



Jørgen Hauberg

Associate Professor, Head of Institute

The Royal Danish Academy of Fine Arts, Schools of Architecture, Design and Conservation.

Institute of Design and Communication. Copenhagen

jorgen.hauberg@kadk.dk

Research by Design—situating practice-based research as part of a tradition of knowledge production, exemplified through the works of Le Corbusier

Abstract:

Research by design concerns the various ways in which design and research are generally interconnected in the production of new knowledge through the act of designing. This paper discusses the role and value of research by design especially through the works of Le Corbusier. It seeks to demonstrate, how the development of *types and programs* contributes to theory building in architectural research. Le Corbusier's development of a constructive system (from the Dom-ino houses to an actual skeleton frame), a dwelling type (from Maison Citrohan to universal block of flats) and a city-model (from a City of Three Million Inhabitants to a Linear Industrial City) represents a reflective practice through which architectural theory is developed in direct engagement with the basic media of architecture: objects, sketches, diagrams, notations and texts.

The paper suggests that work like Le Corbusier's, although never intended as research, demonstrates a hybrid practice between design and theory, which reaches beyond the single projects and unique piece of work, and contributes to theory building through research by design.

The paper presents building types – examples and proposals developed by the author. The intention is to illustrate a combined practice of investigating architecture's history and theory with designing, and is presented as examples of research by design.

Keywords: Research by Design, Architectural Types, The Modern Programme, Le Corbusier.

Material-based research

Architecture is concerned with production of the new and is bound to materials. One of the differences between architecture and research disciplines such as literature, languages or history in the humanities is that these fields are generally not bound to materials or experiments, or concerned with producing new products. In basic terms, research concerns what has happened, because only this can be explained and understood with certainty. Design is forward-looking, not with the main objective to understand the world, but rather to change the world. It is involved in proposing the new, which is, per definition, unpredictable.

In the design process, the architect tests, selects and rejects solutions on the basis of a programme and professional knowledge and in relationship to a certain context. The design process is a reflective practice as described by Donald Schön (Schön, 1983), in which critical assessment, comparability and evaluation take place through sketching, through the continual weaving between problem and solution in an iterative movement between inquiry and proposal (Ramsgaard Thomsen, Tamke, 2009). In this process, practice-based tools and methods have a major and independent significance: a material focus, involving drawings, models, material experiments and completed architectural works. In many ways, the design process is similar to a research process in searching for new products or knowledge but it works in the designer's language: objects, sketches, diagrams, notations and texts (Bjerrum, 2012). Drawings, models and objects are representations of cognitive processes and form a visual language parallel to writing, and like the writing process, the process of sketching is not just linear, in which ideas shaped by the mind of the designer find their representation in a drawing but form a discussion between "hand and brain", whereby the drawing "talks back" and becomes the dialectic tool and moderator for insight and knowledge. The sketching involves art, beauty and intuition, parallel to objective and material requirements, and the design process never becomes strictly methodical, systematic, repeatable or objective.

Research by design concerns the various ways in which design and research are

generally interconnected, producing new knowledge through the act of designing. Research by design is research through design, using the expression developed by Christopher Frayling (Frayling, 1993/4) and developed through contributions as the EAAE Charter on Architectural Research: *"In architecture, design is the essential feature. Any kind of inquiry in which design is the substantial constituent of the research process is referred to as research by design. In research by design, the architectural design process forms the pathway through which new insights, knowledge, practices or products come into being. It generates critical inquiry through design work. Therefore research results are obtained by and consistent with experience in practice"*. (EAAE, 2012). Generally, a research process starts with a research question, topic or problem, which passes through a methodological reasoning and arrives at a new, true or possible answer or solution. Research by design is not hypothesis-led (Verbeke, 2013) and suggests a practice, somewhat in the opposite order, where knowledge arises from design—from the proposal, model or experiment—to the generalisation and rationalisation by consciously extracting rules about the object of the research process: nomothetic research. In research by design, the creation or making is prior to the examination and representation, forming a pathway between work and thought, through the basic methodological means of architecture: objects, sketches, diagrams, notations and texts. Research by design is thinking through practice, to quote Mies van der Rohe: *"I want to examine my thoughts in action...I want to do something in order to be able to think"* (Mies van der Rohe, 1962). Research is different from architectural design and practice, especially in the degree of generalisation and contemplation, in that research must explicitly look for general and normative aspects. Consequently, the intention should not be to claim that all design processes are research, but to distinguish forms of design practices which can be seen as research by design and investigate how new knowledge can emerge and become generalised through the process of designing—through investigations in which designing plays a decisive role, methodologically and as outcome (Verbeke, 2013, p. 2). Recalling Stan Allen's discussion of practice and theory (Allen, 2000), the aim here is to find the process of production in "intelligent creative practice" that is *"...flexible enough to engage the complexity of the real, yet sufficiently secure in its own technical and conceptual basis to go beyond the simple reflection of the real as given... [proposing] a rigorous forward movement, capable of producing new concepts out of the hard logic of architecture's working procedures"* (pp. XVI-XVII), the paper asks how "the new" emerges in architectural design as that which can fundamentally challenge the way we design and think the formal, social and cultural frameworks of the built environment.

