

The Architectural Properties of the Home

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The symposium on the 23rd and 24th of April took place quite appropriately just during the final portions of my thesis work. I completed the research in the beginning of June and defended the thesis on the 2nd of October. The text which I presented at the symposium dealt with axiality in dwellings. It was a small section taken out of the ongoing thesis work. During the symposium, I wanted to test the relevance of my work and to hear commentary from colleagues in research.

The text caused a lively and interesting discussion in the symposium group. I was given a good deal of criticism as well as worthwhile points of view which I was gratefully able to make use of in the thesis work. Among other things, the difference between the concept of value and the concept of characteristic or property was discussed. We talked about the pros and cons of the qualitative research method with which I worked in comparison with the statistically based research methods with which several of the other symposium participants worked. I was also given worthwhile comments regarding unclear details in the illustrations.

At the same time, I found that in many ways it was difficult to discuss the characteristic of axiality alone, in as much as the other participants were familiar neither with

the complete material nor with the context within which my text ought to be read.

Now, when the symposium texts are being compiled for publication, it therefore seems to be problematic to once again present only a disconnected piece taken out of the thesis. In order to avoid the problem concerning understanding the whole, I have chosen to change the text considerably. The present text amounts to a summary of my thesis, *The Architectural Properties of the Home*.

The text is linked in several ways to the symposium's theme of architecture, management and renewal. For example, the architectural quality of apartments and of residential areas is significant in relation to demand and to the willingness of people to move to newly built dwellings. Also those who continue to live are influenced by the architectural experience the residents have in a broad meaning. In a corresponding way, the architectural quality of the dwellings ought to be a question for managers and owners, both in terms of building technology and as immeasurable values linked to measurable factors such as continuing residency, disposition to move, and willingness to pay. The article can be seen as the foundation for the discussion about the connection between management and architectural quality.

Problem Description

The architecture of the home can be regarded as the combined result of measurable practical and functional properties and non-measurable aesthetic properties. Since the unparalleled building boom of the 1960s, our image of residential architecture has been dominated by its functional and practical aspects, and the architectural design of the home has been widely neglected. Many architects today are therefore unaware of the importance of a holistic approach to residential architecture and of the significance that non-measurable aesthetic properties have for the home and its residents.

The measurable functional properties of the home include everything we can physically delineate, measure, and quantify. Its practical properties have been carefully described in the many housing research projects carried out in Sweden since the 1930s. The non-measurable properties of residential architecture, on the other hand, have not yet been given the same attention by researchers. These are the qualitative aesthetic and symbolic properties that are critical to our perception of the home.

The purpose of this thesis is to identify, describe, and analyze the non-measurable architectural properties of the home, to demonstrate the role these properties play in the home, and to describe their influence on residents' perceptions of their homes. By conceptualizing these issues, the study also intends to contribute a greater clarity to the discussion of the architecture of the home.

This study is based on the following questions:

- What are the non-measurable properties of residential architecture?
- How do these non-measurable properties appear in the home?
- What spatial variables and relationships influence our perception of these properties?
- What is the underlying symbolic significance of non-measurable architectural properties for residents?

These four questions are considered against the background of a description of the historical development of Swedish housing and against my own experiences in the field of residential design during the 1980s and '90s.

The historical description concludes that there has been a change in the relationship between the measurable and

non-measurable properties of the home. The preponderance of formal properties in the well-to-do 19th-century home was supplanted in the early Modern era by a balanced integration of measurable and non-measurable properties, and this balance gave way to an overemphasis on technical and functional properties beginning in the 1960s.

The Field of Research

Until the 1970s the focus was primarily on the functional properties of the home. The results of this extensive research were gathered in books of industry standards – first in *Svensk byggnorm* (*Swedish Building Standards, 1985*), then *Nybyggnadsregler* (*Regulations for New Construction, 1991*), and later *Bostadsbestämmelser* (*Housing Guidelines, 1997*).

During the 1970s, the methodological emphasis of architectural research shifted from quantitative functional analyses to increasingly qualitative analyses. Architectural researchers were inspired by ethnological and sociological research methods and greater attention given to residents' perception of the built environment. The research of this period provided valuable information about residents' perceptions of their homes and revealed many shortcomings in newly-constructed housing developments.

Several of these studies gave methodological support and inspiration to my research. One is a 1986 study of the Berglärkan housing block in which a sociologist and two architects together investigated residents' perceptions of the housing development in relation to specific architectural properties in the apartments. The three researchers relied on qualitative interviews to interpret the residents' perceptions of their homes. The fruitful interaction between architects, the residents, and their apartments allowed the researchers to get close to the non-measurable properties of the home.

