Container and Urban Raster
– elements in the theory of urbanism

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In contemporary urban theory and in architectural practice, the primary focus is on the process, and less on the end result. Seen in that perspective, it might seem strange to base an analysis on form typology in architecture and urban development. It is however, my experience from architectural practice that major architectural and urban projects are often founded on form-based historical models, or that new building types are developed with qualities that are in contradiction to existing types. Also, in the historical analysis of a period, its architecture, and its relation to the urban context, formal typology is often used.

Even though it is rare to meet architects who admit their use of typology, I believe that its use in the creation of architecture is widespread. Many of the world's most renowned architects have made new architecture and produced new architectural forms and hybrids on the basis of the knowledge of the history of types and forms. So, if the purpose is to analyse the development in urban forms and architecture, a number of questions arise. Firstly, whether it is possible and reasonable to operate with types of architecture and types of urban form? Secondly, how to organise the different types of buildings on the surface in an urban pattern? And lastly, what different types are to be organised?

I have just completed a research project concerning architecture and urban planning in the Danish welfare city from the 1950's to the 1990's.[1] The analysis in this project is based on typology and gives priority to geometrical and formal architectural analyses of architecture and urban planning.

In the analysis I use what one could call a simple modern typology of form – a typology that categorises building types in modern urbanity, and a typology that focuses more on form and less on function and programme.

This kind of analysis is based on rather descriptive tools and simple readings of the city that, although narrowing the object to be observed, are also intended to sharpen focus on the aspects of form in the development of urban landscapes during that period.

Type has acquired many different meanings – that

of functional types, form types, stylistic types, types of construction, and types of scale. I have focused on the typology of form and geometry – a descriptive tool that provides the platform from which to understand some of the complex networks and forms of the last 50 years of urbanisation in Denmark.

An 'evaporation' of the chaotic urban environment created in Denmark over the last fifty years has been made, and on the basis of this it is possible to put forward some simple abstract types that are very visible in our urban environment in different variations, both as architecture (container), and as patterns of infrastructural organisation and expanses of land (urban raster).

In this article I will discuss the typological analysis and make a very short representation of the descriptive form types.

But before I describe the content of the typological form analysis, it will be necessary to briefly mention some historical conditions. I will demonstrate how the 'architectonic object' has developed into an independent object in the last 200 years, that is, as relatively independent from the traditional urban fabric, and perhaps as the condition for the very abstract concept of the container.

The birth of modern types

The architectonic object is a historical conception marked by time. One could call the last two hundred years the history of conquest, and the process of independence of the architectonic object. In the pre-modern European City there was a continuous urban fabric. Buildings were continuously interwoven as urban blocks in many different ways; from the bent and narrow streets of the medieval city, to the well-ordered blocks in the urban plans for the baroque city, as for instance in Southern Friedrichstadt in Berlin. Historically the 'urban fabric' was the background on which isolated architectonic objects could represent themselves.

If we examine the last 200 years, we will witness the birth of functional and formal types parallel with their description from Durand to Nikolaus Pevsner.[2] The museum has developed from isolated collections to what we today understand as a 'museum type' being an independent building. This is also true in the production sector where the development has been from integrated production, as for instance breweries in the city block, to independent types and buildings. The same processes of independence are found when it comes to libraries and schools, opera and concert buildings, department stores, offices and shops. Often the development has been from a situation where a function was located in a minor area of the urban block, to a situation where the function has spread to the entire city block, and at last has raised to the sky, as has been the case in many American cities. What we have witnessed is the process of independence for types, and their performance as sculptural objects; a process that has produced 'the city of objects' or 'the city of figures'. This has especially been the case within the era of modernism, and has fundamentally changed the street and the spaces of the city.

The fundamental principles for the modern movement CIAM were written in the 'Charter of Athens' from 1933. When it comes to new urban development following CIAM principles[3], it has often caused both the death of the urban street, and of pedestrianism. The scale of distances has increased, and the car has become a necessity. Roundabouts have eliminated street corners, and buildings no longer flank intersections. Public spaces, as we knew them from European history, have disappeared, and in their place, difficult to describe empty, or undefined spaces have emerged between sculptural forms. This results in the introduction of a new urban raster in the European city, as I will later comment on. In a city scale it also means a new definition of urban transportation by replacing the urban street flanked by urban facades and the street as figural emptiness.[4]

When we observe a two-dimensional figure/ground plan of a city before modernism, it is nearly black, however, the same kind of plan for the modernist city is almost white. In the urban plans of pre-modernism the plan consists of non-modulated masses of buildings, but with a strict, manipulated and defined emptiness or void – that of the streets, the squares and the courtyards. The urban plans of modernism consist of solid, manipulated masses of buildings and non-modulated voids. Every building is now an isolated sculpture – a

monument, as we see in Hansa Viertel in Berlin, Brasilia or in Le Corbusier's urban plan for the city centre of Saint-Die. This means that the difference between public and private has become difficult to discern, and also that public buildings are no longer more sculptural than other buildings, tending then to become anonymous.[5] Every building can be recognised as an isolated and independent form. As a container.

In the early 1950's there was a change in the conceptions in CIAM, and thoughts concerning the continuous building emerged. Peter and Allison Smithson had a great impact on this. Their studies resulted in systems of continuous buildings that, according to them, corresponded to the network of existing social relations, systems that confronted the earlier doctrines of the Unité d'Habitation and the neighbourhood. The architects Candilis, Josic and Woods were also influential and developed several projects based on the ideas of continuous buildings, for instance their project for the central Frankfurt am Main and for Freie Universität of Berlin.

In the post-war revision of the concepts of CIAM, the tendency moved away from the object and towards the structure and the conception of the network – a tendency that often resulted in building systems that took the form of the mega-object.

In the last twenty years of transformations in European cities such as Berlin, Rotterdam and Amsterdam, it is obvious that the use of an abstract typological repertoire has been widespread. Even if the concept was contextual, the mega-transformations of the European metropolis were contextual in a special 'abstract' way: that of the 'abstract' site. This was less specific, less regional, less historical, but more average, more general, more formally abstract, and generated more simple types. This development towards the abstract context can perhaps be described by the concept of the container, and these few historical remarks should make probable an analysis of the different architectonic objects as types of containers.

The concept of the container – container without a programme

In my research I have primarily identified different forms in the urban landscape – this without much attention to their function. But is there a reason for this separation of form and function? It is the hypothesis that it is reasonable, and that this will increasingly become the situation in the real praxis of construction.

The German architect Hans Kollhoff states that present-day programmes are no longer capable of generating meaningful forms. This is due to the fact that in contrast to the 19th century and the beginning of the 20th, wholesale privatisation has transcended public power, and the tertiary sector has assumed the main role – that which was formerly occupied by the production industry.[6] This opens the possibility for the con-

cept of the container as perhaps a positive situation that can make the modulation of form, materials and space free of earlier restrictions.