The question of the role of the proposal in research is a particular aspect of the discussion. Preparing proposals is one of the options within architectural research and one that is already available within categories such as applied research, action research and development work. Within architectural research, there is a tradition for concrete, alternative, spatial, building and urban proposals which include an accessible contemplation of the experience and cognition achieved through the physical work. This tradition for writing and drawing proposed futures can be found in examples from early renaissance to modernism such as Palladio's *The Four Books of Architecture*, Ledoux's *Architecture*, Adolf Loos' *Ornament and Crime* and Rem Koolhaas' *Delirious New York*, and it is characteristic that the theoretical practices of these authors have their building practices as an essential and indispensable prerequisite. The built work holds an embedded knowledge and experience of which the author concentrates a new generalized cognition, a cognition which, in turn, affects the work and is crucial to its architectural quality. This *materialised knowledge* (Nilsson, 2014, p.127) is reflected in all built environments, in vernacular buildings and villages, but becomes especially evident when the researcher and designer is the same person.

Le Corbusier (Charles Edouard Jeanneret 1887–1965) is, in particular, an exponent of this tradition of practice-based knowledge production. His *Œuvre Complète* and other written works are not research in our understanding, nor were they intended to be. However, they have contributed significantly to the collective cognition of the profession and to the theoretical foundation of architectural thinking by demonstrating a hybrid practice lying between the practice of design and that of theory building. The works of Le Corbusier exemplify creations which reach beyond the single project and unique piece of work, moving between the descriptive (the purely describing), the ideographic (the unique and exceptional) and the nomothetic (the argued, rule setting) by extracting rules from the proposal, which is ultimately based on an ethical argument.

The thesis of this paper is that such practice of design and analysis, and in particular the effort of key architects in the development of *types* and *programmes*, is both normative and directed towards the future—and should be recognised as research by design.

Types and standards in Architecture

What is a type in architecture? Already in *Vers une Architecture* Le Corbusier discusses development of the type exemplified by the Parthenon temple on the Acropolis: "The

Parthenon is a product of selection applied to a standard. Standards are a matter of logic, analysis and precise study. They are based on a problem which has been well stated. A standard is definitely established by experiment.” (Le Corbusier, 1927, p.131). Through the comparison of the temple with the car and the plane, Le Corbusier argues that it is by stating the problem precisely, in the analysis, in the experimentation and through accumulation of experience from practice that a standard may be developed that goes beyond the individual work and offers experience and knowledge that may be generalized. Le Corbusier does not talk about a standard in the sense of industrial standardisation or the mass production of houses and building parts, as he does in other contexts, but an architectural standard achieved through refinement, development and intensive study of architectural issues, by way of which a standard of the highest level may be set. Through this, almost Darwinian, *selection*, a type arises that constitutes a new architectural space that gathers and is the result of collective experiences while allowing the sublime, the individual, in this case the Parthenon. *“The standard is not perfection. It is merely the path, the basis, the spring-board, the preparatory phase... Before ultimately creating the Parthenon, which is architecture, a work of the highest spirituality, the Greeks made countless temples, always of similar construction but each time further refined. The standard expresses ineluctable realities, belonging to the economic and social realm. The architect, on the solid basis of standard, has the possibility of attaining perfect beauty, but only the possibility.” (Weber, 2008, p.172).*

Le Corbusier's argument is that the development of a standard provides the basis for the architectural work, but does not guarantee its result. The individual designer operates alongside the collective knowledge accumulated through the works—free art juxtaposed with the scientific- and research-based—and the primary aim of architecture, to move people, to create emotion or "emotion plastique", cannot be systematised.

“From our inner debts, before even the formulation of a theory, the emotion leading to action can be felt: reason then gives support to feeling in a variety of seemingly incontrovertible ways. Feeling perceives and reason confirms. Feeling makes one act. So let no one accuse me of wanting to kill feeling. So I think that not everything serves a purpose, that not everything moves us.” (Le Corbusier, 1927, p.167).

The development of an architectural type occurs, according to Le Corbusier, through repeated practice, experimentation and the accumulation of experience in the model, plan, realized works and text. In the temple's "design process" through the centuries, the type accumulates what is professionally recognized as the highest level of knowledge, which, by way of examination, representation and peer review, is tested and

evaluated in ways that resemble research process and methodology and produces knowledge through production of the work, which is research by design.

