

Science for Architecture: Designing Architectural Research in Post-War Sweden

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Like many other post-war European countries, Sweden underwent a building boom from 1945 until the early 1970s. During this period, Sweden transformed from a small-town society to a large-scale consumption society. This transformation had a major effect on how the architecture profession evolved and how strategies for the built environment developed to satisfy the demands of society. What is interesting is how this affected the academic terrain. In particular, questions about how to design the built environment became an academic research subject. The question of how to resolve and fulfil the needs of urban expansion and an increasing building industry established as a major agenda within a state-supported structure, which put a focus on developing standards for the built environment.

The link between the Swedish state and urbanism was very strong at the time, which meant that careful research investigations laid an important foundation for large, state-supported investments. What is specific for Sweden as a neutral country is that this approach was implemented already during the war, projecting future development.¹ Herein lies a specific approach to urban structure, which was established early on as a convention in Sweden. It might be asked how this approach influenced the new model for architectural research. The simple answer is that design for the built environment was already part of a model based on a scientific approach where invested interest was primarily the domain of the building industry. This article examines the development of that process

in relation to what came to be called 'architectural research' (*arkitekturforskning*), a term first used in the 1980s.² In particular, this article examines why, in relation to architecture, this model remained so strongly scientific despite the fact that architectural education in Sweden was strongly influenced by the Bauhaus pedagogy, including a 'learning-by-doing' approach. Adopting a scientific model for research with respect to designing the built environment was not inevitable. This approach was constructed through the strategic establishment and appointments of professorships in architecture schools in 1969. These professors had backgrounds in social and cultural state-supported research that rested on a sociological engineering approach in the tradition of the pioneering social planners Gunnar and Alva Myrdal. This produced a particular kind of research where expertise was produced according to a model relying on optimization and problem-solving. In what seems to be separated from the architectural education model, this kind of post-war architectural research only lasted for a short time and quickly became outdated. This study will explain why and how this happened. One can use a timeline to explain how developments in practice turned a so-called Bauhaus modernism into a medium for ideological politics rather than an objective for design, strengthening the rules of the norm rather than allowing for aesthetic freedom.

The discussion can be structured around three aspects that trace how tendencies in research related to architecture practice and its educational

environment. First, pedagogical influences, primarily represented by Walter Gropius, turned didactic in architectural practice. I will show how Bauhaus modernism influenced both architecture education and practice to create a background for how the profession was understood in terms of educating an architect. Second, reactions against functionalism as well as the rapidly developing need for institutional facilities prompted a structuralist approach to building designs. Herein lays a specific context in which the state supported building research in order to effectively and rapidly urbanize the country. This context is important to understand how research in architecture rested on pragmatism and an understanding that research involved a problem-solving activity for society at large. Third, Sweden creates an interesting case study with regards to architectural research and perhaps the architecture profession at large because of its specific kind of sociological engineering approach, which was humanist and technocratic at the same time. To illustrate how this sociological-positivistic trend in architectural research literally imploded, I will use the architecture building at KTH Royal Institute of Technology (KTH) from 1970 to show how this model for architectural research receded into the background as it was found to be hopelessly inadequate for its purpose.

There is a strong link between architectural education as it developed in Sweden during the early twentieth century and central European philosophies, particularly the modernist design ideas of the Bauhaus. In Sweden, the Bauhaus pedagogy influenced architectural education, which in turn affected practice. Architects developed a very sincere aesthetic preference – a modernism that was understood and applied in the Swedish context that was termed functionalism. As a style, functionalism actually prompted the development of structuralism in the Swedish architectural profession. After the years of high modernism launched by the Stockholm Exhibition of 1930, architects

wanted to move away from aesthetic ideals as basis for design and become even more 'functional', that is, effective, rational and objective. The Bauhaus model affected practice, but this effect was modulated by a structural condition in Sweden: urbanization. Years of increasing and intensified urbanization precipitated a shift from functionalism to structuralism. Some of the major Swedish architecture practices during these years developed into large architecture and engineering offices that had a particular organization for which a structural approach to buildings became necessary. In the background, a state-supported structure that investigated fundamental building methods strengthened its position during the post-war period. In architecture, these kinds of investigations were primarily funded and carried out by the National Board of Public Building (KBS). Setting an example and serving as a model, the KBS influenced how the academic research field of design adopted similar methods and structures. However, the model for architectural research was based on a scientific model as a result of radically changed adoption of the Bauhaus model due to other important factors such as the Swedish analytical model for urbanization, a model that emphasized educating architects that could serve the needs of society.³

How education and practice affected architectural research in the post-war period is especially apparent in the work of two Swedish architects, Nils Ahrbom and Eskil Sundahl. In different ways these two architects link practice and architecture education. Understanding this link plays a significant role in understanding how architectural research as a second school of thought developed. Identified as such, it is set apart from the ethnological-art historical architectural research primarily showcased by Gregor Paulsson. Both architects illustrate architectural ideology as actively being part of functionalism in their early career and then develop the profession and its design process during later years in life. Nils Ahrbom and Helge Zimdahl combined teaching and