Several studies from tangential fields have given greater depth to the picture of the significance for residents of their perception of architecture. Four that have been particularly important to my interpretation and analysis of the case studies are Christian Norberg-Schulz's *Mellom jord og himmel* (*Between Heaven and Earth*) (1978); Gaston Bachelard's *The Poetics of Space* (1964), (1958); Dom Hans van der Laan's *Architectonic Space* (1983) and Magnus William-Olsson's *Obegränsningens ljus, (The Light of the Infinite)*, (1997).

The Research Method

My analysis is based on four case studies of apartments, on interviews with the architects and residents of those apartments, and on my own arrangement, interpretation, and reconstitution of this data. The study deepens and expands the implications of several well-known and widely-used concepts. My work is a tentative attempt to develop a research method that pays particular attention to those aspects of science which are unique to the field of architecture. The information on which it is based is derived from empirical social studies in the form of resident interviews and from observations of empirical conditions and relationships relevant to the architecture.

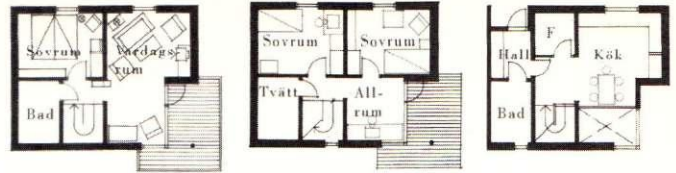
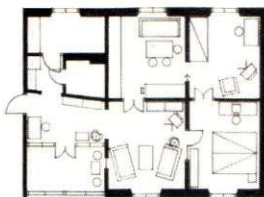
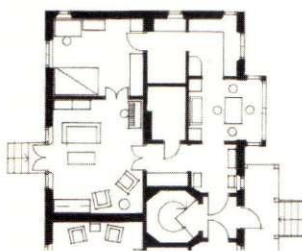
The study has been inspired by the qualitative methods advanced in the social sciences and the humanities in which the development of concepts is of great importance. Glaser and Strauss's *grounded theory method* has had particular significance for my approach. I have attempted to reinterpret the dimensions with which they worked as *property fields*. These fields are complexes of details, properties, and distinctive characteristics that I attempt to describe in the analysis of each case study.

The gathering of empirical evidence has been an important part of my research. The material in the case studies has been treated in three phases: gathering, compilation, comparative analysis, and conclusions.

I have chosen four apartments as research objects in a series of case studies.

- Case Study Lindholmen is a one-bedroom apartment with a floor area of 69 m² built in 1992 on Lindholmen in Gothenburg. The architect was White arkitekter through Armand Björkman.

- Case Study Stumholmen is a two-bedroom apartment of 82 m² in the Västra Kungshall complex on Stumholmen in Karlskrona built in 1993. It was designed by Brunnberg & Forshed Arkitektkontor through Kjell Forshed.



Planer skala 1: 400

- Case Study Hestra includes apartments in the Nielsen block of the Hestra housing development in Borås built 1992–3. The architect was the Danish office of Vandkunstens Tegnesteue through Jens Thomas Arnfred.

- Case Study Norrköping is a 98 m² three-bedroom apartment in the Vattenkonsten block in Norrköping from 1987 designed by Bengt Lindroos.



These four apartments are included in many architects' repertoires of prototypes. These homes have given their residents opportunities to establish deep relationships, meaning, and quality of life. An important aspect of my research has been to critically examine the content in these presumed exemplary works. I chose to limit the scope of the study to a few objects that are particularly rich in content in order to provide a suitable basis for in-depth analysis. Not the number but rather the character and quality of the observations have been decisive for the results of my research and the conclusions to which it leads. I have chosen a qualitative methodology in order to allow me to identify non-measurable architectural properties. It has not been my intention to describe any quantifiable aspects of those properties. The qualitative interpretative method was also appropriate given that an important part of the study was my analysis of the residents' perceptions of non-measurable properties in residential architecture.

My research method developed during a number of preliminary studies. The empirical material is taken from structured in-depth interviews and analyses and set in relation to relevant literature. My method has developed successively through the interplay among

data collection, observation, literary studies, seminars, and analysis. The study has also given me a better understanding of and insight into the architectural properties of the home.