We find a similar approach in the article Types are Us, written by Karen A. Franck. According to Franck, the current practice in urban design is to create urban structures that can accommodate many different functions. This way of working is a critique of the modernist notion of a close fit between form and function. Franck expresses a genuine discomfort with the practice because the real client for the structure is capital – in her opinion the only truly mobile element of post-modern culture.[7] These remarks support the thesis of the increasing possibility for analysing container forms with less focus on the functional aspects.

Through the analysis of the history of buildings and their shifting functions over the span of time, it was obvious to Aldo Rossi that architectonic objects had a certain independence. There is an incredible time lag in architecture, what Aldo Rossi has called its 'indifference to function'. What is specific about a building is less its exclusive adaptation to particular functions than its capacity for representing ideas.[8]

Anne Vernez Moudon[9] writes regarding Aldo Rossi, and the approach of typology in general, that all typological work must be linked to a measure of time. Built and open spaces together constitute form. They are persistent; they dominate the definition of the built landscape, as use and function come and go according to changing social practices and related needs.[10]

According to Aldo Rossi, architecture could be seen as part of a collective historical experiment where certain figures and forms have the power to become archetypes, independent of the different functions they contain.[11] This almost ontological 'history' based on the necessity of the appearance of certain forms, is very distant from the standpoints in my research, but it is of great importance in that Aldo Rossi emphasised the autonomy of architectural forms. His point of view was a critique of the functionally defined building types of modernism, and a critique of its ideology.[12] The ideology of functionalism did not allow a typology based on form, although it should be mentioned that Le Corbusier descibed form types developed from modern technology and new possibilities of life. He visually described them as for instance linear types, y-types, slab types, lens types and several other types.[13] However, a concept based on pre-existing models movable from one place to another was in principle far from the ideology of functionalism.

Mies van der Rohe was one of the architects that most clearly gave priority to form with a relative independence to function. He also argued that the purposes a building serves are always changing, and that we cannot afford to tear down the building. Therefore we can turn Sullivan's slogan 'form follows function' upside down, and construct a practical and economical space into which we fit the functions.[14] This practical and economical space was for Mies a general type of form, sufficiently robust to handle different challenges.[15]

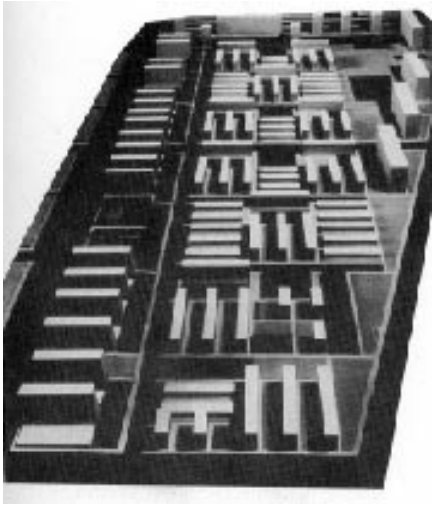
In this way Mies worked with pure and general form, argued both from practical and economical problems, and the functional problems were often seen as a nuisance.[16]

The following remark from Mies to Hugo Häring also illuminates his priority to design rather than notions strongly tied to functionalism: "Mach deine Räume gross, Hugo. Dann kannst du sie verwenden wie du willst."[17]

These remarks support the concept where the typology of forms provides the platform for my research. In this research I make use of the concept of the container as a category that classifies housing and post-industrial buildings based on configuration. As mentioned previously, in post-industrial societies building types are not much related to the functions they have to contain. In addition, there is a tendency that containers are increasingly being constructed in relation to the variation in different functional programmes, or even constructed without a programme. The concept of the container is defined in that perspective – as a developing concept with very loose relations to function.[18] I will suggest here an abstract definition of the container: The container has a form, a surface that functions as climate screen and filters daylight, an interior construction and structure that support the skin and the inner separation of volume, and an internal organisation and division of volume.

This tendency to separate form and function has been theorised by Peter Eisenman. He has done several model studies with priority on manipulation of the form of architecture, and only secondarily with interest in function. In the work of Peter Eisenman there is a non-direct reflex of the development of international architecture. In the discussion of the relation between form and function Peter Eisenman states:

> The main thrust of my work is the need to supplement an architecture that will always be and look like architecture, the need to break apart the strong bond between form and function, is what my architecture addresses. In its displacement of the traditional role of function it does not deny that architecture must function, but rather suggests that architecture may also function without necessarily symbolising that function. [19]



The concept of the urban raster

The concept of the urban raster is a very important element in illuminating the relations between building types and urban form. And in this respect it is the basic element in urban design. According to Anne Vernez Moudon typology used in the USA is often very weak, and flawed with ambiguities.[20] The majority of typological categories are most commonly based on functional or aesthetic/stylistic criteria. Moudon describes a concept for urban design called typomorphology. Mouden maintains that typomorphological studies reveal the physical and spatial structure of cities. They are both typological and morphological because they describe urban form (morphology) based on detailed classifications of buildings and open spaces by type (typology). Typomorphology is the study of urban form derived from studies of typical spaces and structures. This concept is theoretically based on the typological classification of buildings and spaces, which is similar to my differentiation between containers and urban raster.

According to Anne Vernez Moudon a typomorphological approach to defining type differs from other approaches. Type in typomorphology combines the volumetric characteristics of built structures with their related open spaces to define a built landscape type. And the element that links built spaces to open spaces is the lot or parcel, the basic cell of the urban fabric – the link between building scale and city scale.

The concept of the container and the urban raster establishes the relationship between object and city lot, between architecture and the scale of the city. The concept of the urban raster corresponds to city form with the priority on two dimensions. The concept of the urban raster has to be combined with the concept of the container before it can characterise city form in three dimensions.

The abstract definition of the urban raster is based on a metaphor where the urban raster is characterised as a technique of simplification based on figure and ground. A material comprised of an infinite numbers of shades of grey is simplified to either black or white. This reduces the amount of information. To do this, a number of different geometrical grilles comprised of e.g. points, lines or diamonds and possessing a certain density are used. The urban raster operates with the notion of figure and ground, and is characterised by a geometry, or a pattern that has density. The geometric pattern can be points, lines or diamonds. For the concept of urban raster I use lines.

In his book on post-war urban structures, Albert Pope[21] clearly operates with urban patterns, as for instance the grid and the ladder, and in my research I

have extended the number of known urban organisational patterns, and at the same time developed this into the concept of the urban raster.[22]

The American architect Steven Holl is one of the very few who has done research on abstract building types and their relation to urban design. His research includes an analysis of different American building types, for instance the T-type, the I-type, the U-type and others. They are all abstract geometrical interpretations of existing buildings. The research also includes analyses of different grid types, and the relation of the buildings to the grid. Steven Holl's studies search for the conceptual cement binding urban planning and architecture.[23] This is also the purpose of my concepts of container and urban raster.