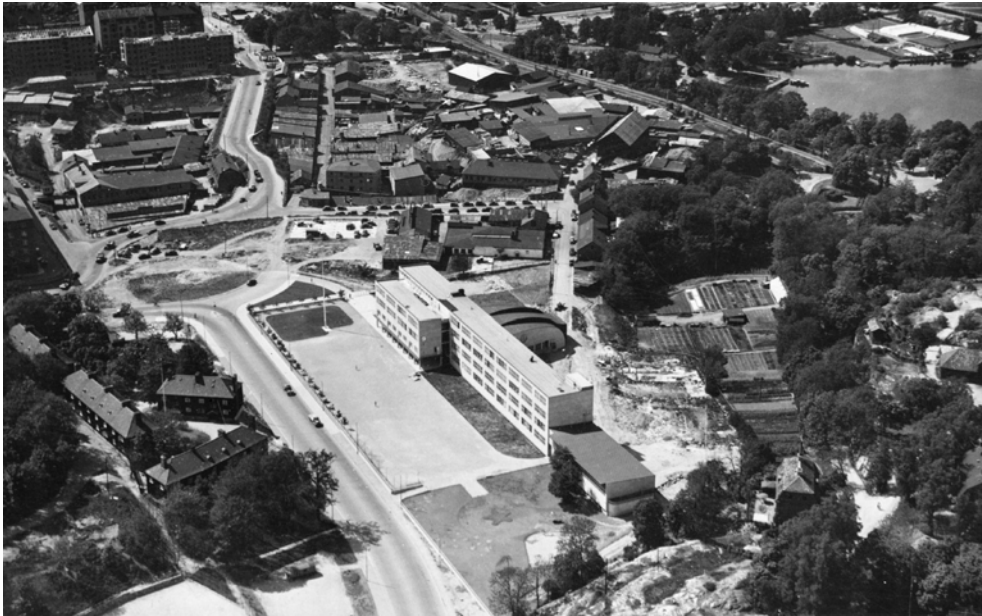


Fig. 1: *Sveaplans flickläroverk* designed by Nils Ahrbom and Helge Zimdal in 1936.(image credit: Arkitekturmuseet)

architectural practice, and show how the architectural field paradoxically developed a humanist albeit scientific model for the practice of architecture, a particularly Swedish approach.

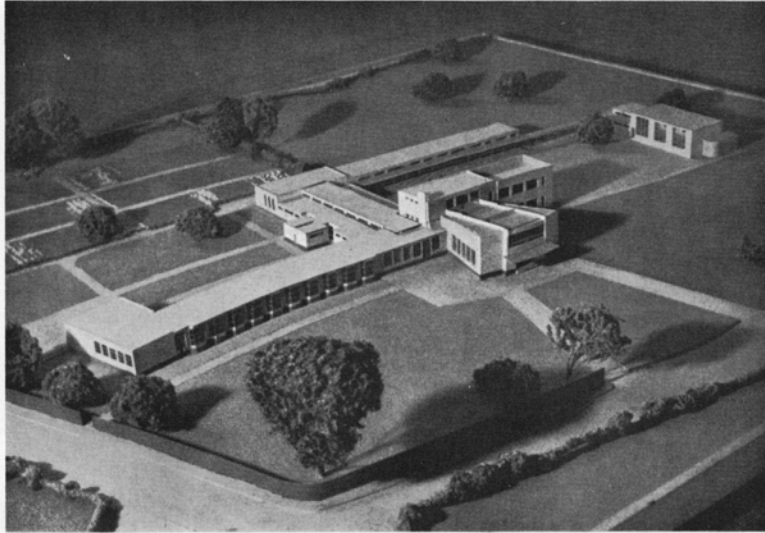
Can the resulting praxis be humanistic? Yes, indeed. At its foundation, Swedish architecture had a human approach to design. After the Stockholm Exhibition, much of Swedish modernism did exactly this. For example, the arrangement of apartment buildings in a U-shape creating courtyards used as playgrounds in Vällingby; Alva Myrdal and Sven Markelius designed collective housing as an urban form of living; as well as the typology of *barnrikehus* – social housing for large lower-income families with small children, illustrate a humanist approach to design. In addition, what has been termed New Empiricism, which challenged purist modern aesthetics and turned to ‘local materials and a homey aesthetics’, was a more humanist and regional architecture than Swedish functionalism.⁴ Swedish modernism, however, was designed according to a theoretical practice, theory with a social, ideological (humanist) basis for the architectural programme.⁵ Many ideas that challenged modernism proclaimed to be even more humanist. As Swedish design and architecture turned modernism into an even more practical approach focused on pragmatic working methods, structuralism emerged as the dominant philosophical approach; however, as strange as it may sound, this new approach relied on a strong belief in user participation and scientific methods to develop a normative answer for a specific problem; that is, a humanist technocratic understanding of design.