Property Fields – identification

What are the non-measurable architectural properties of the home? Residential architecture of high quality standard is described as maintaining a balance between measurable and non-measurable properties. Seven distinct fields of non-measurable architectural properties are identified and described. Each field is presented in its historical context and in the light of relevant theories. The seven fields of properties are:

- Materials and Detailing
- Axiality
- Enclosure
- Movement
- Spatial Form
- Light
- Spatial Organization

The discussion of the first field explores the significance of *materials and detailing* to residents' perception of their homes. Their ability to perceive authenticity and care in a building's materials and detailing is shown to be important indeed, and can be a catalyst for the process of appropriation of the home. Residents can more easily establish a relationship to materials which they perceive as authentic. The authenticity of a material depends upon its origins, finish, and use. As an example, the study examines a floor of wood, a material whose origins in the forest and the individual tree are readily comprehensible, whose production and finish from milling and dressing to the nailing of the boards we can easily understand, and whose surface becomes gradually marked with traces in which we can read the history of its use.

The second property field is the *axiality* of the home. Directional axes help to relate the spaces in the home and make them easy to survey. They connect important points in the apartment in meaningful patterns. Axiality was a common feature in well-to-do homes of the 19th century. The Arts and Crafts Movement and Functionalism changed the spatial organization of the home, replacing directional

axes and axially-aligned sequences of spaces with a system in which the principle rooms of the home were reached from a central hall or circulation space.

The third field, *enclosure*, describes the open or closed character of a space. In Classical architecture each room is clearly enclosed, while Modern space strives for openness. An enclosed space holds one's attention in the room, while an open space invites connections to its surroundings. Enclosure is important to the relationship between the interior, private space of the home and the public, urban and natural environment outside.

The fourth property field is *movement*, an important element in the perception of residential architecture. Some movements stem from purely historical experiences, and for some movements our perception of the space depends upon our experiences of other spaces. Certain details and building elements are symbolically associated with movement, such as a stair. Movement can also be induced by attracting or repelling forms and by contrasting levels of light.

Spatial form, the fifth field, encompasses the form of a space in plan and section, and its size in area and volume, but also the relatively static or dynamic character of the space. Spatial form has been deeply influenced by the standards for proportioning rooms developed during the Renaissance, which attributed higher aesthetic value to certain forms and proportional relationships. The spatial forms of post-war architecture have been generated by construction regulations and housing standards.

The sixth property field is *light*. Historically, we have striven to maximize the amount of daylight in the home. The housing standards developed in the 1940s established the quantity of daylight required for a home. The Nineties have seen the beginnings of a discussion of the quality of daylighting in the home. There is a new awareness of the importance of the articulation of daylight in significant details such as window moldings and window niches. Light has been a central theme in the work of many artists. The architectural spaces in the paintings of Danish artist Vilhelm Hammershøi are filled with a concentrated, dense light, and make a clear distinction between direct sun and the reflected daylight of a window niche. Architects such as Jean Nouvel and Henning Larsen have explored in their work the path of daylight into the interior of a building. Nouvel's multi-layered vitreous membranes and Larsen's

rastered facades momentarily capture the sun at the building's surface and give a veiled quality to the interior lighting.

Finally, the seventh property field is *spatial organization*. This field includes the schematic layout of spaces and circulation patterns, but concentrates on the juncture between the interior, private realm of the home and the public space outside. The opportunity for residents to establish their own territory is critical to their appropriation of the place. The sense of security in the private interior of the home is a precondition for identification and territoriality in the public realm that surrounds it. The purpose of appropriation is to infuse the act of dwelling with identity and meaning. Proximity to nature and the relationship between the home and its site are important aspects of territoriality.

Case Studies

How do non-measurable architectural properties appear in the home? Architectural analysis of each case study allows the fields of characteristics to be described and clarified in concrete contexts.

Case Study: Lindholmen

Case Study Lindholmen is a one-bedroom apartment with a floor area of 69 m² built in 1992 on Lindholmen in Gothenburg. The architect was White arkitekter through Armand Björkman.

The use of materials and the detailing of the Lindholmen apartment is both traditional and typical for its time.

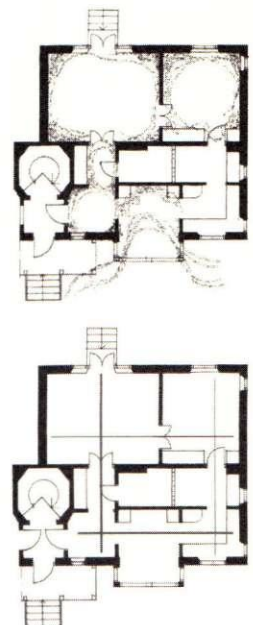
It is organized around two primary architectural axes and two secondary axes. The long main axes extend through several rooms, connecting the apartment's important rooms through broad openings.

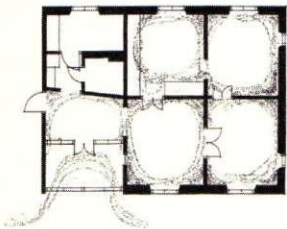
The rooms on the street side of the Lindholmen apartment are more enclosed than those toward the rear. There are but a few small openings toward the street. The courtyard-facing rooms have a more open character, and are integrated with one another through wide openings.