An empirical typology of containers

The following is a very brief examination of container- and raster types that have been utilised in my research on the development of the Danish welfare city.

In the search for the typical forms found in the Danish cityscapes I have used simplification as a tool. This simplification is necessary despite the fact that it reduces information about local variations and differences. These typical and simple forms are dominant in the world of architecture and dominant in the urban plans for large-scale city landscapes.

The Slab

The first container type I will mention is the slab type. This type is found in the 19th century in Cerda's plan for Barcelona and in the American grid city. In the 1930's the type dominated the education in the German Bauhaus Academy, and was the basic tool in projects for the design of large housing schemes, often with Ludwig Hilberseimer as teacher.[24] Particularly in European urban planning of the 1930's the slab had a tremendous influence. The master plan for Amsterdam South of 1934 was originally planned with urban blocks. But when it was realised a few years later, it was built with opened blocks as slabs oriented according to the sun.[25] The slab occupies a special position in this century, being a key factor in the critique of the early functionalist city.

Walter Gropius argued at the CIAM conference in 1931 that high buildings constructed as slabs in the city could guarantee light and air for the inhabitants. He argued for buildings with 7 or 11 storeys.[26]

In general, one can define a slab as a simple rectangular 3 dimensional form, often with a rectangular plan. It is one of the most common types in the urban landscape, and usually simple to build and organise. A variation in the form is often achieved with an appendix placed on the long side.

In the 30's the first Danish housing projects based on functionalism were realised. Blidah Park from 1932–34 was organised as staggered parallel slabs in order to ensure maximum benefits from the sun. The project has pleasant green areas and the apartments have balconies as a symbol of the new area, and as architectonic motive for the aesthetics of the facades. The architects responsible were Ivar Bentsen and Edvard Heiberg, with others.

The slab was the primary element in large-scale urban projects in Europe from the 1940's to 1975 – primarily in the new areas outside the historic city centre, but also in a few projects for the central area of the city. Often the projects were not realised, however, the large project for Lijnbaan in central Rotterdam with the architects Bakema and van den Broek was built in 1952–54.

The large projects from the 60's caused a massive critique in Europe, and it became difficult to use the slab type in the 70's and 80's. As a result other types came to dominate.

The Urban Block

The urban block type is a type constructed around a closed courtyard. In a special model of this type the atrium is covered and integrated into the inner structure of the building.

The urban block plays an important role in the history of the European city culture. The development of the large city block had, in the time of industrialism, a great influence on contemporary urban discussions.

Almost all major European cities in the late nineteenth century, for instance Amsterdam, Barcelona, Hamburg, Paris, Berlin, Copenhagen, based their city

structure on the urban block just outside the city core. As late as 1915 Berlage used the urban block for new development in Amsterdam South, a concept that according to Sigfried Giedion, was at the time a matter of obsolescence.[27]

The urban block was nearly erased by the modernism of the 1930's, and did not appear again until the 70's and 80's when it surfaced in the discussion of 'the reconstruction of the European city'; an agenda that was established for building projects in the central areas of Berlin with the 'Internationale Bauausstellung' (Berlin 1980–87), and an agenda that spread all over Europe from the late 70's. The brothers Leon and Rob Krier[28] were key in developing the concept, and Rob Krier was the architect for housing projects in Ritterstrasse and Rauchstrasse.

The architect Hans Kollhoff has stated that when we carry on the tradition of Berlin, we must accept that 95% of all buildings in the urban context are just normal standardised buildings with mixed functions such as housing, offices and shops, and to contain these functions we have established building types that have proved their success by forming an urban texture of streets and squares.

Housing projects in Amsterdam: the Piräus-building by Hans Kollhoff and Christian Rapp, the Sphinx Superblock by architect Erik van Egeraat, Housing Landtong on Kop van Zuid in Rotterdam by architect Fritz van Dongen, and the project by Steven Holl for the harbour in Amsterdam, all demonstrate a free interpretation of the old urban block.[29]

The Tower

The tower or the skyscraper, often an urban block that has grown vertically, has very short communication distances horizontally, but these have been extended vertically. The relatively small floor space secures excellent conditions for daylight, but the small floor space also makes the tower relatively expensive. In addition, the location of the towers is in relation to land prices.

The tower does not always rise directly from the ground – often having a high base or an urban block built in connection with the tower in the lower storeys. This base communicates with the existing urban context and the height of existing buildings. Mies van der Rohe's Seagram Building in New York is one of the skyscrapers that stands solitarily, rising in its full height on Park Avenue, but having a base on the other sides.

The base is often for aesthetic considerations and often integrated in the design to make the tower communicate with the existing context. In the winning entry by Hans Kollhoff for the Alexander Platz competition in Berlin in the 90's, the skyscrapers are placed on urban blocks in such a way that the block type hides the skyscrapers. In this project the tower is a hybrid between the urban block and the skyscraper.

In contrast to American steel skyscrapers which in the 20's often had a facade of traditional materials such as bricks or natural stone, Le Corbusier's ideal picture of the skyscraper was a very high building with a façade entirely of glass, as can be seen in his project Ville Contemporaine from 1922, and later in his project Ville Voisin from 1925; a building regular in form and utilised as an urban design tool that reserved the floor of the city for nature and circulation.[30] In the project Ville Contemporaine from 1922–24, glass skyscrapers were centrally located, each with a height of 183 meters.

In 1921[31] Mies van der Rohe designed a skyscraper for Freidrichstrasse in Berlin. Also for Mies the skyscraper was a glass-clad building. The building is reduced to a skeleton of construction covered with a curtain wall completely of glass. If we examine the plan, some of the proposals feature free romantic forms, forms which are not normally connected to radical minimalism. The latest project has curved forms that secure sufficient daylight and the play of reflections in the facade.[32]

Around the 1960's skyscrapers appeared on the European skyline. The Italian architect Gio Ponti designed the Pirelli office building in Milan in 1956. It had 32 storeys and arrived dramatically on the skyline of Milan. The Dutch architect Oud built the Congress Building in the Haague, the Danish architect Arne Jacobsen designed the SAS-hotel in Copenhagen, and skyscrapers also rose in the centre of Stockholm, London, Paris and Rotterdam in the years to come.

The Groundscaper

The type I call continuous form or the groundscaper is characterised by a formal continuity in what is often a mega scale. Its real appearance is very different, for instance as Meanderstock in Biljermeer in Amsterdam, or as a low-rise network inspired by the structuralism of the 60's and built in many of the institutions and school buildings of modernism. This type is not only an object in space, but also functions as a maker and demarcater of space. The plan is typically an addition of parts and connections.