Influences from Germany reached Sweden in the late 1920s. The significant architects at the time both in practice and in education were Nils Ahrbom and Helge Zimdal, his collaborator who later would become a professor at Chalmers Architecture School. Both of these influential people were deeply inspired by Walter Gropius. The Stuttgart exhibi-

tion in 1927 and the building exhibition in Berlin in 1931 brought with it a new vision for architecture, which Ahrbom termed ‘the new ideology’. What he meant by this can be understood by looking at the *Sveaplans flickläroverk* (a girls’ grammar school), a project that Ahrbom and Zimdahl completed in 1936. *Sveaplans flickläroverk* is an example of functionalist architecture influenced by Weimar modernism.⁶ [figs.1,2] This white stucco building situated at the northern edge of Stockholm is almost a copy of Walter Gropius and Maxwell Fry’s *Village College*. The architecture of the Swedish school had been developed via functional studies in order to determine the building plan. Movement patterns, light and acoustics had been studied ‘with scientific distinction’⁷ so that the programme would be environmentally satisfying. Functions were separated in different volumes so that the architecture reflected the internal organization. For example, the auditorium is an individual volume clearly distinguishable in the overall composition.

Widely seen as an example of Swedish high modernism, the school building is also a great example of how a normative design approach was based on science in order to satisfy the welfare state. How a scientific approach to design advanced may be understood by revealing some of the patterns in the Bauhaus pedagogy, which ultimately was a philosophy that penetrated all of Walter Gropius’s practice. It is fairly well known that there existed a fluent transparency between his practice and teachings at the Bauhaus in Weimar and later Dessau. As today, interchange between studio projects and practice is perpetual.

Swedish architecture education was influenced by the Gropius Bauhaus legacy with on the one hand the ‘learning by doing’ approach and on the other the interest for measuring spatial relationships with the human body and objects people encounter. The latter methodology speaks of an understanding of height and volume as basic architectural training



178. W. Gropius and Maxwell Fry. Village College, Impington



179. B. Taut. School, Berlin

Fig. 2: Village College designed by Walter Gropius and Maxwell Fry. (image credit: Ludwig Hilberseimer, *Contemporary Architecture, its Roots and Trends* (Chicago: Paul Theobald & Company, 1964), p. 185.)

or the relationship between the body and an object (such as a coffee pot or a chair), a view that encourages ergonomic design.

More than the KTH architecture education, the education at Chalmers architecture school in Gothenburg remained artistic and explorative in the first year, along the lines of the *Vorkurs* at the early Bauhaus, which many of the later iconic teachers can be identified with, such as László Moholy-Nagy teaching *Gestaltungsstudien* and Josef Albers teaching *Werklehre*. The Gropius curriculum at the Bauhaus acknowledged craftsmen and apprentices instead of teachers and students: '[Gropius] envisaged two levels of education: the practical training of craftsmen as independent artists or architects . . . and impressing upon the student the spiritual mission they would carry out in the society to come.'⁸ The most fundamental characteristic of the three-level course setup was the interaction between art and craft.⁹

Chalmers was headed by Helge Zimdahl, Ahrbom's former partner (they separated when Ahrbom was hired by KBS). Having visited most of the Ivy League schools, Zimdahl was heavily influenced by architecture education in the USA. He was also close friends with William Wurster, who had 'revamped' MIT's architecture education before developing UC Berkeley's College of Architecture in 1953.¹⁰ [fig. 3]

At KTH, Professor Ahrbom believed that only a fraction of the student body would become competent architects as only a few have an eye for design. As such, creative training was isolated from teaching essential tools in the architecture education. Artistic training taught rules for how 'good design' was achieved and only 'the genius' was allowed outside these boundaries. Artistic was understood in romantic terms where a handful could ignore a reasonable sense. Despite this, some of the core courses were the same for engineers as for archi-

tecture students. Architects studied descriptive geometry, mathematics, statics and statistics.¹¹ Architecture education then seemingly had ties to the technical university stronger than those it has today. [fig. 4]

After Ahrbom, Eskil Sundahl was one of the most influential professors. Sundahl's artistic leadership represented the 1930s ideal that had been formulated in *Acceptera*: he had a rational approach to architecture where collaboration was valued more than the single achievement.¹² Sundahl remained influential in KTH's architecture education until the 1970s. Before becoming a professor, Sundahl was one of the chief architects at *Kooperativa förbundets arkitektkontor* (KF), an experience that may have influenced his predilection for collaboration.

At The Royal Technical University, architecture education at KTH produced a significant technocratic spirit that combined the attributes of humanistic and technical ideals. With scientific accuracy similar to the programmatic design for *Sveaplans flickläroverk*, society at large carried out large-scale development investigations to understand how architecture could help address the needs of society. A structuralist approach to architecture permeated society at large and directly influenced architectural research methodologies. How this developed may be understood by examining large-scale governmental building projects such as the KTH Campus plan carried out by Nils Ahrbom.