There is a circular movement through the apartment, and a movement from darker to lighter areas. The smaller rooms can be comprehended as one walks through them, while the larger require more time for a proper overview and spatial orientation. This difference in tempo gives the apartment's movement a rhythmic articulation.

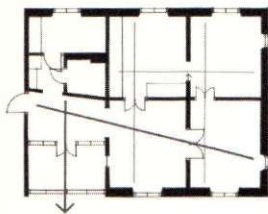


Case Study: Lindholmen
Above: View from Verkmästargatan
Central: Enclosure 1:400
Below: Axiality 1:400





Case Study: Stumholmen
 Above: View from South
 Central: Enclosure 1:400
 Below: Axiality 1:400



The spatial forms are those of the Functionalist apartment's standardized room sizes. The smaller rooms are nearly square in plan, while the larger living room is rectangular.

The daylighting of the apartment dramatizes the distinction between the more private and the more public spaces. The least private, the dining room, is the most light-filled; the dimmest space is the bedroom, where privacy is most important.

The spatial organization of the Lindholmen apartment, particularly the relationship between the interior and exterior, is extremely important to the residents' appropriation

of the place. The openness of the dining room toward the rear courtyard allows residents to orient themselves in the boundaries of the exterior territory from the relative security of the home. Here they can also see and be seen by their neighbors. The site planning allows residents to establish their territory in stages, gradually identifying first with the courtyard's smaller semi-private outdoor rooms, then with the courtyard space as a whole.

Case Study Stumholmen

Case Study Stumholmen is a two-bedroom apartment of 82 m² in the Västra Kungshall complex on Stumholmen in Karlskrona built in 1993. It was designed by Brunberg & Forshed Arkitektkontor through Kjell Forshed.

The materials and detailing of the Stumholmen apartment express care and authenticity in many ways. The pine floors in four of its rooms, the blue tile floor of the loggia, the round window, and the plaster ceiling rosettes are all details that residents appreciate.

The apartment has four architectural axes, a longitudinal main axis, two transverse secondary axes, and a longitudinal secondary axis. This system of axes is complemented by a powerful direction from the hall through the glazed loggia toward the sea.

The open spaces of the apartment are the hall and loggia. Floor-to-ceiling glazing open the rooms and allows for spatial integration. Interior and exterior spaces combine. The openness of the hall and loggia is contrasted by the greater enclosure of the living room, kitchen, and bedroom. The thresholds in the doorways and the lintels above them, the muntins of the divided-light windows, and the downward folding of the white ceiling surface about the tops of the walls clarify the spatial forms, making them easy to read. Door and window openings are symmetrically-placed on walls, giving the rooms strong corners and contiguous wall surfaces.

The Stumholmen apartment is built on a circular movement. The progression through identically-shaped rooms has an even tempo. In addition, there is an architect-choreographed movement from the gloom of the stairwell toward the light-filled loggia.

The apartment's spatial forms are six nearly square rooms. Three of the squares are either divided into smaller spaces or articulated by permanent furnishings. The remain-

ning three are rooms of unusual size, compared to conventional housing for an apartment.

The character of the daylighting varies from room to room, the loggia and hall the most well-lit. The windows have molded frames and casements are set in deep niches, articulating the incoming daylight and creating an elaborate play between light and shadow.

The spatial organization of the Stumholmen apartment differs from Functionalist prototypes in its circular integration, the generality of its rooms, and the direct circulation between adjacent spaces. This organization has certain similarities to traditional housing types such as the double row house. The residents are free to individually determine the use of three of the apartment's rooms. Their generality and the flexibility afforded by the spatial organization provide the conditions for each resident to form personal interpretations of the dwelling situation.

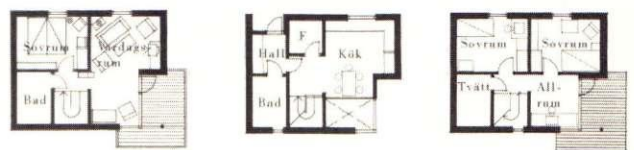
The boundary between private and public is unclear. Nothing on the exterior gives a clear indication of belonging to either the residents or the public sphere. Territorial definition is inhibited by a master plan that precludes semi-private boundary zones and other territorial markings.

Case Study Hestra

Case Study Hestra includes apartments in the Nielsen block of the Hestra housing development in Borås, built 1992–3. The architect was the Danish office of Vandkunstens Tegnestue through Jens Thomas Arnfred.