The architects Candilis, Josic and Woods – of whom both Candilis and Woods had worked at the office of Le Corbusier among other things on the Unité d'Habitation in Marseilles – designed other competition projects in the early 60's that bear the impression of the continuous building. There are in particular two competitions of note from 1963. In the competition project for the centre of Frankfurt am Main between Römerberg and the Dom, their project was a structure that, according to their text, re-established the human scale that had existed in the structure of the old city centre. The project suggests a continuous building system from the river Main across the central area between Römerberg and the Dom. The structure is a multifunctional building system that contains among other things, a youth centre, historical museum, library, and takes the form of a grid that prioritises a continuous system of circulation. The new centre is an unbroken network.

Candilis, Josic and Woods were members of Team X, and Team X developed their own conceptual vocabulary, terms such as: link, web, stem, spine, that were all related to the idea of connection. The buildings were not seen as complete when it came to programme and function. In the revision of the ideas of CIAM in the time after the war, there was a tendency to give priority to structure and network, and not so much to the object; a concept that often collided with the context and resulted in mega-objects.

In Denmark, the architect Knud Holscher was awarded 1st prize for his competition project for the University of Odense, a project that was characterised by the concept of mega-network. In the built project he used a building system that made it possible to realise an open and flexible structure for the university, and the high architectonic quality is achieved by the quality of the design of the different components, and through the architectural control of the structural principle.

The Large Homogeneous Form

The geometry of the type is difficult to describe as the complex programmes that must be contained can result both in completely unexpected large forms, and in other situations, in very simple forms. The type covers different geometrical forms, and the scale is an independent factor. Maybe somewhat different from the definitions of the other form types.

The large form – large homogeneous – is a special type that corresponds to the American mall, the first skyscrapers, production facilities and industrial warehouses, but has its independent role in the city of post-industrialism. If we connect the history of large homogeneous form together with the history of large monuments in architecture, its history reaches back to the first civilisations. In European history one could mention the early architectural forms of the French architects Ledoux and Boullée. In the last century, Mies van der Rohe was an architect with a fondness for large homogeneous forms. In the Neues National Gallerie in Berlin from 1963, Mies designed a quadratic building for the changing exhibitions – a form differentiated by the formal play between the quadrate of the flying steel roof and the recessed glass wall.

If we make a jump from Ledoux and Mies to Johan von Spreckelsen and his L'arch de Triomphe in Paris and look into the history behind the competition for that project, we find aspects that are important to this discussion about the large form of unity, homogeneity and the monumentality. President Mitterand wanted the building completed by 1989, 100 years after the revolution, and at a time when any fear of monumental buildings and the 30 years of discussion about 35 meter high buildings in Paris, had been swept away. Mitterand wanted en architectonic gesture which could match the Eiffel Tower.[33]

The large homogeneous forms play a role in a serial number of projects where the exterior facade is almost neutral, but where there are fantastic experi-

ments with the variation of forms in the interior. Forms that can be explored in section. OMA's 1989 project for the Grand Library in Paris is an extraordinary example.

An irregular large form of homogeneity could sound like a contradiction, but the Nordic embassy in Berlin is an example where irregular parts seen as a whole make a large irregular homogeneous or closed form. In this way the homogeneous form does not have to be regular and simple to be a form of homogeneity

The Compound Form

The type form of composition or compound form, is a commonly used form, not least of all in the industrial areas of modernism. Is it a form that can easily contain very different functions, and it can also very easily adjust to a very irregular context. It is organised spatially as a composition of different forms. The plan is often additive.

As the previously mentioned slab type is often seen as an important form in modern architecture, it is also applicable in the form of composition type. A form type that very much differs from the form ideals of the earlier epoch.

The Danish architect Poul-Erik Skriver stated that functionalism made a break with the classic European ideals of architecture – that the building was a closed form, where nothing could be adapted and nothing could be taken away. The new, freer building expression opened the possibility for seeing structural problems in a new light. Interior rooms could be formed according to their use, and they could be freely placed in an open progression of space.[34]

And the architect Steen Eiler Rasmussen wrote about the development in the 1930's and 40's that architects no longer felt it necessary to build symmetrical monumental buildings, but rather felt an obligation not to, under any circumstance, build symmetrically. A large building should be decomposed into more bodies, more or less tied to each other.[35]

As a turning point in the historical development of the compound form I will mention Kasimir Malevich and his Architecton Alpha from 1923, and Vladimir Tatlin's Corner Relief from 1914–15. Very early in the 20's Malevich experimented with cubic forms. They related to each other in a fluent way; penetrating, crossing, etc, in a relation of many different scales kept in place by the compositional centring of masses. As early as 1914 Tatlin experimented with different models of the compositional form.[36]

In 1921 and 1922, the central figure of the Dutch De Stijl movement, Theo van Doesburg, developed corresponding ideas and the concept of the basic elements of architecture. The single elements were classical rectangles, and in the sculpture they are floating freely in space, centrifugally around a central block.[37]

Theo van Doesburg and Gerrit Rietveld, who worked on several projects together, were interested in the object floating in space, and they organised volumes and planes as compositions in space. They were often organised centrifugally. Something similar is seen in Frank Lloyd Wright's destruction of the box with the help of horizontal and vertical planes.[38] The most famous De Stijl building based on these principles is Gerrit Rietveld's Schröder House from 1924. Yet another Dutch example demonstrating free composition and the collision of different volumes is the Van Nelle factory in Rotterdam from 1925–31 by architects Brinkman & Van Der Vlugt.

It is often said that the early modernist interest in functional aspects led to their interest in compositional form.[39] But if we look at the Russian artists and the work of the architects from 1915 and the years after, and also analyse the De Stijl-movement in Holland, it is obvious that it was primarily their interest in the formal and the compositional that was the starting point, and that their interest in these aspects melted together with the movement to rationalisation and technification of everyday life in households and workplaces. And Functionalism was given a language.

Arne Jacobsen and Erik Møller won the competition for the Town Hall in Aarhus, Denmark. The form type was a compositional type. The composition of the project is made up of three basic forms. In these three forms there are two important insertions. The three forms are: the large hall of the Town Hall, the high office building panoptically organised, and a lower building section containing service facilities and originally, the tax department. In the competition entry, the three

parts had the same roof, however in the final project there is a curved roof on the lower south building and this makes the composition seem freer.