During the war, Sweden prepared different areas of society to launch its most aggressive development in history. As mentioned, research laid an important foundation for large state supported investments. One of these investigations was the SOU 1943 on higher education. For the KTH campus, this resulted in 30 years of continuous expansion of departmental buildings beginning the same year. The SOU 1943 was implemented at the request of the Swedish trade industry, which demanded

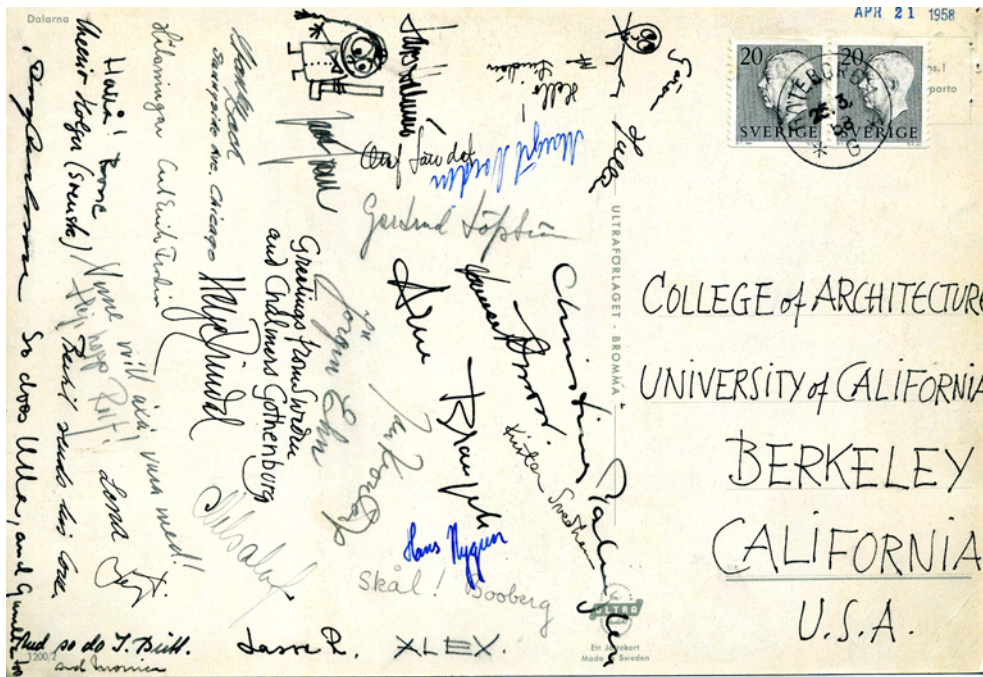


Fig. 3

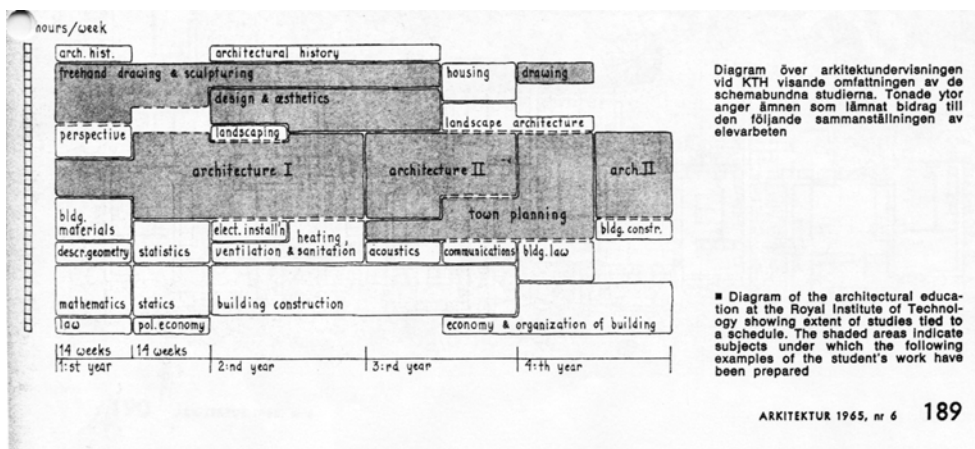


Fig. 4

Fig. 3: Postcard from Helge Zimdahl and Chalmers University to William Wurster and College of Environmental Design (image credit: Design Archives UC Berkeley)
 Fig. 4: The Architecture school curriculum 1965. 'Arkitektutbildningen vid KTH', *Arkitektur* 6 (1965): p. 189.

a review of the technical education in order to increase the industry's influence. The investigation concluded that: 'The goal of all technical education is to provide the industry with skilled workers.' This identifies a higher education that, in Marxian terms, served mainly as fulfilling the purpose of the work-force machinery.

Nils Ahrbom, chief architect of the KTH Campus Building Committee, implemented the campus expansion plan according to the state's goals. He oversaw the project for two decades.¹³ He had already been appointed Professor in Arkitektur II and it was within this subject that the architectural research in question would develop and be conducted.

The expansion project was reviewed under the National Board of Public Building (KBS) for which Ahrbom would later work directly while implementing his structural design ideas. Founded in 1918, KBS organized, designed and built facilities for state authorities. KBS also conducted research (published as reports) that were primarily scientific environmental studies supporting architectural and building strategies. By then, this approach was a typical way of thinking about design that merged into the university as well as being directly adopted by the figures who later became key people at the universities and who coordinated research for the built environment.