The proposal of this text is that concepts and keywords such as *type* and *selection* applied to a *standard* established by *experimentation*, and problems which have been well-stated (Le Corbusier, 1927, pp.131-48), open discussions corresponding to research questions, hypotheses and research methodology, bridge the way to research concepts: originality—that research develops new knowledge, insight and cognition, rigour—use of relevant methods and theory development, and significance—an account of the relativity of the work to relevant areas of knowledge. The Darwinian approach of purism with refinement through the selection and development of a type resembles the research trial, where a new cognition, case studies, empirical data and testing are summarized and made available for peer review. The demand of research that an experiment be repeatable can surely not be transferred directly to architecture but it appears to be an accepted practice among architects: that you stand on the shoulders of others, re-read architecture and even restore architectural periods or styles as with, for example, the reappearance of Classicism in several periods as more or less a direct point of departure for new proposals.

The Modern Programme—the home of man

The modernists, and especially Le Corbusier, phrased the programme for the modern house and the modern city. The elaboration of the modern programme was not the work of a single man—far from it. Le Corbusier was not the first or the only one, but rather continued to build on the results of others. However, he played a decisive role in synthesizing in text and demonstrating in his own works.

The agenda of modernism was primarily to change the construction task. Throughout most of the eras of architectural history, the construction task remained unchanged. The style changed more than anything else, as did lifestyle and culture, but architecture remained reserved for the rulers of society and the social upper class. With the advent of modernism, architecture expanded its field, and the construction task was formulated in relation to all social classes. Council housing, the residential block of flats, became the main task. Le Corbusier expressed it like this in the introduction to his short manifesto, *La maison des hommes* (The Home of Man) from 1942: “... *people live in poor conditions; this is the real, the most profound reason for the battles and upheavals of our time.*” With modernism, the home of man became the primary task of architecture (Le Corbusier, Pierrefeu, 1948, p.11).

In the Modern Movement and its organisations, for example CIAM (Congrès International d'Architecture Moderne, founded in 1928), ASCORAL (Assemblée the Constructeurs pour une Renovation Architecturale) and Nordic functionalism (Sørensen, 1933), is a clear pursuit of science and research, distinguishing the ideology and methods of the period from that of previous periods, and discussions somewhat based on scientific analysis and recognised knowledge as foundation for professional programmes. Demonstration by medical science of the link between human housing and health is an example of research that gained crucial significance for the development of modernist ideas about healthy housing, air, sunlight and hygiene in the home—technical installations, heating, water and a minimum of space per person. Health and hygiene became a key item on the agenda for all housing construction, also in major cities, and research-based knowledge from other disciplines formed a direct and operational part of the architects' projects and ideology. Conversely, the executed works and experiments of architects contributed to unfolding the link between health and housing conditions and, in the long term, to showing that this connection is not conditional on specific solutions. Where doctors initially sought answers in the direction of the garden city, the main movement around CIAM took it upon itself to combine healthy housing with city density because, already at that time, city density had been recognised as a necessary and culturally and economically preferred response when compared to suburban spread.

Theory building from practice

Le Corbusier's thoughts on architecture and urbanism were fundamentally based on the dwelling and habitation—as a human right and a personal matter. Modern architecture and the city should ensure the individual a home and a private haven corresponding to the standard of society (The Athens Charter, 1933).

Le Corbusier phrased and developed the modern house and the modern city. He did so in practice and in theory. And he did this as a combined answer to function, structure and aesthetics. Even in the first volume of his complete works 1910–29, the outline of the answer was clear: the mass-produced house and the Dom-ino House, the practice of the white villas and the five points of a new architecture, the four compositions and the Pavillion de l'Esprit Nouveau as the exemplary residential block of flats, and the Plan "Voisin" de Paris for 3 million inhabitants.

Le Corbusier's theory building from practice can be seen in his theorisation of *The Five Points of a New Architecture* (Le Corbusier & Jeanneret, 1929, p.128). Published in 1926, *The Five Points of a New Architecture* became the ruling manifesto for a mod-

ern architecture, combining advances in material development, technology and construction with new ideals for a social architecture and its place in the city. The points: 1. Supporting columns, 2. Roof gardens, 3. Free plan, 4. Horizontal windows, 5. Free facade.

This was an urban, social and societal programme, which Le Corbusier followed throughout his entire life, and it is fascinating that the rich man's Villa Savoye contains all of the same programme points as the high-rise building Unité d'Habitation in Marseilles. The Five Points constituted a cross-laced unity, a programme for habitation and for the interlinking of residential and urban planning and the synthesis, or "research result", of years of writing, designing, testing and building. The Five Points were developed through the design process and could only be formulated after 12 years of design practice.