The residents of the Hestra apartments have a conscious relationship to the materials and detailing of the home. Large, unusually-shaped windows, balcony openings, and pitched ceilings are some of the details of which residents are most fond. The many and unusual details are seen as indicative of care taken for the residents' interests. For some, the conscious simplicity of the detailing has become symbolic of their own particular form of housing and an integral part of their lifestyle. The unusual choice of materials and the challenges to standardized architectural detailing have an expression the residents perceive as authentic and appropriate.

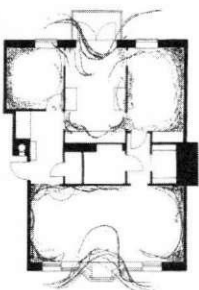
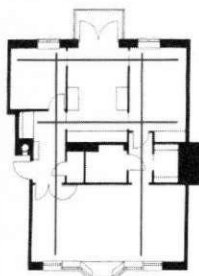
An opening in the second floor connects the rooms of the two levels in a vertical axis. There is a great contrast between the open and closed spaces, the most open being the void in the second floor. The apartment is ordered by a



Case Study: Hestra
Above: View from South
Below: Ground floor, first floor and second floor



Case Study: Norrköping
 Above: View from Verkmästargatan
 Central: Axiality 1:400
 Below: Enclosure 1:400



movement from darker, enclosed rooms toward open, light-filled spaces that seem to occupy the border region between the interior and exterior.

The spatial forms adhere to the prototypical Functionalist apartment's standard rooms. Some of the rooms share a proportional similarity, so that some smaller spaces have the same proportions as larger spaces.

The Hestra apartment is filled with daylight, and its unconventional fenestration creates a dynamic play of light through the apartment. There is nonetheless a gradation in the intensity of daylight, with the private rooms more dimly lit than the more public rooms, and the most light of all in the second-floor opening.

The apartment bears many of the features of the prototypical Functionalist home. There is plenty of light and air. The organization of the floor plan is based on a radial circulation system by which the principal rooms are reached only from a neutral central space. The stair leads up to a small upper hall with access to each of the second-floor rooms. The buildings that make up the Hestra development are carefully fitted into the forest landscape, and arranged to surround open courtyards. There is a strong connection between the buildings and the character of the place. The site planning provides clear boundaries for various territories. This allows residents to gradually identify with the environment surrounding the home, establishing a sense of territoriality in stages. The sensitive intrusions on the natural landscape and the preservation of clear traces of the history of the site are critical to the process of appropriation by the residents.

Case Study Norrköping

Case Study 4 is a 98 m² three-bedroom apartment in the Vattenkonsten block in Norrköping from 1987 designed by Bengt Lindroos.

The subtle treatment of materials in the Norrköping apartment is, paradoxically, both traditional and typical of its time. The materials play a subsidiary roll in the residents' perception of the home. The bay window in the living room, however, is a welcoming and inviting detail that proven extremely important to the residents.

There are two transverse and two longitudinal axes in the apartment. The transverse axes reach from facade to facade, from light through the interior gloom and into the light

again. There are two different kinds of longitudinal axes on the courtyard side of the apartment: one toward the interior and one along the light-washed inside surface of the facade.

Characteristic for the apartment are the clearly enclosed rooms. The rooms toward the street are somewhat more open than those toward the courtyard. They all have many enclosing attributes such as clearly-defined corners, symmetrically-placed openings and broad, contiguous wall surfaces. Two large openings provide a powerful contrast to the enclosing character of the rooms: the living room's bay window and the kitchen's wide balcony door.

There are several different movements through the apartment. There are different opportunities for circular movement, and the movements along the directional axes have various rhythms depending upon the size and lighting conditions of the rooms through which they pass. The circulation system of this apartment also shows the influence of a traditional conception of the ideal representational home.

There are contrasts between the indirectly-lit central parts of the apartment – the hall and corridor – and the sunlit rooms along the facades. A welcoming movement beckons from the entrance hall to the living room, from the dim core of the building toward the light-filled space of the periphery.

The square plays an important role in the formal composition of this apartment. The living room is a double square. The smaller bedroom is square, and the larger bedroom is formed by the addition of two small squares to a larger square.

The spatial organization of the Norrköping apartment has certain similarities to the 19th-century respectable middle-class home. It is divided into three longitudinal zones: one along the street, one through the center, and one along the courtyard side. There are axially-aligned sequences of rooms and opportunities for impressive movements and formal entertaining. At the same time, however, the apartment satisfies the requirements for circulation and functionality that characterize the prototypical Functionalist home. The hall, for example, provides a neutral point of access to bedroom, kitchen, and living room. The building has a decidedly urban character that distinguishes it from the other case studies. There are no signs of resident territoriality outside of the individual apartments.