At this point, Sweden was in a state of high production of factories, apartment buildings and commercial buildings through organizations such as *Kooperativa förbundets arkitektkontor* (KF), which had a great influence on architectural practice. The KF was Sweden's cooperative movement's main architecture office contributing to developing the welfare state, and KF designed some of the highlights of Swedish functionalist architecture. As the largest architecture office in Scandinavia, KF also influenced many of the period's key architects who

often worked in the organization for a few years.¹⁴

The path to structuralism began at KF as well as in other large architecture and engineering offices such as HSB (a cooperative association for housing) due to their specific organizations. KF, HSB and KBS not only designed buildings but also administered and managed the completed buildings.¹⁵ After a number of years, buildings had to be rebuilt, restructured, extensions added, and so forth. Young architects grew aware that buildings would not last for long. As a result, architectural drawings were cleverly planned so that the building's programmatic organization as well as its construction made them more flexible and more easily dismantled. This led to an even more rational architectural approach: designing buildings that could be used for a variety of purposes.¹⁶

Historically, it has been held that structuralism in Sweden developed independently of any international, theoretical influences. Instead, planning with regards to social aspects such as the user and his/her immediate environment increased ecological awareness, and energy consumption constraints have been considered as the basis for structuralism. In some ways, this picture may be correct, as most of the architects and engineers that used structuralist methods lacked a theoretical grounding for their decisions. The user aspects resulted in programmatically planned variability, limited installations of technical equipment and adaptability in building technology. However, it seems unlikely that architects during the late 1960s would have been unaware of international tendencies. The exhibition *Arkitektur-Struktur* organized by KBS in 1968, which showcased Swedish public works over the last 50 years, formulated the new architectural view clearly distinguished as structuralism. Quite simply, this exhibition illustrates an informed view on a worldwide trend.

The Swedish rational approach to the practice of

architecture illustrates how the profession evolved and how documentation and empirical research became the foundation for political decision-making, which ultimately played a central role in how Swedish society urbanized. One familiar example of how this started is when the Swedish state set out an agenda for housing studies in 1942.¹⁷ This empirical research, in observation and experiment, was at first primarily carried out to improve housing. Included in this kind of research were observations on movement in particular spaces, such as the kitchen environment, and the analysis of the actual work performed in these spaces. These kinds of studies, which started out as housing surveys, were sociological in nature and relied on the idea that recording human practice could establish standards for future designs.¹⁸ [fig. 5]

In response to the increasingly large-scale building projects in Sweden, between 1957 and 1963 the student body in architecture increased from 144 to 288 students due to a parliamentary decision. This increase in enrolment resulted in a new architecture school within Lund Technical University, which was built in the 1960s. During the design process of the new architecture school a special committee was issued. Their task was charged to propose how the new architecture education should be organized. Three subjects were identified as necessary within the architecture education: Building Construction; Theoretical and Applied Aesthetics (which includes the language of architecture, creation of space, and the experience of form, material and atmosphere); and Building Function Analysis. These three 'scientific' and 'analytical' disciplines were given the same importance as construction and production. The new subjects centred on building use and aesthetic form. It was argued that empirical research could investigate user values and aesthetic form.¹⁹ In 1964, the very first professorship in Building Function Analysis was held by Carin Boalt. She then also became the first female professor at a technical university.²⁰

Carin Boalt's career started at KF. After two years at KF, where she mainly worked on nutrition issues, she moved to the National Institute of Public Health, which was an institute founded in 1944 in order to rationalize the working conditions for women in their home environment. At the institute, she continued to work on nutrition issues and one of the institute's accomplishments was identifying parameters for efficiently planned kitchens, which was mentioned earlier. Through detailed research and movement pattern studies of kitchens, the institute outlined measurements for countertop heights and organization of working stations in the kitchen. In 1957, Boalt became the head of the institute, which today is called the Consumer Agency, until she was appointed a professor in Building Function Analysis at Lund Technical University.

KTH instituted the same professorship in 1969. Most of the published research results in Building Function Analysis came out of Lund architecture school where a particular space called the full-scale laboratory was used for many of the empirical research studies that focused on people's interactions with the built environment. In an attempt to map Swedish research and its history within the architecture institution, this type of research has been characterized as follows:

This research may at large be regarded as a painstaking and tedious work of mapping 'normal science' in order to find out different user categories and particular design problems, or on the basis of methods such as full-scale experiments, video filming, etc. examining and propose design improvements in the home environment.²¹ This research was phased out when the architecture profession came under the critical eye of the public as a result of the intense building period. In regards to establishing a scientific knowledge, this kind of research did not seem to have much more to offer. The methods were becoming more precise, but mimicking other scientific disciplines led nowhere.