The Shaken Form

In some cases, a compositional form is replaced by an attempt at mirroring movement thereby generating a shaky form. The shaken form type is a type reflecting rhythms, movements, and a lot of the forms earlier referred to as organic forms. It is a type that contains many differences and architectural concepts, and it is often very complex, changing more regular forms in such a way that they become barely recognisable. The final expression can, in certain examples, look like a very complex fragmented collapse of forms where the parts are difficult to discern.

This type is not in its own understanding a form type, and it sees itself as everything else but a type. Still is it perhaps this consequent anti-typology attitude that makes it possible to name this category as a special type different from the others. It is not common in dense urban fabric, and it is often more expensive to build than more regular types. This type has been studied early in the last century in modern expressionism and later during Scandinavian modernism, as for instance in Alvar Aalto's interest in frozen movements and where analogies to nature provided the primary sources of inspiration.

This type has in past years made an appearance in new editions, also referring to natural phenomena such as in Chaos Theory.

These inexact differentiated forms, 'free' forms, or shaken forms, cannot, according to Greg Lynn, be described in any simple way. They are difficult to describe geometrically. As mentioned, according to Greg Lynn[40] they can be described as inexact forms that resist description. They are more complex, having local variations – something that may not give any meaning to the attempt at geometrical description. This category often has these difficulties as regards geometrical description.

Greg Lynn demonstrates how a multiple part of sections makes it possible to make a description of this type of form. The section based on randomness is the method for its geometry.[41] But for the architect, the section has always offered the possibility of describing local variations in form. So although this is not new, some basic differences between the different form types are mentioned.

In the Guggenheim project Frank Gehry gave a museum the form of a sculptural object, which was later measured, mapped, sectioned, drawn, and then built.

In the years between the 1980's and the 1990's, many different concepts challenged the normal borders of architecture: the field of gravitation, the rectangular, the building as event, etc. But in this sea of experimentation there were several concepts based on references to fields other than architecture itself – references to Chaos Theory, the Theory of the Fold, etc. From the field of natural science came the temptation to make analogies between the fields of natural science, philosophy and architecture. Here the concepts introduced by the architect Peter Eisenman can be seen, although only a few have been realised as buildings.

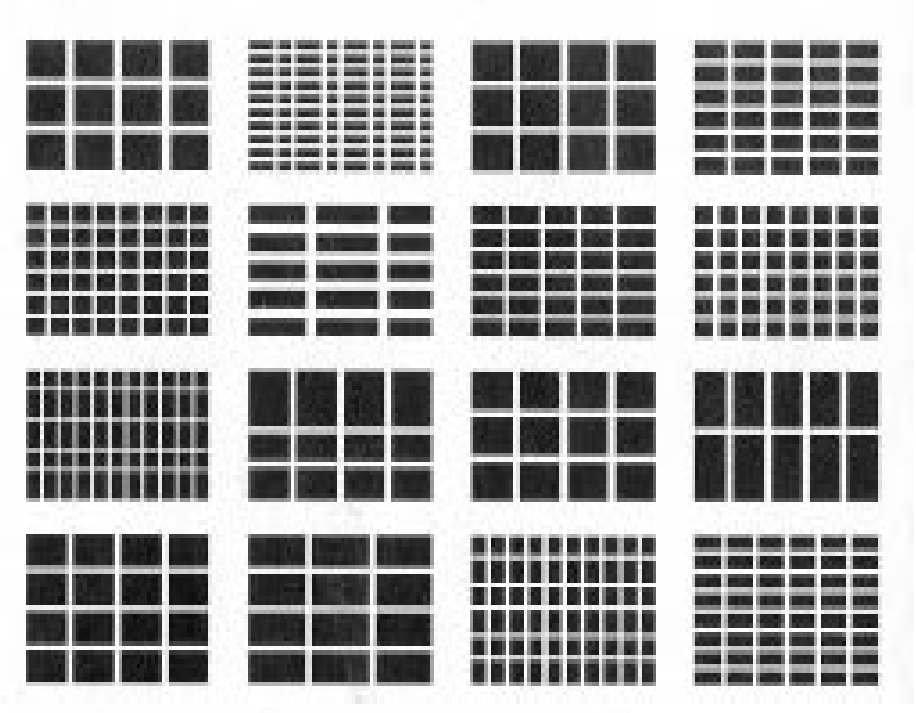
The event as an element in the process of design is integrated in the project for Cincinnati University, College of Design, Architecture, Art and Planning Design, by Peter Eisenman. As a comment to this project Sanford Kwinter writes:

> There is a new theory of nature emerging today – one based on dynamics, complexity, discontinuities, and events – a new (though still inchoate) architecture that embraces these same fundamental rhythms of free becoming. The 'structures' that interest the late 20th century are no longer those of isolated Forms in disposition, or even in motion, but embedded matter in the throes of creation, that is, in free and continuous variation and combination with external forces, perpetually intervening and releasing new capacities, attributes, mixtures, states.[42]

One can also mention that Daniel Libeskind refers to the long tradition of German expressionism in Berlin, and sees himself as part in this tradition.[43]

An empirical typology of urban raster

In the last centuries European cities have expanded by conquering new land and subduing it with spatial organisation. The European city is therefore a city with new



1.1 Urban Grids. From left to right. First row: Buenos Aires, Aix-en-Provence, Santiago, Aranjuez; Second row: Petra, Manhattan, Turin, San Sebastian; Third row: Montpazier, Philadelphia, Barcelona, Berlin; Fourth row: Bilbao, Madrid, Athens, Trieste.

city layers marked by different times. It means that the European city is a large patchwork where different parts have different orders, and this simultaneity of different spatial orders is one of the characterising features of the European city.

It has been that way in the past, and it will surely be so in the future. A total logic, a total urban raster, is not a possibility in the future just as it wasn't in the past. But inside the parts of the patchwork, in the fragments of the city, it is possible to create urban design in both two and three dimensions, where three-dimensional container types are combined with the two-dimensional urban raster that organise the ground level.

There are general concepts for organising space through the sectioning and organisation of the ground level. The urban raster has 3-dimensional implications. The concept of the raster is used as metaphor, and is defined as lines per centimetre. A raster has a geometry and a density. And it appears as black/white or figure/ground. This is the abstract definition of the urban raster.

The Grid

Generally the most well known urban raster is the grid. It often appears as a rectangular net, where the single thread in the net has a width that corresponds to the street or other open spaces.

The grid has a long history of development from Antiquity and Roman military cities to the last five hundred years in Europe. The fact that the grid was the main tool for organising fortified Roman cities means that it still exists today in the historic centre of many European cities.

The grid can also exist as a baroque axial grid, as for instance in the grid in Friedrichstadt in Berlin, where

the axis runs towards large geometrical squares such as Leibziger Platz, Pariser Platz and Brandenburger Tor, and the roundabout Mehrings Platz.