Property fields – in-depth description

What spatial variables and relationships influence our perception of the non-measurable properties of residential architecture? What is the underlying symbolic significance of these properties for residents?

The seven property fields cannot be quantified or unequivocally defined. The criteria for the way in which they influence our perceptions are qualitative. However, the symbolic value they create for residents can be described by analytic comparisons of the four case studies.

Spatial Characteristics and Relationships in the Seven Property Fields

The wood floor of the Stumholmen apartment can serve as an example of a material that residents associate with authenticity and care. The history of the material – the origins, production, and finish of its boards – is easily comprehensible. Unusual materials and detailing can also be read by residents as a sign of care taken on their behalf. The windows, balcony openings, and pitched ceilings of the Hestra apartments are examples of unusual details that their residents greatly appreciate. Such care for the residents can never be given a fixed value; it must be always be evaluated in relation to the given place and situation. Shoddy workmanship, poor quality construction, seems to have a destructive effect that hinders the process of appropriation.

In the Hestra and Norrköping apartments, directional axes generate a movement through which the spatial organization of the home is presented step by step. At Lindholmen and Stumholmen, directional axes give views



Interior, Living Room, Case Study Hestra

through the apartment from the entrance, so that much of the architecture is immediately revealed. Important variables for an apartment's axiality are the length of each axis, the number of rooms through which it passes, the appearance and function of those rooms, the form of the



Axiality, Case Study Stumholmen



Windows, detail from Case Study Lindholmen, Dining

openings between them, and the origin and destination of each axis. There are also a number of important physical preconditions for establishing a sense of enclosure in a residential space. The number and shape of wall openings can either dominate the wall surface or be dominated by it. Surrounding the openings with large expanses of wall surface contributes to the enclosure, and a symmetrical placement of openings can further strengthen it. The detailing of the openings can underscore the mass of the walls, increasing their ability to enclose. For the movement field, there are several important possible properties: circular movement, rhythmic tempo, movement patterns with historical connotations, and movements toward daylight. A circular movement unites the rooms of an apartment and can be combined with axiality. The opportunity to see from a room into one or more others enriches our perception of the home. Variations in the size, lighting, and enclosure of rooms can vary the tempo of one's movement through

them, lending a rhythmic quality to that movement. The study also documents two movement patterns that call forth associations to historical homes. In two of the case studies, the architects used the impulse to migrate from dimly-lit areas toward areas filled with daylight to elicit choreographed movements.

In smaller and medium-sized rooms, built-in furnishings exert a strong concrete influence on our perception of the form of the space. The proportions of a larger room in plan and section can be more fully appreciated when its boundaries are strongly delineated, its corners clearly defined, and its openings limited.

My analyses of the field of light suggest several important aspects of daylighting that are specific to residential architecture. The light in clearly delineated spaces is more concentrated, with a higher luminance and plenty of reflected light. The concentration of daylight in a window niche demonstrates the importance of openings in establishing the relationship between the interior of the home and the space outside, as well as underscoring the mass of the enclosing walls and indicating the presence of time.



Interior, the Bay Window. Photo Sune Sundahl

The spatial organization property field includes the interaction of the home with its surroundings. Important concepts in this context are territory, boundaries, appropriation, and interpretive potential. In each of the case studies there are border regions that openly mediate between the interior, private space of the home and the pu-

blic space outside. These border regions allow residents to acquaint themselves with the conditions outside, to orient themselves in the exterior space, in preparation for emerging from the privacy and security of the home to meet the public sphere.

The Symbolic Significance of the Property Fields

The second question addressed in Chapter Six is what deeper symbolic significance these non-measurable architectural properties have for residents. My organization of these properties into fields is intimately connected to the process by which residents appropriate their homes. Appropriation is the transformation of house to home as residents use the space of their apartments to generate meaning and significance in their life-worlds. Architecture is thus of great importance to this appropriation, and can actively support the creation of meaning by those who live in it – both in the design of the interior and in the relationship established by the architect between the interior of the home and its surroundings.

The field of materials and detailing offers many opportunities for making gestures that can be interpreted by residents as signs of consideration for their well-being. The choice of materials and the design of details intimately affects a building's residents. Care is an important concept that can concretely improve residents' self-image: they generally interpret careful design as a confirmation of their social dignity. The process of appropriation often begins when residents read in the materials and detailing of the home that they mean something to someone.