The sociological and positivistic attitude in architectural research that was established during the 1950s and 1960s was foremost represented by Lennart Holm and Carin Boalt. Holm, who acted as an investigator and later the director of the Building Research Institute, was an entrepreneur and a leading figure in this field. He based his working methods on what he thought was a danger; that is, a typical architect has different values and uses other proportions than the individual for whom the environment is designed. In coming to terms with this issue, he searched for scientific knowledge and active individual participation in the design process.²²

Two years after Lennart Holm presented his PhD thesis, *Familj och Bostad* (1955), at KTH, he started teaching in the subject Building Function Analysis and contributed to the education on issues regarding family and housing. Historian Eva Rudberg and others have noted that his studies resembled a typical sociological engineering approach in the tradition of the Myrdals' understanding that culture, architecture and buildings are interdependent of political decision-making.²³

Holm's thesis includes surveys based on interviews of some 600 families. The idea was to evaluate the families' contentment with their home comfort. Holm also performed morphological evaluations from the users' perspective comparing apartments with views in different directions (thin lamella house) with apartments having views in only one direction (thick lamella house). The sociological methods used were largely modelled on American behavioural research. It is remarkable that Holm's dissertation is one of the first PhD degrees at KTH Architecture and led to a professorial appointment in Housing Design, a new subject.²⁴

Holm had a significant role in developing the architecture curriculum during the 1960s; the investigation 'Building training at the technical

universities' (*Byggnadsutbildningen vid de tekniska högskolorna*) - meaning the architecture education - interestingly illustrates how architecture education was understood at the time. In 1965, this investigation was the foundation for a parliamentary decision to institute the architecture curriculum A68. Holm's investigation primarily focused on increased cooperation between the Department for Road and Water, the Department for Land Surveying and the Department for Architecture. In addition, the new curriculum put a stronger focus on education on 'project management' by instituting new subjects and professorships that guaranteed a stronger knowledge in this field with respect to the architecture profession.²⁵

The current architecture school building at KTH made use of the curriculum (A68) in terms of space, programme and plan. The building was designed by Professor Gunnar Henriksson (a prodigy of Ahrbom and close friend of Holm) and in use by 1970.²⁶ [fig. 6] It represents an inflection point in architecture education and serves as a guide that illustrates how scientific research was carried out, an approach that began in the mid-1940s. The new architecture building was programmatically divided into two volumes. One volume contained seminar rooms, offices, and studio environments. One volume is all facilities with specific requirements, such as auditoriums, ateliers and workshops, which were located around an inner courtyard connected to the entry level. Three new kinds of spaces were included for the laboratories dedicated to subject areas in line with the A68 objective to increase knowledge in project management: one laboratory for Building Function Analysis, one for Construction Design and one for testing Acoustics. In May 2011, a fire destroyed two out of three laboratories and today only the full-scale laboratory at Lund Technical University stands as a reminder of this moment in architecture education and research.



Fig. 5



Fig. 6

Fig. 5: Woman in respirator is doing the dishes. Study by *Hemmens forskningsinstitut* (image credit: Ateljé Herrried, Nordiska museet)

Fig. 6: Staircase of the architecture school at KTH designed by Gunnar Henriksson (image credit: KTH School of Architecture)

This new architecture building caused a massive revolt among the students less than a year after its completion. This was mostly related to the building's inhumane environment, but also the design in terms of facilities, spatial relationships and communication to and within the building. The building itself is brutalist in its expression, using raw materials and presenting itself as a grey, concrete mega block towards the street. Henriksson defended all of the criticism publicly in an article published in *Arkitektur* next to the students' critical review. One of professor Henriksson's most interesting rationales for the design of the facilities and the use of equipment and furnishings is found in a set of preliminary studies. These studies had been carried out as student projects in the full-scale laboratory in the Department for Building Function Analysis at Lund Technical University.²⁷ As a result of how KBS was organized and how state authorities wanted buildings to be designed and built, professor Henriksson was fully responsible for the programmatic description, project management and building construction. In addition, the investigation preceding the new curriculum (A68) was, as mentioned, singularly prepared by Henriksson's long-time friend Holm. All of these issues put the building's project process into question.

The architecture building at KTH showcased an implosion of how new ways of doing architectural research had been implemented, evolved and conducted. The building was programmatically strongly tied to the curriculum (A68). Appropriate laboratories had been designed and built to fill the needs of the A68 curriculum, but these laboratories were soon used for all sorts of purposes, not the least as an archive. The main reason for this change was that the A68 curriculum was implemented at a time when society was in a state of political change. Architects and their field were soon to be seriously questioned by the general public as a reaction against the large-scale urban projects accused of creating inhumane living conditions. In

response, architecture culture reevaluated its ambitions. The strong ideas for architecture education that were developed towards the end of the 1960s were outdated at the same time that they were programmatically implemented.

In later years, architectural research has been discussed in two different ways: developing an aesthetical objective and developing a scientific knowledge for the practice of architecture. The second school of research – a scientific environmentalism – was a continuation of the 1940s and 1950s empirical research, which was considered necessary. State authorities and university competence served as the inherited experts. Developing norms for building construction (kitchen design and housing, for example), these institutions presided over an educated knowledge that construction companies did not have nor could afford to host as research projects. However, when the building industry along with technological developments became more sophisticated, the industry itself began to develop standards and norms geared towards consumer culture. As consumer society was established, choice and preference became possible, an impossible scenario during previous decades.