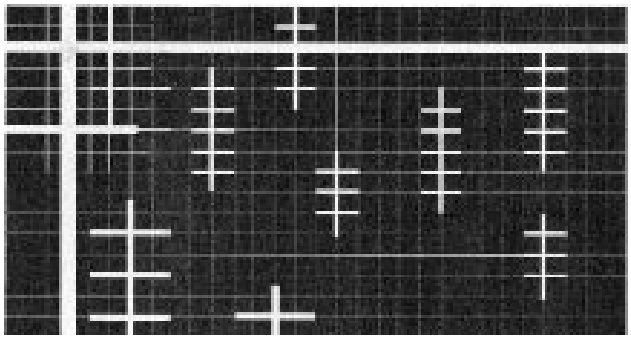
At the CIAM-congress in 1930, Le Corbusier presented the project 'Ville Radieuse' which was based on the grid – not an infinite and equal grid, but the grid in a closed figure. As such, this type of grid is very much like the baroque grid, and differs much from the more modern undifferentiated grid. Moreover, the grid in the project of Le Corbusier is not the border of the buildings, which is the case in the baroque and the early modern grid types.

Le Corbusier had already created the ideal city plan, named Ville Contemporaine, in 1924 – a plan based on these ideals. The master plan is organised as a large grid net. The plan is sectioned with several diagonals, and their crossing indicates important points in the city. The total plan is classical with centrality and symmetry. Smaller building structures are partly closed in form and partly open towards the central city, which is the location for 24 cross-formed skyscrapers with 60 storeys for offices. The traffic is concentrated on two axes; north-south and east-west.

In the 19th century the grid was the most common organisational principle. It existed as the baroque grid, but also as an undifferentiated grid as for instance in the city plan for Barcelona by Cerda, and in the plan for Manhattan in New York. In Cerda's plan for Barcelona, the grid creates a homogenous urban space, without direction, and therefore quadratic, prepared for relatively homogeneous building masses. This equal structure is, however, divided by major streets, Avinguda Diagonal, Avinguda Meridiana, Gran Via, and the large boulevard Passeig de Grácia related the old city to the new.[44] The squares in the grid are 113 m x 113 m, and the buildings were supposed to be raised only on two sides of the squares, which would secure sufficient daylight for the residents. The urban design was not originally prepared for the urban block as it developed later, but was a plan for freestanding slabs formulated as an urban concept nearly 80 years before the modernists adopted it as a part of their agenda. Cerda's city plan for Barcelona is still today an inspiration for the development of new types of urban space and new hybrids of containers, as forms in between the urban block and the slab.

According to Bosse Bergman, the Manhattan grid net was the urban plan for liberalism. The urban squares were easy to parcel out and to build-on, and their content was determined by free competition. But perhaps it was the best and most provident city plan, if we take into consideration that the year was 1811; the prairie in the west still belonged to the Indians, and nobody had seen a train.[45] And according to Rem Koolhaas, it was Simeon de Witt, Governor Morris and John Rutherford that made the plan for Manhattan, based on twelve avenues in a north-south direction and 155 streets going east/west. In this way they proposed a city made of 13 x 156 = 2028 blocks. The urban raster creates a 2 dimensional order, but establishes a freedom in 3 dimensions.[46]

This grid plan, more than other system of street organisation, is an undifferentiated and continuous pattern that organises the different parts of the city in an equal way. It makes a continuous space of streets, where every point is accessible and easily related to



any other point. There are no cul-de-sacs. It is obvious that the grid can be differentiated in many different ways. For instance around public squares and different width of the streets. According to Bosse Bergman on Manhattan there are two different sizes of block; 244 m, and 122 m length, both with a 61 m width – and the street width is either 30.5 m or 15 m.[47]

Organisation based on the grid has dominated for centuries, both in the baroque, and in the city of blocks

from the late 19th and the beginning of the 20th century. And it seems that it still is used in modern large-scale urban projects, where it successfully integrates the skyscraper, for instance in the Daimler Benz project on Potsdamer Platz in Berlin.

The Linear Raster

Another type is the linear raster used in the linear city. An urban raster characterised by an unequivocal direction of organisation and development as a parallel linear system; a direction of organisation in relation to the lines of transport and communication.

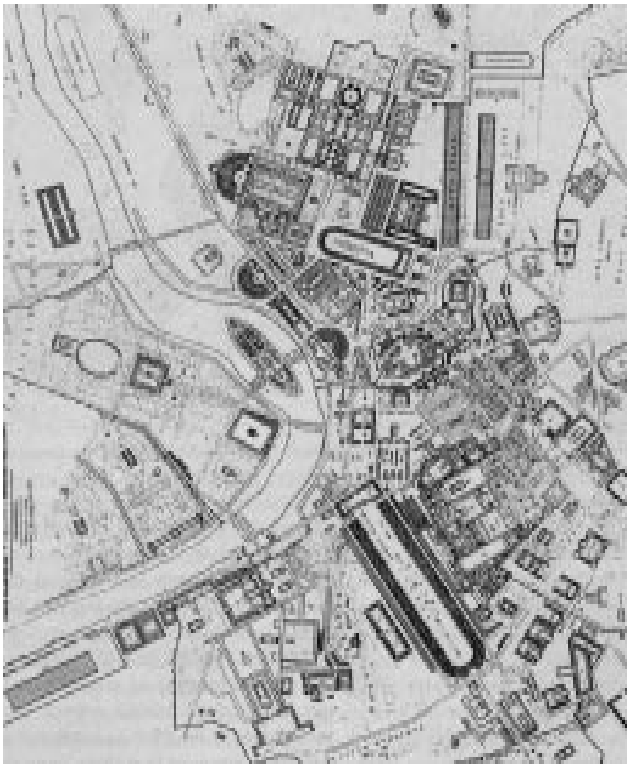
In the late 1900's the Spanish engineer Soria y Mata did some early research on the linear city. Both Mata and Cerda were interested in the communication in the city, and both used this interest as a challenge to give the city form. Soria y Mata created a project for the linear city in 1882, Ciudad Lineal in a suburb to Madrid.[48]

The linear city was discussed in the Soviet Union in the 20's. The revolutionary transformation of society had to change the way the city was organised, and there were different projects for linear cities.[49] For instance, Miliutin's plan for Stalingrad (Volgograd)[50] and the project for Magnitogorsk by Ernst May in 1930.[51]

In the late 1920's, the Soviet government wanted to develop a new city in the Urals in connection with a steel factory. According to Miliutin's theory the city was organised in 6 parallel zones: 1. Train zone, 2. Industrial zone, 3. Green zone, 4. Housing and institutions, 5. Park zone, 6. Agriculture zone. Miliutin also made a project for Magnitogorsk in 1929 based on these principles. The plan was never realised. These principles were also leading principles for the project by Ernst May at Magnotogorsk.