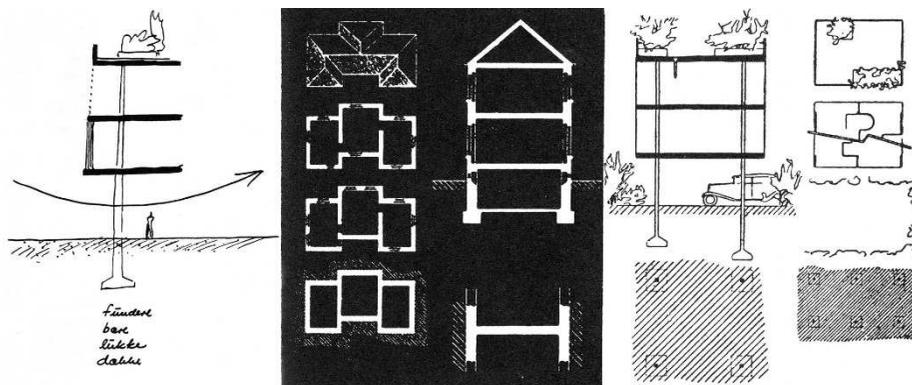


FIG.1. Le Corbusier: The Five Points of a New Architecture - 1. The supporting columns, 2. The roof terrace, 3. The free plan, 4. The horizontal window, 5. The free facade

Le Corbusier's work towards The Five Points and its foundation in design of the Dom-ino Houses from 1914-15 and the development of Maison Citrohan 1920-22 represent a design process in which architectural theory emerges from a direct engagement in practice. It represents the development of a building type with a specific type of construction and a dwelling type combined into a city-model. Twelve years before the theory of The Five Points, in 1914, Le Corbusier and Max Dubois developed the *Dom-ino system*: a construction principle intended for a fast and cheap reconstruction of Flanders after World War I. The system consisted of slabs, columns and stairs. Originally, the Dom-ino house was a modest, traditional

house justified by its cheap construction of infilling walls, with materials recycled from war ruins. The Dom-ino house was first publicised as a small masonry one-family house and illustrated with a small skeletal figure. Later, in *Œuvre Complète 1910-29*, it is the structural system and the actual concrete structure that is given primacy, while the actual proposal of the house is suppressed. Here, the Dom-ino figure stands as an iconic signature of the open city and the modern block of flats, able to be repeated indefinitely as a prototype for the first industrialised housing complex and expressing, so to speak, the purpose of the block of flats in ultimate terms: to establish floor above floor. The Dom-ino skeleton drawing had become the Modern Movement's most immediate and clear icon (Eisenman, 1979, pp.118-28) developed long before this potential was recognised by Le Corbusier. From the diagram that emerged as a direct part of a practice-based exploration, an embedded knowledge was extracted and generalised, becoming the synthesis of a subsequent theorisation. The Dom-ino house and The Five Points were linked to *the Laboratory of the White Villas*, but the programme points gained their real significance as a programme for the city and large residential blocks of flats. This was where the roof terrace and the columns revolutionised the house, whilst the villa on the ground did, after all, quite alright without.

The house skeleton was a sign of a modern building, which increased the city's density and productive forces, shortened its transport work and made it possible to draw sunlight and greenery into the city. The independence of the house skeleton, the room-grid, expressed that the building's structure was, in reality, able to accommodate all types of functions and cover any construction task. Plan and facade were liberated, and the contour of the house became free—the exterior form became free and the interior distribution became free—with function only having little significance. The performance specification defined the task, the requirements to the house, its climate, technical installations and layouts rather than the form, which could more or less be chosen optionally, but disciplined by the plan, a functionalistic way of thinking and economy.

In the 1920s, Le Corbusier developed the housing type *Maison Citrohan*, which introduced the five points and a distinctive combination of double-height and sunken spaces from which the housing type is developed and varied in villas, terrace houses and apartment blocks from *Immeuble Villas*, *Pavillon de l'Esprit Nouveau* to *Unité d'Habitation*. Across these very different situations and solution proposals, the housing type appeared to remain clear. Varied on the same theme and in the type's combination with the Dom-ino skeleton and later with an actual skeleton frame, the proposal for a universal building type and urban home appeared—*“une seule maison pour*

tous pays" (Boden, 1989, p.78)–featuring double-height outdoor space, double-height indoor space and freely modulated room partitions. It was potentially a volume whose interior could be shaped by the individual inhabitant, builder or architect, and whose private outdoor space placed the block of flats on an even footing with the garden house.