The directional axes in a home are an important part of the interaction between the inside and the outside. These axes lead to the important points at which the interior and exterior meet. This is what happens in the hall of the Stumholmen apartment, where the main longitudinal axis meets the powerful transverse movement toward the sea. The same happens in the dining room of the Lindholmen apartment, where directional axes meet and the space opens with a movement toward the courtyard. Axiality contributes to architecture's ability to support the creation of meaning by residents.

Enclosure also plays an important role in the generation of meanings. The walls and their openings do much to determine the character of a room and its relationship to its surroundings. The thick walls and divided-light windows

of the Stumholmen apartment mitigate the diffusing effect of making openings in the walls, underscoring the delineation of the interior space in contrast to the boundless expanse of the exterior. This strengthens the sense of security inside the home.

Openings in the building shell can also both generate and demonstrate the contact between interior rooms and particular areas of the exterior space. The open dining room of the Lindholmen apartment is the point of contact between the home and the courtyard outside. Similarly, the expanses of glass in the Hestra apartment invite and describe the contact between residents and the natural landscape.

Architectural movements contribute to the exploration and perception of the private space of the home. In each of the case studies there are movements from dimly-lit rooms at the core of the building toward the openness and daylight of spaces that occupy the border region between inside and out. Movements toward daylight emphasize the role of these border regions, thereby helping the architecture of the home support the creation of meaning by residents.

The design of a building's wall openings can allow the sun to illuminate important parts of the interface between interior and exterior spaces. Daylight accentuates the effect of directional axes, architectural movements, and the enclosure of space, thus contributing to the process by which residents appropriate their homes.

Many of the other fields of characteristics influence the spatial organization of the apartments. The gradation of the exterior space into zones of increasing privacy as one nears the home facilitates appropriation. Site planning in which boundaries divide common space into clearly-defined areas also helps residents establish a sense of territoriality. An example is the courtyard on Lindholmen which is maintained collectively by the residents themselves. This gives them the authority to use the space as they see fit. They plant flowers and maintain the flower beds, marking their territory.

The generation of meaning described above is part of the comprehensive process of appropriation. There are many indications in the four cases studies that the process has been successful for the residents of these apartments. The furnished floor plans from the Stumholmen apartments presented in the study bear witness to that success. Iden-

tical apartments have been interpreted in a variety of ways by their individual residents, thus contributing to the sense of home and strengthening the identity of each. The personal experiential space of the individual has expanded to embrace the physical space of the home.

A similar process has taken place in the Hestra apartments. Comments from residents suggest that their homes and their way of living in them have become an important element in the personal identity and lifestyle of each. At Hestra some of the exterior space has also been appropriated by the residents. The delineation of spaces in the borderland between inside and out and the sensitive treatment of the natural landscape have been extremely important. The ability of residents to read the preserved evidence of the site's history is a further resource for the creation of identity.

Results and Conclusions

The principal result of this study is the identification of seven property fields – materials and detailing, axiality, enclosure, movement, spatial form, light, and spatial organization – which are important to our perception of residential architecture. The study describes the nature of these fields and how each appears in the home.

The primary conclusion drawn from this research is that non-measurable properties are essential to the sum quality of the home. They are particularly important to residents' perception of their homes, which is intimately tied to the process of appropriation and the generation of meaning, assigned to a built space.

My analyses show that the key aspects of the seven property fields taken together can heighten residents' sense of reality, enhance their contact with the present, which suggests that these fields are full of deep symbolic importance to residents. In my interviews with the residents of the case-study apartments several described their relationship to their home in such strong terms as love.

But when we went inside the apartment, with that loggia, I at least fell madly in love with the place. That was on Sunday and on Monday we bid on the apartment over there, but another a couple – the people that live there now – had already taken the place. So we took this one – that's how it happened.

Britta from an interview with Bertil and Britta, residents of a two-bedroom apartment on Stumholmen.

Axiality is an example of the capacity of residential architecture to convey a powerful sense of presence and awareness of the now. Our perception of axiality in the home begins when we find ourselves at the origin of an axis. The visual impression of an axis creates an anticipation which we can physically satisfy by moving along its length. The movement involved in our perception of axiality establishes an immediate corporeal relationship to our perception of the architecture of the home.

Well it's actually a room in the apartment, although we call it the balcony. But it feels like outside when I open these four windows, because then I can hear the sea, I hear the birds, and the sun glitters, and you feel the breeze in hear. You're outside, but you're inside.

From an interview with Anders, resident of a two-bedroom apartment on Stumholmen.

Movement connects axiality with our awareness of time – both in the anticipation of a future event and as an experience of the present at the moment we arrive at the anticipated goal. Our visual and corporeal impressions are stored as elements in the sum of our experiences, our memories, the past we always carry with us. The temporal aspect of axiality is an important part of our subconscious perception of the architecture of the home.