Miliutin also created a project for a linear city in relation to Stalingrad with continuous structures of production, city units and green areas. In this plan the linear principle is made of 5 different zones: 1. Train zone, 2. Housing zone, 3. Second zone of communication, 4. Industrial zone, 5. The Volga River.

The original theory on the linear city is developed in relation to transport and structures of communication. Some of the most urbanised regions in Europe today function as linear cities in terms of their mega size, and their ties to communication and production structures.



Imperial Rome, plan after Canina, c.1834 (from Collage City)

At a smaller scale, traffic lines are developed and cut through existing city fabric. The early ring roads as we know them from Vienna, or on a lesser scale in Aarhus, are related to the traditional compositions of the city. New development along the new ring traffic system seems to follow its own composition of traffic as relatively free from the city fabric. It created a new type of city related to regional traffic and structures of communication and the flow of people, and at the same time filled up the emptiness between the traffic structures and the city fabric behind. It is the elements of the ring road that are researched by Willem Jan Neutelings.[52]

The Danish Ørestad could be an example of the linear city. The competition for the Ørestad was won by Aaro Artto, Teemu Palo, Yrjö Rossi, Hannu Tikka and Matti Kaijansinkko in 1995. The Ørestad is a long, narrow city

organised around linear lines of communication, and having only little architectural connection to the older parallel structured Amager.

Some main elements in the city are the large water elements, the boulevard and the city train from north to south. The parts of the city are located randomly along this linear structure. This new city is primarily guided by large elements in the landscape and by infrastructure. Located as the second layer are the built quarters for housing and offices. In this way the Ørestad and the linear city are based on the same concept: a city primarily determined in the direction of development by landscape and infrastructure, even though the Ørestad is not based on linear zone separation as the historical models were.

The Antenna Raster

Newer urbanism in the last century was first and foremost organised using the urban antenna raster.

We all recognise the antenna or the tree structure in city landscapes, but this form of organisation has been analysed by the American Albert Pope.[53]

The urban antenna raster is an abstract form of organisation for parts of cities and the road net, often organised as a spine with radiations to the sides, and organised according to fractal principles. In a system of larger and smaller antennas in fractals, they can become a form of urban organisation. An abstract analogy to the tree could also illustrate the hierarchical organisation of a closed system.

The antenna is the most dominant urban raster realised in Europe after World War II. Areas were organised with separate functions and built specifically for housing, industry, offices or recreation. They were related to the city via road connections that no longer had the character of streets shielded by the facades of the houses. These roads were connected to the general network of communication. In the contemporary cartography of the city these lines of communication dominate in both form and scale; a total system of highways, ring roads, motor traffic roads, main streets, secondary roads, traffic-protected smaller roads and paths for biking and walking. This system of the antenna exists in both the suburb and in some parts of the city centres.

However, the antenna is the dominating principle in the modern suburb. And it relates the different parts of the sprawl – the scattered neighbourhoods, with housing, a school and a shopping area separated from other neighbourhoods by green areas, a manageable unit for spending your spare time. This is a concept based on zoning, and neighbourhoods based on housing.[54] Basically the organisation of the antenna is hierarchical in communication structures.

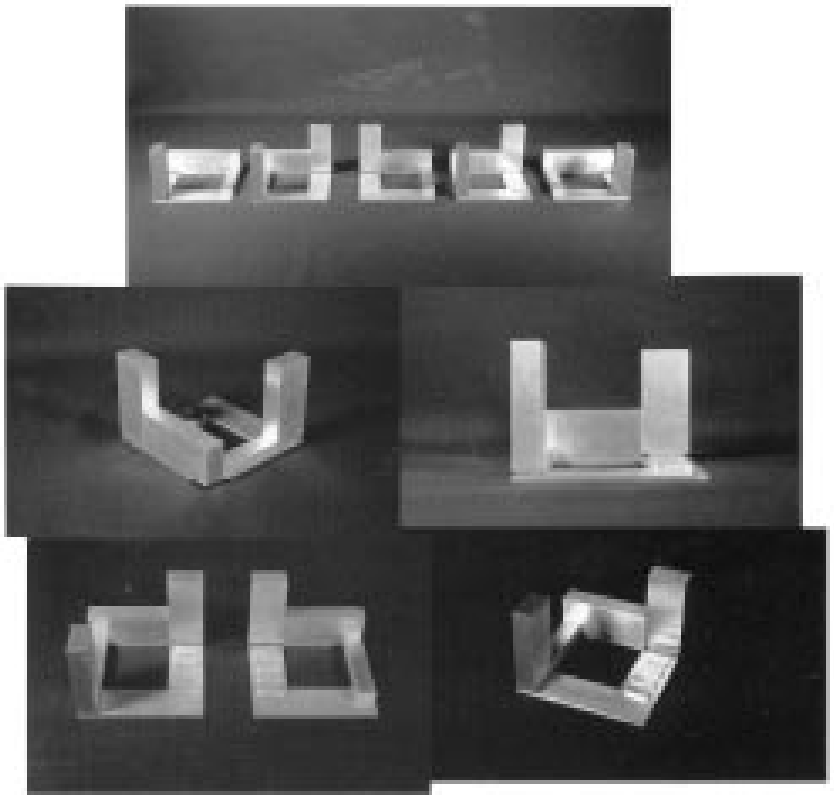
But these basic principles are also found sporadically in the centres of the city. According to Albert Pope, the injection of the antenna in the city centres is disintegrating the existing grid. It cuts down the integrated network of the grid, and makes isolated pockets in the city such as cul-de-sacs. This centripetal development for Pope means that all continuities are disrupted and displaced by distinct figures. These are fields of the ghetto. According to Albert Pope the grid, especially in the American City, is becoming something else. The implosion in the city changes the grid to the antenna, and generates contradictory systems of order.[55]

At the CIAM-conference in Brussels in 1930, the modern movement argued against the urban block, but this also became an attack on the urban grid as an urban raster.

Walter Gropius proposed in the lecture entitled, 'Flach-, Mittel- oder Hochbau?',[56] a division of the urban block into 3 slabs, and the illustrations to the lecture showed 2 parallel roads instead of 4 roads around the block. In addition, it was only the green areas that were given attention, not the spaces related to traditional urban street life.

In this way it was decisive to minimise the expenses to traffic infrastructure. The cul-de-sac and the green areas were not only introduced for ideological reasons, but also in an attempt to keep down the expenses for urban development.

In the functionalist housing projects in Denmark you find that the street has been expelled – in Blidah Park from 1933–34, in Søndergårdsparken from 1949–55, in Bellahøj from 1951–56. And this has continued in the development of areas of the city until today where the antenna raster is almost considered an inevitable



Hybrid between the Urban Block, the Slab and the Tower. Eduard Bru: Poblenou Sea Front

structure of nature.