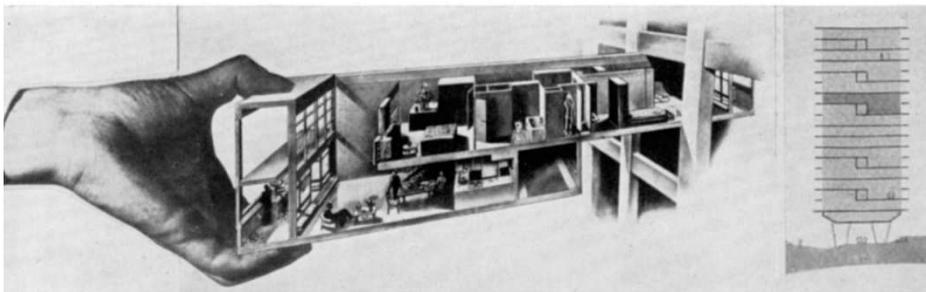
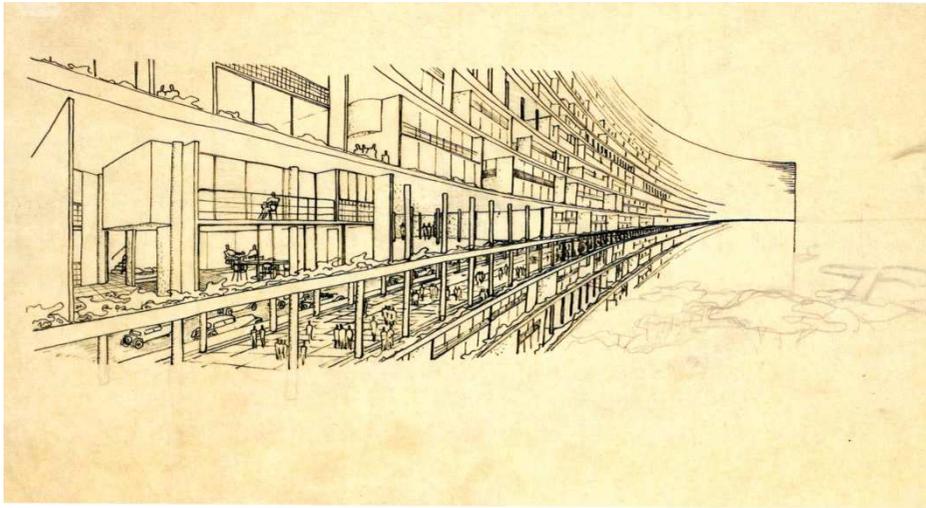


FIG.2. Le Corbusier: Masterplan for Algier, The Viaduct 1931, L'Unité D'Habitation, Marseilles 1947-52, apartment - the bottle.

Is it Research by Design?

The intention of this text is to describe how the modernist's attention toward the future and the becoming in architectural theory building is aligned with theorising

propositions made in what we today call practice-based or research-by-design modes of reflection, namely through drawings, models, texts, prototypes and buildings. The process from the Dom-ino skeleton toward an actual room grid and Maison Citrohan toward The Five Points represents Le Corbusier's type-building and can be seen as steps into architectural theory based on analysis and developed through design and programme. The Dom-ino system was created from the ambition to build and to realise architecture rather than to theorise modernity. However, it is through this direct engagement with the *"intelligent and creative practice"* of building (Allen, 2000) that Le Corbusier was not only able to situate an emerging technological platform with a political and social programme for a new architecture for the 20th century, but also imbue this with a new spatial distinctiveness that was to radically and profoundly change the way we think our built environment. The Five Points, along with the Four Compositions (Le Corbusier, 1929, p.189) and a host of other contributions, was to become the central thesis of an architectural ideology that was to challenge society as a whole. As such, this contribution to knowledge had immense authority on architecture as a field of study, research and practice. Furthermore, this theorisation of The Five Points was projected forwards towards the imminently realisable rather than backwards as a validation of the already realised.

The issue under discussion is whether the works of Le Corbusier can be compared with research process and methodology—with research by design. Beyond their immediate architectural quality, the realised works, sketches, texts and proposals represent a cognition of the city and housing, which goes far beyond the programme's brief formulations and sketches. The "research result", the Five Points, the Dom-ino icon, the housing type and city-models contain analyses and proposals for the future, which are later rationalised, examined and reviewed by peers through exhibitions, publications, international conferences and realised works. The diagram-form is open but presents a complex realisation and action instructions which in content are no less accurate than the written word and attain a level of public recognition among field practitioners. The testing of the proposals and the results of Le Corbusier and other architects were not governed by a research tradition and the analysis was not primarily generated in order to achieve recognition. The architects chose the programme and the prototype as a reporting form, but the discussion was not uncritical and the proposals allowed for evaluation. The project was ideological, but the analysis was consistent in relation to the issue and the location, the specific needs between and after the two world wars. The processes and discussions framing the Modernists are not far from the EAAE Research Charter definition: *"Architectural research meets the general criteria of originality, significance, and rigour. It produces*

forms of output and discourse proper to disciplinary practice, to make it discussable, communicable and useful to peers and others. It is validated through panels of experts who collectively cover the range of disciplinary competencies addressed by the work” (EAAE, 2011).

Generally, one can hardly speak in terms of science in the context of the heroic project of the modernists, and many have subsequently questioned the validity of the programmes (Koolhaas, 1978). But at the same time, the contribution of the programme development and the works to professional and societal knowledge is not fundamentally different from analyses and research results in other parts of the humanities. Research in architecture generally satisfies its needs in the humanities tradition but does not always do this comfortably, because the subject itself ranges from natural science and sociology to art and because the most important way in which the architect achieves new cognition is through work with form and space, drawings, models and completed works. As with the rest of the humanities, architectural research involves ideology and interpretation in coordination with empirical observations, systematic tests and trials. The scientific ideal is to produce explanations which have enduring validity and are produced in a systematic, empirical and objective way, which means moving from observations of specific instances to formulations of general laws. In general, the goals for academic branches in the humanities are not exact universal laws but more or less an interpretation of the particular and singular. Mostly, the humanities are based on previous writings and widely accepted arguments, theories and philosophy, and in that sense, research in the humanities is generally subjective in character, and fundamentally, there is no such thing as objective knowledge in this field of research (Archer, 1995). Architectural research therefore has the same objectivity as the other humanities. Architecture, architectural proposals and research in architecture are social constructions and thus dynamic, changeable, normative and open to criticism, even though actual scientific methods and processes are also included, and the research method establishes both nomothetic and normative values, which is an unavoidable consequence of the nature of research and architecture.