Towards the end of the 1980s, design research at KTH and LTH had become outdated. The unfortunate sequence of events that made it questionable at the same time as it was carried out extensively was that finally the resources were made available for new research laboratories and new professorships. It was possible to conduct and increase this form of research and it ended up becoming repetitive and obsolete at the same time as it was instituted in full scale. This architectural research no longer contributed to new expertise; rather it became an experienced procedure.

Swedish post-war research in science was shaped by a state-supported research economy

within which the area of architecture was included because, in part, architecture education belonged to the technical university as well as Sweden's technocratic spirit that also inculcated the architecture profession, education and research. The American post-war research legacy in architecture has been re-examined on the basis of ideology, which rests on an 'enthusiastic pursuit of scientific research'.²⁸ Against this background, it is of interest to examine how Swedish architectural research shows a link with the same ideological basis. In addition, the history of architecture education has recently surfaced as an important scholarship.²⁹

In Sweden, architectural research charted the positivistic trend in social science following the dominant position of positivism in philosophy. This research framework was extremely influential at Lund Technical University where a new architecture department was created in the 1960s. This new department and its research was concerned with home environments and public facilities using scientific methods to create normative standards. It was short-lived, culminating and phased out already in the 1980s as the result of heavy criticism from all levels in society towards the practice of architecture. Since 1942, the Swedish Committee for Building Research had been focused on issues related to industrialization and standardization. With the development of consumer culture, these issues became less relevant.

The intention of this essay is to illustrate how post-war architectural research developed out of circumstances in architectural practice, which in Sweden were directed by large-scale governmental building institutions as well as the increased construction of factories, apartment buildings and commercial buildings, the cogs of the welfare state. In addition, it is of interest to show that in the background of societal changes an argument took shape for a wider understanding of architecture as an environmental concern. Reyner Banham can be

credited for writing the history of how this evolved, a history that included how technical aspects create atmosphere. In this respect, Sweden belongs to an international context. Although parallel developments in architectural research took place at other universities, such as UC Berkeley, Sweden is in most respects a unique case study, which is a result of its organizational structure.

Notes

1. Swedish research in science was shaped by the research economy. To prove this, recent scholarship has argued for financial support as an 'instrument of foreign policy' in terms of how research in science illustrates a link between the American military industrial complex and Sweden in the interest of both countries. See, for example, Carina Gråbacke and Jan Jörnmark's 'The Political Construction of the "Million Housing program"' in *Science for Welfare and Warfare: Technology and State Initiative in Cold War Sweden*, ed. by Per Lundin, Niklas Stenlås and Johan Gribbe. (Sagamore Beach: Watson Publishing International LLC, 2010), pp. 233-50.
2. In 1879, the first professorship in architecture was instituted. Beginning in 1912, according to the polytechnic development model, a number of subjects were cleaved from this original subject area. The new curriculum A68 instituted no less than eight new professorships in individual subject areas in 1969-1970. This direction in combination with a growing conception during the 1970s that the same organizational method used in technical research could be used in social and political research resulted in a revised agenda where research in subject areas under the headline of architecture were questioned towards the end of the same decade. Discussions on what the agenda for architectural research ought to be introduced the term 'architectural research' during the 1980s. See *Förslag till omorganisation av undervisning och forskning vid Sektionen för arkitektur vid tekniska högskolan i Stockholm – A68* (Stockholm: KTH, 1969); *Arkitekturstuktionenens Forskningsprofil: FoU vid KTH/A – mål*

