be made more appropriately urban and thus meet the responsibilities that this site bears as a coherent introduction to the city. In other words this introductory modal position I think implies a concept for development which holds that the realisation of coherence and harmony be achieved in terms of the uses found in the wider urban environment to which it forms the entrance.

3.2 Building Design:

With respect to the wider urban-scaled environments outlined in 2.4 Special Considerations, the designed complex should clearly be expected to embody in its form and character, the following attributes:

.../6.
(i) A landmark in support of the orientation and way-finding needs of the travelling public.

(ii) A social gesture of public urban scale indicative of appropriately varied urban activities accommodated within it, and indicative also of the significance of this welcoming gateway into the life of the Wellington Urban area.

(iii) A cultural symbol of Wellington's landform and built-form identity generously conceived, built and inhabited to convey infunctional and aesthetic experiences, an emphatic statement of what being in Wellington is about.

In assessing building design at the South Bench, against the various criteria which make up the component "pleasantness", key characteristics of design to be expected will be those of formal and spatial beauty, interest, liveliness, friendliness and impressiveness.

I believe the proposed approved development incorporating a series of tower pavilions upon a varied podium all related dynamically to the surrounding landforms, views and traffic routes, has the potential to achieve these characteristics provided the occupancies and uses are appreciably elaborated to take advantage of the multi-storey accommodation and to authenticate the urban activities wisely implied by the building forms.

These forms and their controlling building envelope have, I think, an appropriate measure of heroic scale, generosity of bulk and intricacy, and a responsiveness to the dominating land, sea and city scapes which relate to them, to provide a well intended and pleasant introduction to urban Wellington.

With regard to the "coherence" and "harmony" of the South Bench building proposals, I consider that the architects have shown uncommon skill in site layout, formal expression and composition, spatial and traffic dynamics, and landscaping all of which have been forthrightly considered and managed in their efforts to integrate the development into its environment in a coherent and harmonious way. I believe a generous and splendidly appropriate architectural statement is evident in the design proposals.

They appear to have reached a concept wherein the regional setting of the site, the significance and meaning of its role in the functioning of the urban area, and even some of the characteristic fabric and style of Wellington City itself have been either expressed or integrated into the development, and thus make its coherence and harmony with that wider context inevitable and real.

.../7.
4. CONCLUSIONS

In summary it is strongly held that the South Bench site shoulders a very great responsibility in matters of amenities and general welfare with respect to the Wellington region; that except for the approved provisions for building bulk, location and envelope, the Wellington City Corporation's proposals for the site especially its restrictive policy on the range of permitted uses, is in marked conflict with that responsibility in matters of amenities and general welfare.

Furthermore, it is asserted that the proposed building design concept for the South Bench is a highly commendable one in terms of its enhancement of the amenities and general welfare of the area, but that without a significant easing of the restrictions on office use currently imposed, this concept will be unrealisable.

Moreover, it is asserted that a simpler and less lofty form of development accommodating only the narrower mix of uses permitted under current restrictions will fall well below the standard potentially set by the proposed design and use mix, as far as enhancement of the amenities and general welfare of the area are concerned.

P.J. BARTLETT


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