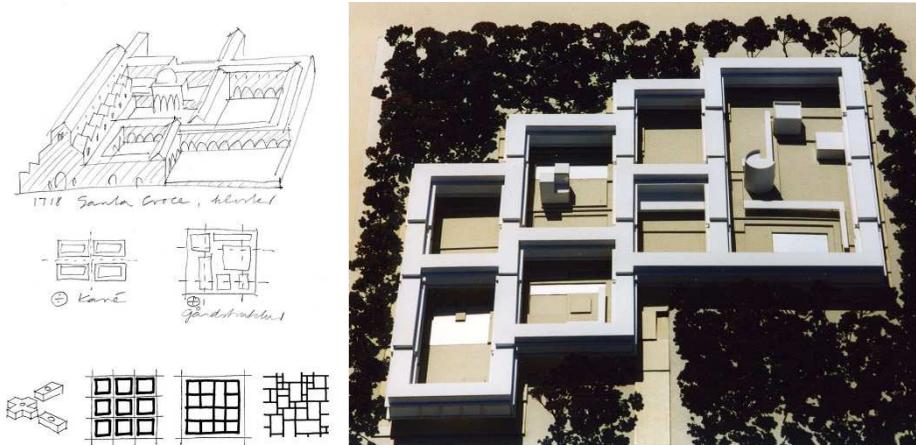
The historical circumstances, the time and location, of the works of Le Corbusier did not make the issue of research relevant, but the originality and significance of the proposals and the critical test of time make it meaningful to recognise this work as research by design. The proposals are thereby being considered within a context for which they were not intended and they are not able to be judged on all aspects based on the criteria of today. What is decisive is that through the design process a cognition is developed which adds something new to the individual projects,

diagrams, notations or figures, and which brings to light knowledge that was not visible before: that the diagram and the figure contain a potential which is exposed through investigations, in which design plays a decisive role, methodologically and as outcome. The text concludes that this is the case and that the inherent knowledge and prospective use of the proposals appear with a special vitality through the development of works as generalised types.

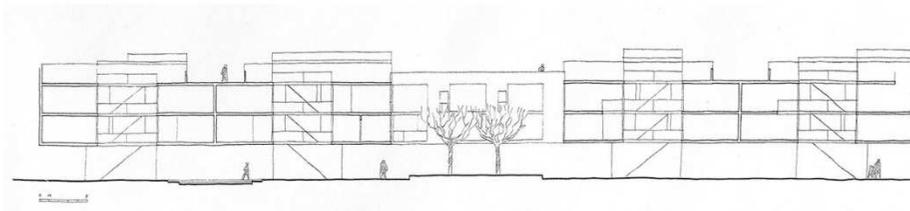
The programme on a contemporary agenda

The modern programme instituted a new pact between house, city and nature, of light, air, a view from the buildings and nature between the houses and on their roofs: health and hygiene for everybody, also in the cities. The works, types and programmes developed still currently hold originality and validity that goes beyond the individual project and makes re-reading possible. Today, the issue of sustainable development and urban and population development puts city density once again on the agenda and identifies the garden city as a less sustainable form of living. The Five Points, housing types, the open room-grid of the block of flats, the high density of cities and linear city development comprise an urban potential, freedom and functional use, making them current in this forward looking perspective.

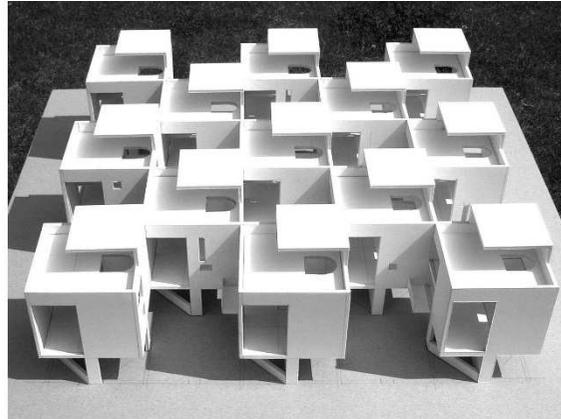
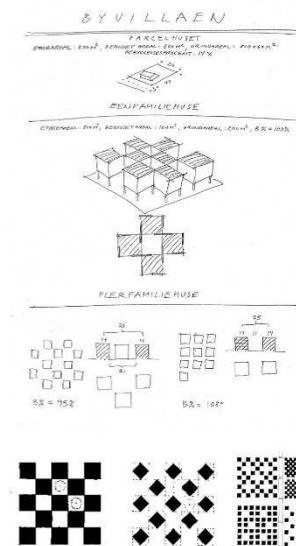
The paper presents building types – examples and proposals developed by the author. The intention is to illustrate a combined practice of investigating architecture's history and theory with designing models and types. The projects are based on the outlined programme points, housing types and open constructive systems. They all have densities similar to that of the Municipality of Frederiksberg (Denmark's most densely populated municipality), they are served by public transport and have traffic grids and urban spaces that allow greater traffic-free areas. The housing types seek to put the modernist programme onto a current agenda, re-reading the outlined types and programmes, and are presented as examples of research by design.