- och medel/Sektionsnämnden (Stockholm: Sektionen för arkitektur, Tekn. högsk., 1981); Ulf Sandström, *Om den svenska arkitektur-, bostads- och stadsbyggnadsforskningens karaktär*, Arbetsrapport 2001.4.
3. Swedish architecture education is the responsibility of state supported universities. Parliament decides how many architects are needed and how they are educated.
 4. Jill Perlman, *Inventing American Modernism: Joseph Hudnut, Walter Gropius and the Bauhaus Legacy at Harvard* (Charlottesville and London: University Virginia Press, 2007), p. 6. See also Sanford Andersson, 'The New Empiricism-Bay Region Axis: Kay Fisker and Postwar Debates on Functionalism, Regionalism and Monumentality', *Journal of Architecture Education*, vol. 50, 3, (February 1997), pp. 197-207.
 5. Trying to capture the sequence of events in regards to the New Empiricism and the international discussion for a Swedish public, Eric Westerberg wrote in the Swedish architecture journal *Byggmästaren* that there is a sense that these buildings are designed for people rather than designed according to a theoretical practice. Eric Westerberg, 'Tre begrepp. (The New Empiricism. The Bay Region Style. Monumentalitet)', *Byggmästaren*, 24, (1948), pp. 429-35.
 6. Nils Ahrbom references *Sveaplans flickläroverk* as an example of buildings in the functionalist style. See Nils Ahrbom, *Arkitektur och Samhälle, funderingar över 50 års svensk arkitektur* (Stockholm: Arkitektur, 1983), p. 41. See also Ludwig Hilberseimer, *Contemporary Architecture, Its Roots and Trends* (Chicago: Paul Theobald & Company, 1964), p. 185. (Photograph of Village College, Impington by Walter Gropius and Maxwell Fry, which looks like a model for *Sveaplans Flickläroverk*.)
 7. Eva Rudberg, *Sveaplan: en skola i tidens funktionalism* (Stockholm: Apokromat, cop. 1997), p. 7.
 8. Marty Bax, *Bauhaus Lecture Notes: 1930-33* (Amsterdam: Architectura & Natura, 1991), pp. 30,1.
 9. The three-level course was set up as follows: I – a course for apprentices; II – a course for craftsmen; III – a course for young masters (a building course that also taught architecture).
 10. At the time, the transatlantic influences in architecture education, which travelled from the east coast to Berkeley, were established by William Wurster's desire to develop an interdisciplinary curriculum that also encouraged research. After establishing the College of Environmental Design, a second major change was the development of a comprehensive research policy. Ezra Ehrenkrantz, who came from the Department of Building Science at Princeton, formed a committee to set up a research programme. In 1970, the Building Science programme was established at UC Berkeley to promote research. As in Sweden, this development illustrates a desire for scientific research with the intention to broaden the architectural profession. 'Architecture on the (cutting) Edge', Roger Montgomery with Peter Montgomery, in *Design on the Edge: A Century of Teaching Architecture at the University of California, Berkeley, 1903-2003*, (University of California, Berkeley, College of Environmental Design, 2009), 108-111.
 11. See diagram of the architecture education at KTH in 'Arkitektutbildningen vid KTH', *Arkitektur* 6 (1965), p. 189.
 12. Brunnström, *Det Svenska Folkhemsbygget*, p. 51.
 13. This state-appointed committee lasted for 30 years and was the longest lasting committee of those appointed. This type of political management is no longer in use and was particular for this period in Sweden.
 14. During the 1950s, KF had 81-152 employees. See Lisa Brunnström, *Det Svenska Folkhemsbygget: Om Kooperativa Förbundets arkitektkontor* (Stockholm: Arkitektur, 2004), p. 68.
 15. The KBS as well as KF may have been one of the world's largest real estate owners at the time. Today, *Akademiska hus*, owner of all of the Swedish university buildings, claims they are the world's largest real estate owner in terms of university buildings.
 16. *Arkitektur i förändring: A4, ELLT, Koordinator 1954-91*, ed. by Claes Caldenby (Stockholm: Svensk byggtjänst, 2000); Lisa Brunnström, *Det Svenska Folkhemsbygget: Om Kooperativa Förbundets arkitektkontor* (Stockholm: Arkitektur, 2004) and

Anders Bergström, Lars Marcus and Daniel Koch, *KI arkitektur och kunskapsmiljö: tävlingen, etableringen, förnyelsen* (Stockholm: Akademiska Hus, 2010).

17. In 1942, the state initiated Statens committee för byggnadsforskning, BFR and SIB. See *Byggnadsforskningen – en översyn och utvärdering. Slutrapport från Byggnadsforskningsutredningen*, Ds Bo 1989:2.
18. The very first studies analysing people in relation to their home environment were made by KF architecture office in 1938. Brita Åkerman conducted a family study on behalf of *Hemkommittén* in 1941.
19. 'Arkitektutbildningen i Lund,' *Arkitektur* 2 (1962): pp. 29-31.
20. Ulf Sandström, *Arkitektur och Social Ingegörskonst, Studier i svensk arkitektur- och bostadsforskning* (Linköping: TEMA, 1989), p. 156.
21. Sandström, *Arkitektur och Social Ingegörskonst*, p. 156.
22. Sandström, *Arkitektur och Social Ingegörskonst*, pp. 136,37.
23. Sandström, *Arkitektur och Social Ingegörskonst*, p. 137.
24. Holm's thesis is the 7th doctoral thesis and the majority of these today would be distinguished as theses in the field of engineering.
25. *Förslag till omorganisation av undervisning och forskning vid Sektionen för arkitektur vid tekniska högskolan i Stockholm – A68*. pp. 1-6.
26. Plan, section, and layout as well as a description of the new building by Professor Gunnar Henriksson (1919-2006) were first published in *Arkitektur* 3, 1969. The school functioned as a department by January 1970, yet the building was not completed and fully used until May 1970.
27. During one semester, a variety of student projects testing the facility, equipment and furnishing designs were carried out at the school of architecture at Lund University. Gunnar Henriksson, 'KTH, nya A-huset,' *Arkitektur* 9 (1971), p. 13.
28. Abigail Sachs, 'The Postwar legacy of Architectural Research', *Journal of Architecture Education*, vol. 62, 3, (September 2009), pp. 53-64.
29. See *Architecture school: Three Centuries of Educat-*

ing Architects in North America, ed. by Joan Ockman (Cambridge, MA: MIT Press, 2012).

Biography

Frida Rosenberg is a practicing architect, educator and researcher. She is a PhD Candidate in Architecture History and Theory at the Royal Institute of Technology and a frequent guest critic at Lund University. She received her architecture degree in 2004 from Chalmers and Yale University in 2007.