Similarly, movement through the home is intimately connected to our perception of time, physical proximity, and reality. Like axiality, movement has a corporeal relationship to residential architecture – through the movement just noted as part of axiality, but also due to the rhythm of movement. Our movement slows unconsciously upon entering a larger room to allow us to form an impression of the space and gather the information necessary to orient ourselves within it. This establishes a relationship between the body and the room's size, lighting, form, and time. The rhythm of the changing tempo of our movement is an important part of our subconscious impression of residential architecture.

Also important to the subconscious architectural experience is the element of surprise as one moves through the home. At Stumholmen, the powerful contrast between the gloom of the windowless stairwell and the light-filled openness of the loggia makes for a striking experience with the kind of culmination and confirmation that come with a sudden awareness of reality.

Axiality and movement have a relation to the subconscious through the physical and corporeal. In the field of light there is a visual relation to our sense of reality. The wall separates the exterior space of nature, thoroughly exposed to the sun, from the more sparsely-lit interior space of the home, where the sun's rays strike only scattered points. The light caught and reflected by the openings in the wall illustrates its enclosing function but also has a relation to our perception of time. As the sun's rays are caught and reflected in the borderline space of the niche, the light becomes more dense.

At the same time, the concentration of daylight momentarily alludes the passage from outside to inside. The visual pause of light in the window opening seems to stop the passing of time for a moment. The window is therefore a breach in the wall between bounded and unbounded space and between contrasting lighting intensities, but with the concentrated light that fills it the sun-lit window is also an opening onto the present. The temporal aspect of light is important for the subconscious perception of architecture.

The description above suggests that axiality, movement, and light are property fields that have the potential to create a sharp awareness of reality and contact with the present moment. Architecture shares this ability with other art forms such as poetry, sculpture, film, and painting.

Architecture has the ability to touch its residents, to enrich their everyday lives, but that potential is far too seldom exploited. The practical and functional aspects of our

art are not the only qualities architects can offer residents. There are also opportunities to create a wealth of impressions, open to individual interpretation, through form, light, and movement. Architecture can support residents in the process of appropriation of the home, and can awaken and release fundamental subconscious feelings such as curiosity and desire.

Nylander: It sounds like it was kind of love at first sight.

Karin: Yes, it was. I thought the apartment was ... I don't know, I guess it was a lot of things: partly that it wasn't the same old rectangular sort of building, and partly that there was so much light, and then that there were natural materials everywhere. Our apartment before this had plastic trim and vinyl flooring. And then just the architecture of the place – the light and the location, with nature right outside.

From an interview with Karin,
resident of a four-bedroom apartment at Hestra

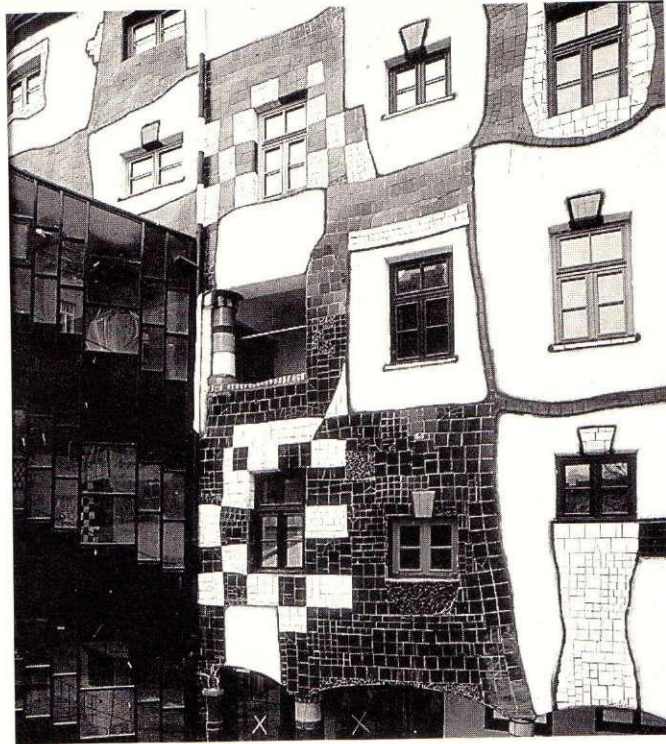
The four case studies show how all of these qualities can be incorporated into the home. They demonstrate the kind of existential depth and meaning that architecture can support and inspire in residents. The case studies show that the architecture of a home is of profound importance for its residents.

It is my hope that, with the support of the observations in this explorative study, housing design will again be recognized as a matter of architecture in the fullest sense of the word.

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The playful mixing of codes is central in postmodernism