The Collage Raster

In contrast to such an ordered and thorough structure as the antenna, it seems that many city areas are organised in relation to an urban raster that could be characterised as collage raster, this based on the theoretical research in the book Collage City written by Colin Rowe and Fred Koetter. The collage raster can be defined as accumulation of set-pieces in collision.[57]

Rowe and Koetter describe Villa Hadriana as a miniature Rome, without one single idea of control. Hadrian did not need a totality but proposed the opposite – an accumulation of isolated ideal fragments. And to capture this quality of accumulated ideal fragments they introduced the concept of 'bricolage' – a concept with the intention of capturing the special character of 17th century Rome, with many closed compositions existing with some ad hoc material in between.[58] A dialectic of ideal types and empirical context. These are the urban qualities that Rowe and Koetter described with the concept ofn'bricolage', and which I have freely renamed collage raster. In my opinion it is not just an urban quality, but also a type that can be described very differently than other types of urban raster.

This type of urban raster and its spaces are very rare in urban design, but are not seldom the result of the development of different parts of the city and their clashes with each other. Whatever the reason, either natural landscapes as rivers, cliffs, or historical differences in urban design, this type can be characterised as closed urban enclaves based on their own systems of order, existing separately with some indefinable stuff in between.

In 1987 OMA entered the competition for a new city 'Ville Nouvelle Melun-Sénart' – one of the new cities to be situated in the ring around Paris. Their project was based on a number of strips and islands.[59] The strips are geometrically random system; strips that are linear voids. These strips contain many different functions, public and private, recreational and commercial, production and leisure, building and landscape, and malls, headquarters for offices, a university campus, original landscapes, and others.

The islands cut out of the strips are random in shape. They are negative forms shaped by the different voids. The islands are areas for housing with different densities, structural types and architectural ideals and their development over time would be in relation to the shifting ideals and demands in the areas. Every island has total autonomy.

This plan could be seen as a collage raster. The islands are developed and shaped according to their own logic and systems of order. And they are arranged together with the help of some undeniable stuff called void. A void that is more or less filled with treated surfaces, objects or landscapes.

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The Atomised Urban Raster

The atomised urban raster – or non-structure structure is a type that tries to escape any typology. The atomised urban raster is a peculiar construction and very rare in urban design. It fits some projects for planning and architecture in the 1980's and the 1990's. These are projects that deny the common principles of order such as for instance the grid or the antenna, and instead try almost to freeze a chaotic event as a structure. The structure may be produced by accident or through a special reading of the context of the site.[60] The structure is geometrically characterised by not being produced by a specific geometry. On the contrary, the relation between the parts of the structure, such as angles, axis, etc., is defined by relations and scales and determined accidentally.

We are confronted here with a raster that becomes a principle bynnot having the regularity that the other raster possess. It is very rare in history to plan a geometrical and perhaps spatial chaos, and an organisation of urban spaces with very high complexity.

As an example of the use of this raster the project for Parc de La Villette in Paris by Bernard Tschumi – a project that uses superimposition as a strategy – can be mentioned. This strategy produces randomly defined relations between the layers of the plan. The object of the project was the transformation of a large area in Paris, an area that was a part of the production structure of Paris containing for instance slaughterhouses and manufacturing facilities. The project integrated the existing elements of production and a system of canals by superimposing a new structure over the existing urban elements.

This new structure is atomised and superimposed, and is formulated as an anti-structure, consisting of points, lines and surfaces. Each is an independent structure. The net is a grid, which is superimposed, but not hierarchically controlling. Reminiscences exist

from earlier spatial models of organisation, but a hierarchy is not in existence, nor is the grid unfolded. In this way the project clearly differs from the others.

Potential and limitations of the typological approach

The concept of typology has often been criticised when it has been used as a design method. As such it can be rigid and impose restrictions to developing new architecture. However, this concept has been accepted as an analytical tool in historical research and in projects for the reconstruction of historical buildings and parts of the city.[61]

As mentioned earlier, the concept of typology is often vague and flawed with ambiguity. Often the existence of type is seen as restricted to the period before modernism, rather than a more general concept that is not restricted to a certain period, but that also exists in modern and post-modern architecture as well. Modernism also used types, even though they were not considered as such. In this general concept, types can easily be an innovative tool to develop the urban environment and its architecture.[62]

As mentioned earlier however, the concept of type has difficulties describing buildings that are developed via free rhythms.[63] And the concept of typology has even more difficulty when it comes to open systems than when it deals with traditional closed compositions. The concept of typology has a tendency to be general and abstract, an overview that does not catch the local differences, but assumes formal, geometrical measurability, which is not often the case in the complexity of the real world. These limitations in the concept of typology will perhaps be more present in the contemporary development of our urban systems and built containers.

First of all, the concept of typology used in my research is developed to analyse urban relations between the site, or lot, and the urban building, and not developed to describe buildings placed in the landscape. And if there is a tendency to interrelate landscape and urbanity, there will be many cases where the concept of type is irrelevant.

Secondly, there are tendencies to develop new, as yet undefined hybrids of containers, where a typological description would not be the most interesting observation.

Moreover, the concept of typology is problematic with regards to the specific qualities of places and local differences, and has to be supplemented with more local research. It is obvious that the typological characterisation of the geometrical form of a square is not sufficient to capture the qualities and atmospheres of specific urban neighbourhoods in the cities of say, London and Paris. Even if the squares have the same formal description, the local research will show other major differences.[64]

Typology has its limitations, but being aware of that, it has still been beneficial to research typical forms in the urban landscapes of Denmark from the 1950's to the 1990's. I have in my earlier book, Space and the Architectonic Object,[65] and in accordance with the standpoints of Greg Lynn stated that there are no absolute forms, and some forms have only gained importance by being used through centuries. Today, these simple forms have no special relationship to the understanding of the cosmos, as they once may have had, still they dominate our design of architecture and urban development. In this sense they exist and are of importance, though they must not prevent us from continuing to develop architecture and urbanity in relation to contemporary challenges.

I have attempted to practice an analytical method that is influenced by a wish to present a neutral morphological approach to modern urbanity, thereby escaping the ideologically slanted debate about different 'isms' that has continued over the past 10–20 years. A debate that easily begins prioritising stylistic differences rather than being about the clarification of spatial relationships between building, building complexes and urbanity.

It is my contention that a more neutral morphological analysis based on the concepts of container and urban raster, is useful in understanding the material conditions for potential existing in everyday life, and in architectural and planning practises. Analysis of these

basic forms of architectural intervention in the urban is a fundamental premise for understanding, and thereby for the intervention in, and the transformation of, contemporary urbanity.

Notes

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