Building types - examples and proposals

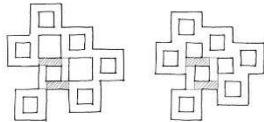
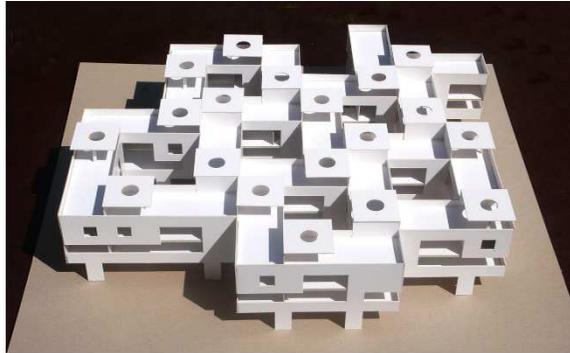
The Grid has connected courtyards and gates and is based on Le Corbusier's five points, housing type and the open room-grid of the block of flats. The traffic grid is greater than the city block, in order to obtain larger areas without traffic. In the Grid, street space still exists, but the proposal points to the square and courtyard as a structuring element. The buildings are proposed with raised lower levels and numerous openings with visual and easy connection between the urban spaces. Discusses the urban block's spacial and traffic potential compared with the grid.



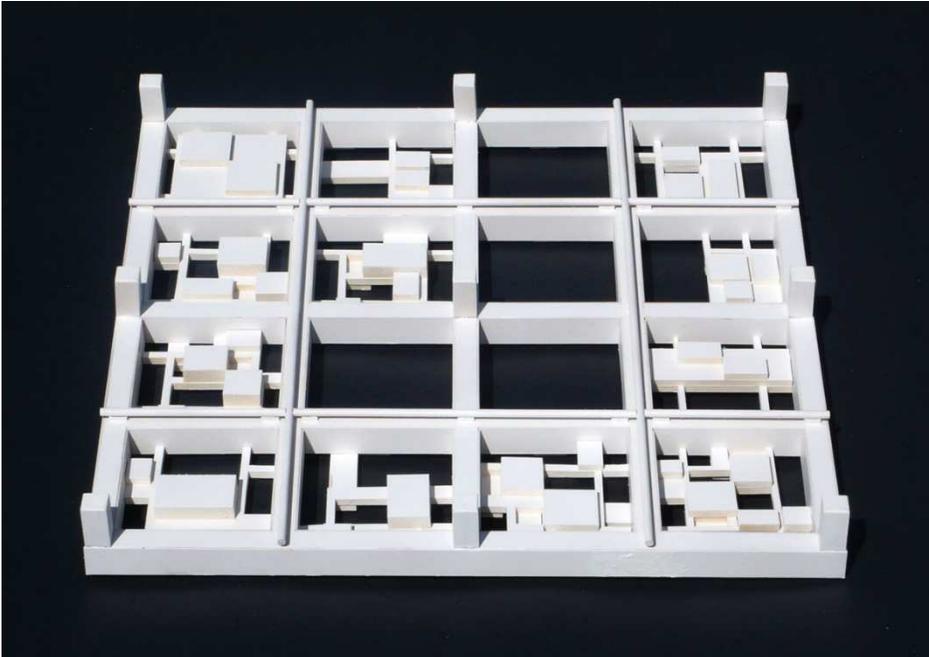
The Casbah: Low-dense urban structure based on Le Corbusier's five points: the development consists of courtyard houses built closely together. The individual home spans from bottom to top, with access from below and a private rooftop terrace. The project proposes a collective living arrangement, where a large common area of indoor and outdoor spaces binds the building together and provides direct access to the private residence. The building structure positions itself functionally and in terms of density between the block of flats and single-family home. References to the housing type are found in the low dense cities of antiquity, in courtyard house types from Asian societies, in China and in the Arab Casbah. Discusses the built together structure's potential compared to a structure of elements.



The Villa: low-dense building structure based on Le Corbusier's five points and housing types. The type presented takes its starting point in the detached house and the courtyard house. Various densities and degrees of assembly are investigated. The minimum courtyard size is 8–10 m. The home spans from bottom to top, has the four facades of the villa and is oriented towards four courtyards. The distribution of rooms on several floor, transmitted light, double-height rooms and opportunity for flexible placement of living rooms and bedrooms allows for good lighting conditions. The facade has offset openings, whereby the view between the houses becomes smaller. Discusses low-dense structure's potential in urban densification of suburbs.



The Villa: low-dense development based on Le Corbusier's five points and housing types. Two-storey houses in a swastika-shape around a courtyard of 8-10 m. The home spans from bottom to top and has frontage on two courtyards. The house is lit from two sides by large offset window sections and double-height rooms opening to the south. The lower floor can be open and public or closed and private. All the houses have a rooftop terrace with a small sunroom and a covered outdoor area. Discusses low-dense structure's potential in urban densification of suburbs.



Building and transport structure: the proposal is based on Le Corbusier's five points, housing type, room-grid and the idea of transport integrated into the building structure. The connected buildings may contain internal streets—at ground level as open arcades, on the floors as indoor walkways and on the roof as continuous paths and park lines. Public transport follows the buildings. The proposal shows horizontal-running elevators or PodCars in rooftops pipes. The proposal combines a built together wing structure with tower houses and low-rise buildings. Discusses public transport as the predominant mode of transport.

References

- Allen, S., 2000. *Practice, Architecture, Technique and Representation*. Introduction. G+B Arts International imprint.
- Archer, B., 1995. *The Nature of research*. Co-design, Interdisciplinary Journal of Design.
- Bjerrum, P., 2012. *Three Tales on Architecture's Founding*. The Royal Danish Academy of Fine Arts, School of Architecture, Copenhagen.
- Boden, C., 1989. *Modern Arkitektur – Funktionalismens uppgång och fall*. ArchiLibris Bokförlag, Helsingborg.
- Borgdorff, H. 2004. *The Conflict of the Faculties. On Theory. Practice and Research in Professional Arts Academies*. In *The Reflexive Zone*, Utrecht, HKU.
- Borgdorff, H., 2005. *The debate on research in the arts*. Amsterdam School of the Arts.
- EAAE Research Committee, 2011. *Charter on Architectural Research*. European Association for Architectural Education.
- Eisenman, P., 1979. *Aspects of Modernism: Maison Dom-ino and the Self-Referential Sign*. *Oppositions*,
Journal for Ideas and Criticism in Architecture. Vol. 15/16
- Frayling, C., 1993/4. *Research in art and design*. *Research in art and design*. Vol. 1, nr. 1. Royal Collage of Art: Research Paper. London.
- Le Corbusier, 1923. *Towards a New Architecture*. Architectural Press. An imprint of Butterworth-Heinemann, Linacre House, Jordan Hill, Oxford, 1927.
- Le Corbusier, 1925. *The Decorative Art of Today*. The Architectural Press: London.
- Le Corbusier, 1926. *The 5 Points for a New Architecture*. *Almanach de l'Architecture Moderne*. Edition G. Cres, Paris.
- Le Corbusier & Jeanneret, P., 1929. *Œuvre complète I-VII, Vol. 1, 1910-29*. Birkhäuser Publishers for Architecture, Basel.
- Le Corbusier, 1930. *Precisions on the Present State of Architecture and City Planning*, Cambridge: MIT Press, 1991.
- Le Corbusier & CIAM, 1933. *The Athens Charter*, New York: Grossman Publishers, 1973.

- Le Corbusier, 1935. *La Ville Radieuse*. Paris, Editions de l'Architecture d'Aujourd'hui.
- Le Corbusier, Pierrefeu, F. de., 1948. *The Home of Man*. Architectural Press, University of Michigan.
- Le Corbusier, 1967. *The Final Testament of Père Corbu (Mise au Point)*. New Haven: Yale University Press.
- Koolhaas, R., 1978. *Delirious New York: A Retroactive Manifesto of Manhattan*. The Monacelli Press, 1997.
- Loos, A., 1910. *Ornament and Crime*. Innsbruck, reprint Vienna, 1930.
- Nilsson, F., 2014. *Making, Thinking, Knowing Architecture. Notes on Architecture as a Making Discipline and Material Practice*. In: *When Architects and Designers Write Draw Build?* Arkitektskolens Forlag, Aarhus School of Architecture, Aarhus.
- Ramsgaard Thomsen, M., Tamke, M., 2009. *Narratives of Making: thinking practice led research in architecture*, CITA Centre for IT and Architecture, The Royal Danish Academy of Fine Arts, School of Architecture, Copenhagen.
- Rohe, M v.d., 1962. *Conversation with Peter Carter*, AD, London.
- Schön, D., 1983. *The Reflective Practitioner. How professionals think in action*, Temple Smith, London.
- Sørensen. A., 1933. *Funktionalisme og Samfund*. Forlaget Fremad, København.
- Verbeke, J., 2013. *This is Research by Design*. LUCA, Sint-Lucas School of Architecture, Brussels-Ghent.
- Weber, N.F., 2008. *Le Corbusier - A Life*, letter to Ritter, October 1, 1918, Paris. Alfred A. Knopf, New York.